

Language Evolution:
The View from Restricted Linguistic Systems

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Language Evolution:

The View from Restricted Linguistic Systems

Edited by

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LOT

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Preface

This volume offers a sample of the work on the theme *Restricted linguistic systems as windows on language genesis* done by a research group at the Netherlands Institute for Advanced Study (NIAS) in the 2005-2006 academic year. A central concern of the group was to investigate facets of the evolution of language – as one of the forms of language genesis – by adopting what has come to be known as the "Windows Approach". Two ideas are fundamental to this approach: the recognition that no direct evidence of the evolution of language has survived, and the working assumption that at least some facets of the evolution of language can be studied by investigating other phenomena about which there is direct evidence. The group pursued in depth the idea that linguistic systems which are restricted in terms of formal means and functions can legitimately serve as "windows" on language evolution. In particular, the group examined the "window" potential of pidgins and related contact varieties, of the linguistic systems acquired naturally by adults learning a second language, of homesigns and other sign language systems and, finally, of early non-grammaticalized language as well.

All chapters in this volume arise from extensive additional work on draft articles or papers presented at conferences. Chapter 1 outlines the conceptual framework employed in various other chapters; it can, accordingly, be used as an introduction to them. In addition, each chapter includes an Abstract that provides a good idea of what it is about. Many of the outcomes of the work by group members have been or will be published elsewhere in the form of articles, chapters of books, and full-length monographs. Details of such further publications are to hand in the references supplied in various chapters.

Without the generous support, financial and otherwise, given by NIAS, it would not have been possible for the members of the group to work on the "windows" project, either individually or collectively. On behalf of all group members, too, we would like to express our gratitude to the NIAS management and staff for the numerous ways in which they contributed to making our stay in Wassenaar so productive and pleasant. Last, but by no means least, we are most grateful to Connie Park for the professional way in which she has gone about compiling and reformatting the manuscript of this volume.

Rudolf Botha, Stellenbosch/Utrecht
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1. What are windows on language evolution?

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Abstract

This chapter offers an elucidation of the idea that certain phenomena provide windows on language evolution. Non-metaphorically, such windows are shown to be conceptual constructs used for making inferences about aspects of language evolution from data or assumptions about properties of phenomena other than language evolution. Putative windows need to meet certain conditions to ensure that the inferences allowed by them are properly grounded, are warranted and are pertinent. Windows are shown, moreover, to vary in the nature of the inferential step for which they provide, in the purposes for which they are used and in the ways in which they are used. From the perspective of these differences, windows are seen to belong to different types: correlate windows, analogue windows and abduction windows. The heuristic potential of the Windows Approach lies not only in its ability to allow the drawing of non-arbitrary inferences about language evolution, but also in its ability to stimulate in-depth empirical work on the phenomena from whose properties those inferences are drawn. Throughout the chapter, general points are illustrated with examples drawn from the respective putative windows based on pidgin languages, on Middle Stone Age shell beads and symbolic behaviour, and on similarities between modern language and music.

1.1 Introduction

Accounts of the evolution of human language have to overcome a formidable obstacle. Such accounts, by their very nature, express claims about why, when, where or how human language emerged and/or developed in a distant past. But there is no direct evidence about the events and other factors that may or may not have been involved in the first emergence and subsequent development of language in our species. In modern work on language evolution, however, various approaches have been adopted for overcoming the obstacle posed by this paucity of direct evidence. One of these is known as the 'Windows

Approach'.¹ It proceeds from the assumption that language evolution can be insightfully studied by examining other phenomena about which there is direct evidence. These other phenomena are taken to offer windows on language evolution. Thus, it has been contended that features of language evolution can be 'seen' by 'looking at' it through windows offered by phenomena such as fossil skulls, ancestral brains, prehistoric symbols or symbolic behaviour, prehistoric sea-crossings, modern music and song, so-called language genes, and modern motherese. And in the view of various linguists, certain restricted linguistic systems – specifically pidgin languages, homesign systems used by deaf children of non-signing parents, the linguistic systems acquired naturally by adult second-language learners, non-grammaticalised early language and agrammatic aphasic language – provide windows on language evolution that have considerable heuristic potential.² This view is expressed in various contributions to this volume, too, including Benazzo (this volume), De Swart (this volume), and Roberge (this volume).

So what are they – these windows on language evolution? On the whole, it must be frankly admitted, their nature and properties are in various respects less than well understood. This is why the present chapter will take up the following questions:

- (1) (a) What kind of objects are windows on language evolution?
- (b) What is it that determines how good an individual window on language evolution is?
- (c) What are the main types of windows that have been used in the study of language evolution?
- (d) Wherein lies the heuristic potential of the Windows Approach to language evolution?

In discussing these questions, the article will draw on a considerable body of recent work, including work reported in (Botha, 2003, 2006a, 2006b, 2007, 2008a, 2008b, 2008c, to appear).

Before turning to questions (1)(a)-(d), however, I have to clarify the compound concept of 'language evolution' that will be adopted below. As for its first constituent, the concept of 'language', this will be used restrictively to include (a) the capacity referred to by such expressions as 'the human language

¹ The other approaches to language evolution include the comparative approach (Hauser, Chomsky and Fitch, 2002; Fitch, Hauser and Chomsky, 2005) and computational simulation (Cangelosi and Parisi (Eds.), 2002; Perfors, 2002).

² See, for example, Bakker (2003), Bickerton (1990, 1995, 1998), Heine (2003), Heine and Kuteva (2004), Jackendoff (1999, 2002), Klein (2001), Perdue (2003), Ragir (2002), Slobin (2002).

'capacity' and 'the human language faculty', and (b) the systems referred to by such expressions as 'the first form of human language', 'ancestral language' and so on. Used in this way, the concept of 'language' does not include what has been referred to as 'speech' or 'mechanisms involved in speaking and listening'.³

As for the concept of 'evolution' – the second constituent of 'language evolution' – I will likewise be using this in a restrictive way below: to include the processes or events referred to as (a) the 'origin, emergence or first appearance (of language in the human species)', and (b) the 'subsequent development of the first form of language into full language (in the human species)'. Used in this restrictive sense, the concept of 'language evolution' represents the phenomenon that has also been referred to as 'language phylogeny/phylogenesis'. And it accordingly excludes the processes or events making up what are known as 'historical or diachronic changes in full languages'.⁴

1.2 Nature of windows

What kind of objects, then, are windows on language evolution? In general terms, a phenomenon X is considered to offer a window on a distinct phenomenon Y if by 'looking at' X it is possible 'to see' something of Y. This point can be illustrated here with the aid of three putative windows on language evolution:

The Shell-Bead-Symbol Window: By 'looking at' certain properties of a number of Middle Stone Age marine (tick) shells excavated at Blombos Cave (near Still Bay in South Africa), it can 'be seen' that the humans who inhabited the cave some 75,000 years ago had so-called fully syntactical language (Henshilwood et al., 2004: 204; d'Errico et al., 2004: 17-18; Botha, 2007b). To elucidate: The properties of the shells include physical ones such as the following: (i) the type of perforation in the shells is rare in nature and difficult to explain as the result of natural processes; (ii) the shells have flattened facets; (iii) four of the shells show microscopic traces of red ochre on their insides and

³ For this restrictive concept of 'language', see for example, Klein (2001: 85-87). It is of course not maintained that speech or other linguistic entities do not have evolutionary histories of their own. For elaboration on this point, see Botha (to appear).

⁴ On Bickerton's (2007: 263) construal of this distinction, whereas language evolution is the process of biological evolution that yielded the language faculty, language change is the subsequent cultural recycling of variants possible in that faculty. For some other non-evolutionary processes excluded from such restrictive concepts of '(language) evolution', see Botha (2006a: 132).

surfaces. These and other properties of the shells are taken to indicate that they were worn as beads in necklaces, a point to which we will return below.

The Music Window: By 'looking at' certain similarities between modern language and music, it can 'be seen' that language and music evolved from a common precursor, referred to as 'musilanguage' (Brown, 2000: 272-273) or 'Hmmmm' (Mithen, 2005: 26; Botha, 2008c). To elucidate: As for the similarities between language and music: on Brown's (2000: 273-275) analysis, both music and language are characterised by 'phrase formation' which involves a limited number of discrete fundamental acoustic units, rules of combinatorial syntax, and rules of expressive phrasing.

The Pidgin Window: By 'looking at' the order of constituents of pidgin language sentences, it can 'be seen', that the ancestral stage of language known as 'protolanguage' used Agent First and Focus Last as semantically based principles of linear ordering for its strings of elements (Bickerton, 1990: 187; Jackendoff, 1999: 275; Botha, 2006b).⁵ To elucidate: As a stage of ancestral language, protolanguage used arbitrary, meaningful symbols which were strung together in utterances that lacked any kind of syntactic structure (Calvin and Bickerton, 2000: 137, 257). Agent First is the ordering principle which says that in strings, Agent is expressed in the subject position. In terms of this principle, the string *hit Fred tree* means 'Fred hit the tree' and not 'the tree hit Fred'. Focus Last says that informationally focal elements appear last in a string. In accordance with this principle, in the utterance *In the room sat a bear*, the subject appears at the end for focal effect.

To characterise windows on language evolution in terms of expressions such as 'looking at', 'seeing' and the like is to use metaphorical language, 'windows' of course representing the root metaphor. So what would a window on language evolution be in non-metaphorical terms? In such terms, a window on language evolution is a conceptual construct for making inferences about language evolution. That is, to – metaphorically – 'see' a property of some aspect of language evolution by – metaphorically – 'looking at' a property of some other phenomenon is – non-metaphorically – to infer the first property from data or assumptions about the second property. The inferences drawn with the aid of windows on language evolution can, for ease of reference, be called 'window inferences'. Similarly, the phenomena – MSA marine shells, pidgin

⁵ Agent First is claimed to be used also (i) by the Basic Variety – which is an early stage in the untutored acquisition of a second language by adult learners; (ii) by homesign systems – which are systems of communicative gestures created spontaneously by deaf children who are not exposed to conventional spoken or signed language; and (iii) by the language of agrammatic aphasics (Jackendoff, 1999: 275).

languages, etc. – from whose properties such inferences proceed can be referred to as 'window phenomena'.

Structurally, it is possible to draw a distinction between compound and non-compound windows on language evolution. In the case of a non-compound window, a single inferential step is taken in order to draw a conclusion about an aspect of language evolution from data or assumptions about a putative window phenomenon. Accordingly, the structure of a non-compound window can be schematically represented as in figure 1.1.

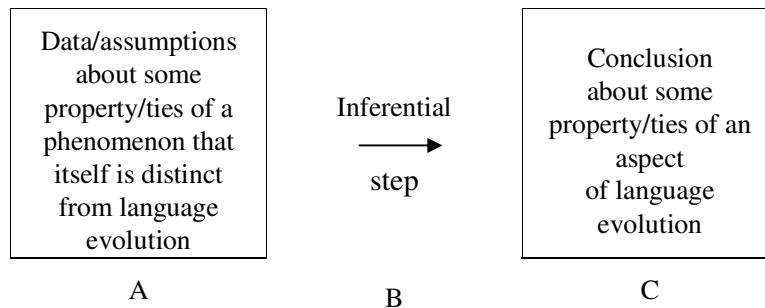


Figure 1.1: Basic structure of a non-compound window on language evolution

The putative Pidgin Window referred to above represents a non-compound window: starting from data or assumptions about properties of pidgins, a single step of inference leads to a conclusion about certain properties of protolanguage on accounts such as those by Bickerton (1990) and Jackendoff (1999) (see Botha, 2006b). Roberge (2008), however, holds an interesting different view of what can be seen through the Pidgin Window.

The Shell-Bead-Symbol Window, by contrast, is a compound window, using a series of three inferential steps for getting from data or assumptions about MSA tick shells to a conclusion about the syntax of the humans who inhabited Blombos Cave some 75,000 years ago. That is, this window is formed by a chain of three non-compound windows.⁶

The Shell Window: From data or assumptions about properties of a number of MSA tick shells, it is inferred that these shells were worn as beads by the humans who inhabited Blombos Caves some 75,000 years ago. To elucidate: Some of the (physical) properties of the tick shells have been mentioned above.

⁶ For an alternative analysis in terms of which the chain is made up of two non-compound windows only, see Botha (2008a).

The Bead Window: From assumptions about the latter beads – or rather the beadworks of which they formed part – it is inferred that these humans engaged in symbolic behaviour. To elucidate: In terms of one of these assumptions, the beads were worn as personal ornaments.

The Symbol Window: From assumptions about the symbolic behaviour of these humans, it is inferred that they had 'fully syntactical language'. To elucidate: In terms of a core assumption, the symbolic behaviour involved transmitting and sharing of symbolic meaning, an assumption to which I will return in section 1.5 below.

The Shell-Bead-Symbol Window, thus, instantiates the structure that can be schematically represented in figure 1.2.

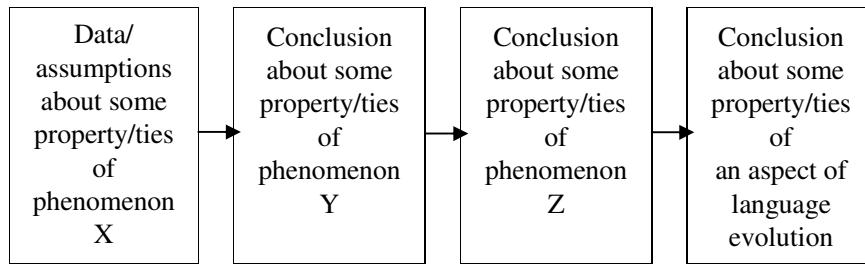


Figure 1.2: Structure of the Shell-Bead-Symbol Window

The Shell-Bead-Symbol Window shows that a distinction should be drawn between windows 'facing directly on to' language evolution and windows doing so indirectly only. The Symbol Window is an example of the former kind, making it a 'direct' window on language evolution. The Bead Window, by contrast, 'faces directly on to' MSA symbolic behaviour and the Shell Window on to MSA beads. This makes them 'indirect' windows on language evolution.

Before considering question (1)(b), the idea of a window on language evolution needs to be clarified in two further ways. First, the expression 'window on language evolution' has a more formal and a less formal use. More formally, it refers to constructs with the structure portrayed in figure 1.1, i.e., conceptual constructs made up of (minimally) three components – those indicated by A-C. Less formally, by contrast, the expression 'window on language evolution' has been used to refer to only the phenomenon or phenomena identified in box A; that is, in this second use, the expression refers to what may be called more accurately the 'window phenomenon' or 'window phenomena'. Note how this second use allows the phenomena – the fossil

skulls, the pidgins, motherese and so on – to be cryptically portrayed as themselves being the windows on language evolution.

Second, a distinction has to be made between the expression 'window on language evolution' and the concept of 'window on language evolution'. The concept applies to any and all instances of an inference where a conclusion about an aspect of language evolution is drawn on the basis of data assumptions about a phenomenon that is distinct from language evolution. The latter data assumptions have conventionally been said to provide 'indirect evidence' for the claim about the former aspect of language evolution. Thus, to instantiate the concept of 'window on language evolution', an inferential device of the kind under consideration does not need to have been called a 'window on language evolution' in so many words.

1.3 Conditions on individual windows

Individual windows on language evolution have merit to the extent that they make it possible to draw non-arbitrary inferences about language evolution. To be non-arbitrary, the inferences need to meet a number of fundamental conditions, three of which will be considered below. The first – the Groundedness Condition – applies to the data or assumptions about the window phenomenon – represented in box A of figure 1.1 – from which the inference proceeds. This condition says that:

- (2) Inferences about language evolution need to be grounded in accurate data or non-arbitrary empirical assumptions about window phenomena that are well understood.

It is clearly not possible to learn anything about language evolution from a phenomenon that is identified incorrectly, analysed superficially or understood poorly in some other way.

But what does the Groundedness Condition involve in concrete terms? The Shell Window – i.e., the first constituent of the Shell-Bead-Symbol Window – satisfies the Groundedness Condition particularly well. That is, the inferential step allowed by it is grounded in data – about properties of MSA shells – that have been collected, analysed and appraised with great care by the team of archaeologists excavating Blombos Cave.⁷ The Music Window, by contrast, is rather problematic from the perspective of the Groundedness

⁷ For particulars, see d'Errico et al. (2004) and Botha (2008a). The inferential steps provided for by the two other constituent windows – the Bead Window and the Symbol Window – are less well grounded, as has been argued by Botha (2008a).

Condition. The inference proceeds from what are claimed to be similarities between modern language and modern music. On closer analysis, however, the putative similarities turn out to be between speech and music, language having been erroneously identified with speech.⁸ Brown (2000: 273) maintains, for instance, that the discrete units of language are acoustic units and that the basic acoustic properties of language are modulated by expressive phrasing. As far as the grounding of the inferential step is concerned, the Pidgin Window is problematic too, being constructed with the aid of an insufficiently restrictive concept of 'pidgin language'. This concept refers to an internally undifferentiated range of contact varieties, including those that have been referred to as 'pre-pidgins', 'incipient pidgins', 'prototypical pidgins' and 'elaborated' or 'expanded pidgins'. Prototypical and elaborated pidgins, however, are structurally too complex for their properties to provide a window on those of protolanguage.⁹

For a window on language evolution to be able to meet the Groundedness Condition, then, the window phenomenon needs to be a well-understood phenomenon. And most of the window phenomena from whose properties inferences have been drawn about language evolution cannot be understood by being subjected to direct observation or relatively simple forms of inspection. In empirical work, the only means of getting to understand phenomena such as prehistoric symbolic behaviour, ancestral brains, pidgin languages and modern language and music is to form non-arbitrarily appraisable theories about them. These theories – which may be called 'grounder theories' – need to underpin (analyses of) the data or the assumptions from which window inferences are drawn.¹⁰

The second fundamental condition to be met by windows on language evolution applies to their conclusions, in box C of figure 1.1. This condition – the Pertinence Condition – can be stated as (3).

- (3) Conclusions about language evolution need to be pertinent in being about (a) the 'right thing' and (b) the 'right process'.

The 'right thing' here is language and not speech, language behaviour or some other linguistic entity. And the 'right process' is the evolution of language in the species and not processes of change – e.g., diachronic processes – to

⁸ For further examples of Brown's attribution of properties of speech to language, see Botha (2008c).

⁹ For further discussion of the insufficiently restrictive nature of the concept of 'pidgin language' at issue, see Botha (2006b: 2-3, 10-11).

¹⁰ For further discussion of this point, see Botha (to appear).

which full languages are subject. The Pertinence Condition seems so obvious that it may seem hard to imagine how it will ever fail to be met. Yet, the literature contains many instances of conclusions about language evolution which fail the condition. Violations of subcase (a) result from conclusions which are about an entity that is not actually language or, worse, which are unclear as to what entity they are meant to be about. A common failing here is the confusion of language with speech, as is evidenced by Brown's conclusion that language and music had a common precursor.¹¹ Violations of subcase (b) result from conclusions which are about a process that is not actually language evolution, or worse still, which are unclear as to what process they are meant to be about. For example, assuming without appropriate justification that conclusions about the historical process of grammaticalisation are statements about the (phylogenetic) process of language evolution would be a questionable step from the perspective of subcase (b).¹²

To ensure that conclusions about language evolution are properly pertinent, they need to be underpinned by various theories. The first is a linguistic ontology: a theory giving a principled characterisation of the large-scale linguistic entities that are believed to populate the linguistic domain. These entities include language, a language, the human language capacity or language faculty, tacit knowledge of language, language behaviour, speech and other modalities of language use, linguistic skill and so on.¹³ The second theory needed for underpinning conclusions about language evolution is one that draws, along the lines indicated in section 1.1 above, a principled distinction among the various processes of evolutionary and non-evolutionary change.

The two theories considered above are not the only ones needed for underpinning conclusions about language evolution. This is illustrated by the conclusion that the humans who lived at Blombos Cave some 75,000 years ago had 'fully syntactical language'. This conclusion is empty if it is not clear what 'fully syntactical language' is being assumed to be. In empirical work on language evolution, it simply is 'not on' for the substance of such an assumption to be arbitrarily stipulated by means of some simple definition.¹⁴ What is required, instead, is a principled theory of syntax. The point is indeed quite general: conclusions about the evolution of any component or aspect of

¹¹ For a discussion of various other instances of this failing, see Botha (2006a: 138-139; to appear).

¹² For elaboration on this point, see Botha (to appear).

¹³ For a fuller characterization of what a linguistic ontology is a theory of, see Botha (to appear).

¹⁴ The need to underpin the conclusion in question with a principled theory of syntax and the consequences of the failure to do so are discussed in some depth in Botha (2008a, to appear).

language need to be underpinned by a principled theory of that component or aspect.

The third fundamental condition for windows on language evolution applies to the inferential step represented by the arrow C in figure 1.1. This condition – the Warrantedness Condition – states that:

- (4) In empirical work, the inferential steps leading to some conclusion about what language evolution involved need to be suitably warranted or licensed.

To see why this condition is needed, note that the following question arises about the inferential steps allowed for by all windows on language evolution: 'Why is it proper to infer properties about some aspect of language evolution from (data or assumptions about) properties of some window phenomenon?' For example: 'Why is it proper (i) to infer from properties of the symbolic behaviour of MSA humans that they had 'fully syntactical language'; (ii) to infer from putative similarities between modern 'language' and music that they had a common precursor; (iii) to infer from the fact that pidgin language sentences have a certain order of constituents that protolanguage strings had it too?' These questions ask for a warrant or license for the inferential steps in question. Such warrants cannot be stipulated; they need to take the form of bridge theories. A bridge theory is an empirical theory of how some specific phenomenon – e.g., MSA symbolic behaviour, pidgin languages, similarities between music and 'language' – is interlinked with a materially distinct phenomenon – e.g., an aspect of language evolution. The function of a bridge theory is, accordingly, to interrelate phenomena in two distinct ontological domains in a way that makes it possible to move inferentially from the one to the other.¹⁵ The inferential steps provided for by the Symbol Window, Music Window and Pidgin Window are still to be underpinned by explicitly stated and empirically justified bridge theories.¹⁶ These windows, that is, are still 'under construction'.

The structure of non-compound windows has been merely represented skeletally in figure 1.1. From a consideration of three of the fundamental conditions to be met by non-compound windows, their structure has been shown to be more complex, incorporating as it does a layer of submerged theory too. More fully, the structure can now be represented by figure 1.3.

¹⁵ On the need for and nature of bridge theories, see Botha (2003: 147ff.; 2006a: 137).

¹⁶ For elaboration on these points, see Botha (2006b: 12, 2008a, 2008c).

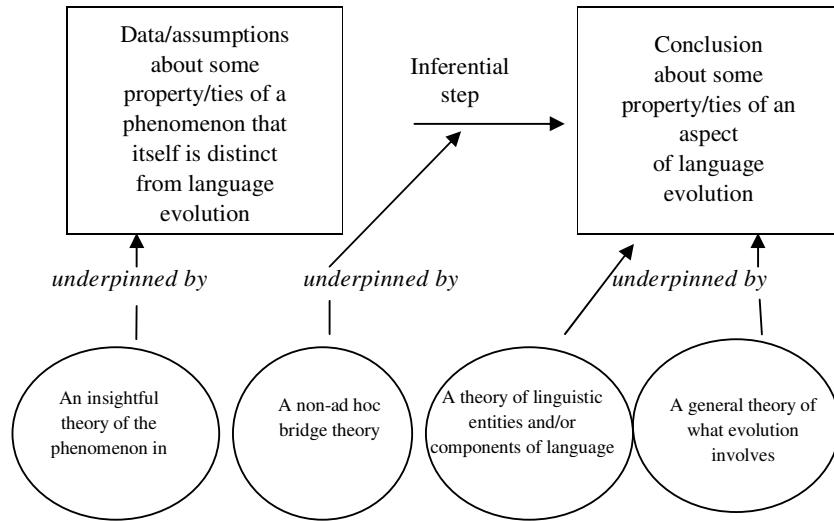


Figure 1.3: Filled out structure of a non-compound window on language evolution

The three conditions discussed above apply to non-compound windows. Compound windows – i.e., windows comprising a series or chain of non-compound windows – have to meet a fourth condition, the Coherence Condition stated as (5):

- (5) Two non-compound windows that are adjacent components of a compound window need to cohere properly: the conclusion of the first needs to present a basis for the inferential step of the second.

Thus, in the case of the compound Shell-Bead-Symbol Window, the conclusion drawn with the aid of the Shell Window should present an empirical basis for the inferential step provided for by the Bead Window whose conclusion, in turn, should present an empirical basis for the inferential step allowed for by the Symbol Window.¹⁷

¹⁷ For some discussion of whether the Shell-Bead-Symbol Window fully meets the Coherence Condition, see Botha (2008a). Botha (2006a: 141-142) offers a further illustration of the import of this condition.

1.4 Window types

Windows on language evolution come in a great variety of shapes and sizes, as it were. They differ, for instance, in regard to (a) the phenomena from whose properties conclusions are drawn about language evolution, (b) the aspects of language evolution about which these conclusions are drawn and, fundamentally, (c) the nature of the inferential steps by which these conclusions are drawn. From the perspective of these steps, a distinction can be drawn among correlate windows, abduction windows, and analogue windows, which we consider in turn.

The Shell Window, Bead Window and Symbol Window are correlate windows. That is, the phenomena from whose properties inferences are drawn about aspects of language evolution are taken to be correlates of these aspects. Thus, the MSA marine shells excavated at Blombos Cave are considered correlates of the beads worn by the inhabitants of the cave; these beads are taken to be correlates of the symbols used by them; and these symbols are believed to be correlates of a particular form of language they used. In the case of the Symbol Window, the correlation is that of 'being an essential requisite for'. That is, in the view of Henshilwood, d'Errico and their co-authors (Henshilwood et al., 2004: 404), 'fully syntactical language' is an essential requisite for symbolic behaviour. 'Being a requisite for' is but one of the ways in which a correlation can be manifested. Two entities X and Y can also be correlated in that 'X causes Y', (or 'X results from Y'), 'X precedes Y in time' (or 'X follows Y in time'), 'X is located in Y or in the proximity of Y', and so on. These expressions are indicative of the nature of the inferential steps provided for by correlate windows.

The Pidgin Window and the windows based on other restricted linguistic systems are analogue windows. That is, the inferential steps that they allow for are instances of analogical inference. Thus, with respect to certain properties, pidgin languages are believed to be analogues of protolanguage, making it possible to draw from known properties of pidgins conclusions about unknown properties of protolanguage. Restricted linguistic systems are not the only kind of linguistic phenomena that have been used as the basis of analogue windows on aspects of language evolution. An analogue window on language evolution has, for instance, been constructed by Dean Falk (2004) on the basis of properties of modern motherese which she describes as the 'sing-song way in which parents vocalize to their infants' (p. 491). Motherese represents a special register of language use (it does not represent a restricted linguistic system). It has the substance of rhythmic, melodic speech sound which is used by caregivers for expressing emotion and for manipulating the behaviour of infants. From these properties of motherese, Falk infers by analogy, for instance, that

(i) the early hominin mother-infant communications – which formed the prelinguistic foundations of so-called protolanguage or protospeech – had the substance of 'prosodic vocalizations', (ii) were used initially in an emotive function, and (iii) developed later into an instrument for manipulating the behaviour of others (Falk, 2004: 491, 501).¹⁸ Inferences such as these vary in regard to the strength of the analogical relation in question: that strength can be assessed in terms of both formal and non-formal criteria, something which has not yet been attempted by scholars who have used analogical windows in the study of language evolution.¹⁹

In regard to type, the Music Window is neither a correlate nor an analogue window: it is an abduction window. The inferential step provided for by this window represents an inference from phenomena requiring an explanation – some similarities between so-called modern language and music – to a hypothesis – that modern language and music had a common precursor – which must furnish the explanation. This inference, accordingly, represents the first stage in a mode of inference called 'abductive reasoning' by Charles Sanders Peirce (1958). Since as a rule there are several alternative hypotheses by which a phenomenon can be explained, abductive reasoning requires a second stage on Peirce's account. In this stage, one of the alternative hypotheses is selected as the one offering the best explanation of the phenomenon, normally by virtue of its being 'simpler' than the alternatives. In the spirit of Peirce, Brown (2000: 277) has invoked a notion of 'simplicity' in choosing among the various hypotheses which could provide an explanation of the similarities between language and music: he prefers the 'musilanguage' hypothesis since 'it greatly simplifies thinking about the origins of music and language'.²⁰

Correlate, analogue and abduction windows do not represent alternative means of drawing inferences about language evolution. Being complementary, they differ not only in the kind of inferential step they allow for but also in what they are used for and in how they are used. Thus, correlate windows have been typically used for drawing conclusions about 'external' aspects of language evolution involving, for example, the time when and place where some form of language was used first. Analogue windows, in turn, have been typically used for drawing conclusions about 'internal' aspects of language evolution, including the function and structure of early forms of language and

¹⁸ For an analysis of the Motherese Window constructed by Falk (2004), see Botha (2008b).

¹⁹ For discussion of some of these criteria, see Hesse (1963), Moore (1996: 278-279) and particularly Wylie (2002: 147-153).

²⁰ His selection of the 'musilanguage' hypothesis over the alternatives, however, is questionable, as is shown by Botha (2008c).

including also the agents, phases and processes that featured in the evolution of early forms of language into full(er) language.

Recent work on the way in which rudimentary homesign systems have been transformed into a full sign language in Nicaragua can serve as further illustration of the latter point. According to Senghas, Kita and Özyürek (2004), this has happened since, amongst other things, the minds of the deaf children involved in the process do two things in particular: (i) they dissect gestures into primitive elements, and (ii) they recombine these elements into linear sequences. These processes, it is claimed, are used by the minds of successive waves of deaf children in the process of learning homesign systems. And it is contended that these two language-learning processes shape fuller sign systems into discrete and hierarchically organized systems. Engaging in analogical reasoning, Senghas and her co-authors (2004: 1782) tentatively infer that the two language-learning processes in question could have been involved in the formation of the first human languages.

Correlate and analogue windows are used in pursuing direct questions about 'external' and 'internal' aspects, respectively, of language evolution. Such questions are so-called fact-demanding questions (Hurford, 2003: 38): questions about, for instance, the time when, the place where, the purpose for which, the circumstances under which, the way in which or the properties with which a particular stage or form of ancestral language first appeared or subsequently evolved. Abduction windows differ from correlate and analogue windows in this regard, being used in addressing questions about properties of modern language, music and other related phenomena. Thus, the hypothesis that language and music had a common precursor, namely musilanguage, was not arrived at in pursuing the question 'What was the precursor of modern language or music?'; on the contrary the musilanguage hypothesis represents an answer to the question 'Why do modern language and music share certain features?'²¹

1.5 Heuristic potential of Windows Approach

Let us consider, in conclusion, the question of wherein the heuristic potential of the Windows Approach lies. Primarily, this approach is meant to make it possible to draw non-arbitrary inferences about what language evolution might or might not have involved. To unlock this part of the heuristic potential of the approach, however, it should be used in the right way. That is, to be non-

²¹ Hurford (2003: 38) holds that the goal of the study of language evolution should be to explain properties of contemporary language. Constructing abduction windows represents one means of pursuing this goal.

arbitrary, window inferences need to be properly grounded, warranted and pertinent. This means that an integral part of 'window' work on language evolution involves drawing upon or constructing the theories from which window inferences can derive these three 'good-making' properties. As shown above, these theories include grounder theories, bridge theories, linguistic ontologies, theories of language and so on. The only alternatives to drawing upon or constructing these empirical theories are unconstrained speculation or arbitrary stipulation. Engaging in such speculation or stipulation would be the wrong way of using the Windows Approach.

The heuristic potential of the Windows Approach, however, is not restricted to what it may reveal about language evolution. For instance, the attempts at properly grounding some inferences about language evolution are likely to spark new questions about window phenomena, a point that may be illustrated with reference to the Symbol Window. Recall that this window has been used to infer that inhabitants of Blombos Cave had 'fully syntactical language' some 75,000 years ago. This inference, it has been contended, can be grounded in assumptions about the symbolic behaviour in which these people engaged. But in relevant literature, that behaviour is characterized in quite general terms only: as behaviour involving the 'sharing' and 'transmission' of symbolic meanings.²² To be able, however, properly to ground the inference to the possession of 'fully syntactical language', it is necessary to know what that behaviour involved in the way of specifics. In this connection, questions such as the following arise:

- (6) (a) What are the symbolic meanings that were 'shared' and 'transmitted' by the inhabitants of Blombos Cave?
- (b) Were these meanings 'shared by' all the cave dwellers or only by particular groups or individuals?
- (c) By whom were these symbolic meanings 'transmitted' – all the inhabitants of the cave, only a particular subgroup of them or only certain individuals?
- (d) To whom were these symbolic meanings 'transmitted' – all the inhabitants of the cave, only a particular subgroup of them or only certain individuals?

In the absence of specifics such as those asked for in these questions, it is not clear which inhabitants the 'fully syntactical language' can be properly

²² See, for example, d'Errico et al. (2003: 6), d'Errico et al. (2004: 17-18), Henshilwood and Marean (2003: 636), Henshilwood et al. (2002: 1279), Henshilwood et al. (2004: 404).

attributed to. Finding answers requires further work, including the construction of an empirical theory of the MSA symbolic behaviour under consideration.²³

Consider next what is involved in giving an appropriate warrant for the inferential step leading to the conclusion that the inhabitants of Blombos Cave had 'fully syntactical language' some 75,000 years ago. This warrant is alluded to indirectly only in the relevant literature (Henshilwood et al., 2004: 404) in the statement 'Fully syntactical language is arguably an essential requisite to share and transmit the symbolic meaning of beadworks and abstract engravings such as those from Blombos Cave.' For warranting the inference at issue, however, more than this bare assumption is needed. That is, one would need such specifics as those asked for in the following questions:

- (7) (a) Why was 'fully syntactical language' necessary for 'sharing' and 'transmitting' the particular symbolic meanings or symbolic meanings of the particular kind?
- (b) Why could these meanings not have been 'shared' and 'transmitted' by means of a less fully evolved stage of ('syntactical') language or by some non-verbal means of communication?
- (c) How do meanings for the 'transmission' of which 'fully syntactical language' is a requisite differ in essence from meanings that can be 'transmitted' by less fully evolved language or by non-verbal means?

These questions arise from the adoption of the Windows Approach; finding answers to them requires the construction of an empirical theory of the transmission of symbolic meanings in general and MSA symbolic meanings in particular. Clearly, then, these questions further illustrate the ability of this approach to stimulate empirical work on phenomena that may be indirectly linked to language evolution.²⁴

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²³ For further illustration of how the adoption of the Windows Approach can generate interesting new questions about window phenomena, see Botha (2006a: 134-136).

²⁴ For further examples illustrating this aspect of the heuristic potential of this approach, see Botha (2006a: 136-137; 2006b: 12).

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2 The emergence of temporality: from restricted linguistic systems to early human language

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Abstract

Temporality is a fundamental category of human cognition which, in contrast to animal communication, is encoded in elaborate ways in every modern language. Following the windows approach, this chapter investigates the development of temporal relations in simple linguistic systems of different natures – early varieties of untutored L2 learners and homesign systems of deaf subjects – and discusses the possible implications for language evolution. The comparison of linguistic systems arising in quite different circumstances allows for the identification of recurrent developmental patterns and thus provides a more robust empirical basis for projections on early language.

2.1 Introduction: research topic and aims

In the debate on language evolution several studies deal with time in language. Pinker and Bloom (1990), for instance, consider the expressive power of human language in the domain of temporality as one of the features showing its complex adaptative design, while Pinker and Jackendoff (2005) list tense and aspect markers among the devices that make human language special (in addition to syntactic organization), although they do not involve recursion *per se*. In a similar vein, Victorri (2005) highlights how natural languages allow the speaker to talk about dynamic situations anchored in time in a simple and straightforward manner and wonders about the role of narration for the evolution of temporal and aspectual marking. In fact, temporality is a fundamental category of human cognition, which is encoded in elaborate ways in every modern human language. Any language presents a full array of devices (adverbial, verbal or grammatical) to express the aspectual and temporal properties of a situation, i.e. broadly speaking, to comment on its distribution over time (continuous, iterative, habitual, etc.) and to situate its overall time of occurrence. Conversely, it is usually assumed that early forms of human language lacked a certain number of syntactic properties and were initially confined to the immediate perceptual reality of the *here&now*, most of

animal communication being generally considered as situation-specific.¹ How is the gap between such extremes to be bridged?

The research topic of this chapter concerns precisely the development of temporality in a linguistic system: the aim is to gain insight into the primordial temporal relations that may have been expressed in early forms of language and their possible elaboration towards modern full language. The empirical evidence used for this purpose comprises data from untutored second language acquisition – early varieties of adult learners (cf. in particular the 'Basic Variety') and from homesigns, i.e. the gestural systems of deaf subjects not exposed to conventional sign languages. Both cases represent spontaneous developmental processes leading to the emergence of communicative systems which are simpler than conventional language and therefore will be used as 'windows' onto language evolution. They arise, however, in quite different circumstances and imply a different modality (spoken vs. manual). Their comparison allows for a distinction to be made between recurrent developmental patterns from process- or modality-specific ones, and thus to provide a more robust basis for projections on language evolution.

The chapter is organized as follows: after providing some background information on the windows considered (section 2.2.), the expression of temporal relations in early stages of L2 acquisition and in homesign systems will be dealt with (section 2.3.). Building on this empirical basis, section 2.4 addresses early language, proposing a logical sequence of steps for the emergence of temporality, which will then be discussed with respect to some widespread models of protolanguage.

2.2 Preliminaries on the 'windows' considered

The debate concerning language evolution has provoked a renewed interest in forms of linguistic organization as attested in pidgins, homesigns, early child language, early second language varieties, special cases like that of Genie, etc. (cf. Bickerton, 1990; Jackendoff, 1999, 2002; Comrie, 1992, 2000; Goldin-Meadow, 2002; Morford, 2002, etc.). These correspond to partially different processes – implying language acquisition or disruption in language transmission – but share one common denominator: they give way to linguistic systems that are initially simpler vis-à-vis fully fledged languages. Following

¹ According to Johannsson (2005), it is actually an open issue to what extent functionally referential calls in spontaneous animal communication carry symbolic meaning like human words (p.128). Hauser et al. (2002) underline that 'unlike the best animal examples of putatively referential signals, most of the words of human language are not associated with specific functions' (p. 1576) and may be 'detached from the here & now'.

Botha (2004), they can be defined as 'restricted' both in terms of the formal means they have at their disposal and as regards the expressive power they display,² and as such can suggest intermediary steps between primitive forms of language and the complexity of modern ones; in other words they can be used as windows³ onto an evolutionary phenomenon that has left no direct evidence behind. This article follows the windows approach by investigating the expression of temporality in 'restricted linguistic systems' resulting from two different processes: early second language varieties developed by adult untutored learners and the communicative systems of deaf subjects who were deprived of linguistic input, i.e. homesigns.

'Untutored adult language acquisition' – the process by which adult subjects acquire a second language outside the classroom – would appear to be a promising window onto the process of language evolution (cf. Jackendoff, 1999, 2002; Klein, 2001; Perdue, 2006). Any subject, be it child or adult, faced with the task of acquiring a conventional language, does not purely imitate the input model. Yet the systems developed by children show, from very early on, the specific linguistic features of the target language to which they will conform in the end (cf. Slobin, 2005). On the other hand, adults are notoriously bad imitators: in contrast to the child, the adult learner very often ends up with a system which differs considerably from the target language, a phenomenon known as fossilization. This result can be attributed to different causes: the presence of a first language, changes in the learning capacity or input paucity. Moreover, especially in an untutored situation, the learner's initial goal is not necessarily to adhere to the target language norm but to convey the message: priority is given to the effectiveness of communication rather than its correctness. In fact, adult learners seem to be less able or willing to copy what they hear in comparison to children.

The initial systems developed by adult learners do not seem to be strongly influenced by their L1 either. Research on untutored second language acquisition (the case of immigrant workers studied in the ESF project, cf. Perdue, 1993) has shown that learners representing different pairings of source and target languages initially develop a very similar linguistic system, which has been called a 'Basic Variety' (Klein and Perdue, 1997): a target language-

² In Botha's terms: 'the concept of *restricted linguistic system* is used to refer to a form of language (a) which – in all cases – uses a limited range of the formal and/or semantic means that characterise fully-fledged languages, and (b) which – in some cases – performs only a limited range of the functions of fully-fledged languages' (2004: 4).

³ As pointed out by Botha (2006), an observable phenomenon X can be a window on an analog but distinct and inaccessible phenomenon Y, so that by studying properties of X one can draw inferences about Y. Here the analogy is based on the emergence of a linguistic system.

like lexicon is organized on the basis of pragmatic and semantic principles which are largely independent of the source/target language specifics.

Given that early stages of L2 acquisition do not correspond to a relexification process (strong influence of the L1) nor to a piecemeal imitation of the target language (the available model), they have been interpreted as:

- (a) reflecting creative processes of the underlying human language faculty (Klein, 2001);
- (b) representing a linguistic organization that is neutral with respect to the grammaticalized features of a specific language (Perdue, 2006);
- (c) applying fossil principles from protolanguage, which modern languages often observe and frequently elaborate on (Jackendoff, 1999).

The features just mentioned make early L2 varieties a potentially valid window onto language evolution: their study allows the researcher to observe the emergence of a new communicative system with a creative dimension, and the whole process is relatively well described. However, even if a direct influence of the specific languages in contact seems to be rather limited, it is not clear to what extent the experience of language itself affects the developmental process, at least with respect to temporality: after all, the adult learner enters the L2 acquisitional process with a conceptual system fully developed during the process of first language acquisition. The comparison with the communicative systems resulting from another ontogenetic process, namely homesign systems, plays a crucial role at this point.

'Homesigns' is the widely used term to designate the gestural communicative systems spontaneously developed by deaf children born into a hearing family, when deprived of contact with a conventional sign language. The work of Goldin-Meadow and colleagues extensively describes the emergence of language-like properties in homesigns: their accounts highlight that it is the deaf subject who creates the gestural system, starting with the minimal input that is represented by the co-speech gestures of the hearing environment, introducing novel gestures and elaborating the organizational properties of this repertoire (caregivers' gestures do not display the same systematic organization). Note that, despite different gestural input, children around the world seem to develop similar systems, the main notable difference being the emblems typical of their cultural environment (cf. Wang et al., 1995; Goldin-Meadow et al., to appear). This remarkable similarity is likely to be due to the high level of iconicity that deaf subjects must keep in their signs if they want to be understood by their hearing communicative partners; moreover, their structuring points to children's basic abilities to segment, analyze and

recombine gestural elements perceived in a meaningful context. Deaf subjects born to hearing families may still live in environments that do not provide them with exposure to institutional sign languages, even in adulthood. Studies on adult homesigners are few in number (cf. section 3.2), but they suggest that a deaf child's communicative system may become more complex as a consequence of cognitive maturation and according to social integration with the hearing environment (cf. Cuxac, 2005).

The case of homesigns represents a unique situation: they constitute the first language of the deaf subjects (and therefore, in contrast to L2 acquisition, the influence of an antecedent language should be ruled out); in addition, unlike ordinary L1 acquisition, the influence of a specific target language can be excluded as well. The absence of a conventional linguistic model forces the creative features of the process not only at utterance level (grammar to combine items) but also at word level (invention of conventional symbols). On the other hand, their study represents a rather recent field of research: there are only few studies which describe how temporality is expressed in child and adult homesigns.

The remainder of this article therefore describes the progressive expression of temporal relations in early L2 varieties; the developmental pattern thus obtained is then used as a basis for comparison with the available evidence from adult and child homesigns. Language is basically modality-independent and no position will be taken here on the advantage or relative primacy of the manual modality over the spoken one in language evolution (on this subject, cf. Corballis, 2003). Rather, the comparison intends to distinguish recurrent developmental patterns from features that could be related to the specific circumstances of the processes in question (presence vs. absence of a previous language and of a model, spoken vs. manual modality). Given the different salient conditions in which such systems arise, if similarities are found between early L2 varieties and homesign systems, (a) an increasingly powerful argument can be made for the non effects of environmental factors on the development of L2 varieties and (b) they would constitute a more robust empirical basis for projections on early language.

2.3 The expression of temporality: empirical data and analyses

2.3.1 Temporality in untutored adult SLA

Previous studies using SLA as a window onto early language have focused on the Basic Variety (henceforth BV): its simple grammar, its stable state and its relative independence from the specific features of the languages in contact makes this stage particularly relevant for projections on early language and will

therefore occupy a central place in this section. In order to capture the developmental dimension of early stages in L2 acquisition, we include a description of how temporality is expressed in the stages preceding and following the BV (cf. 'prebasic' and 'postbasic' varieties: Klein and Perdue, 1992, 1997; Dietrich et al., 1995). Note that the data having led to the identification of the Basic Variety are based on the oral production of adult untutored learners (typically immigrant workers) representing ten different pairings of languages (cf. Perdue, 1993 for details). For practical reasons, most of our examples are given in English and French, but the remarks are also valid for L2 Dutch, German and Swedish.

For the description of temporal relations, three basic operations will be considered: the localization of situations in time, their distribution over time (continuous, accomplished, etc.) and their respective ordering (situation A taking place *before*, *after* or overlapping with situation B). While focussing on how such operations are realized in L2 (and then in homesigns), reference will be made to Klein's model of temporality (1994). Three time variables are relevant to this end: the time of utterance (TU) or speech time, the time talked about or topic time (TT), and the time of the situation itself (Tsit). The topic time corresponds to the temporal span for which the assertion is claimed to hold. *Tense* is viewed as the relation between TT and the deictic TU: in the present tense the TT overlaps with the TU, in the past tense the TT precedes TU, and in the future tense the TT follows TU. In contrast to the topic time, the Tsit refers to the time span the situation occupies on the temporal axis. Grammatical aspect relates the TT to the time of the situation: for example in the perfective aspect the TT follows the Tsit (the situation is presented as completed before the asserted time interval), while in the imperfective aspect the TT is included in the Tsit (the situation is viewed as ongoing).

2.3.1.1 Prebasic variety

The initial L2 repertoire consists of some unanalyzed target language expressions and a set of lexemes roughly corresponding to target-language-like nouns, adjectives and adverbs. These items have a sound/meaning correspondence, but no clear grammatical specification. If verb forms are present, they have a rather 'noun-like' use or in fact they are difficult to categorize at all (cf. Perdue, 1996, 2006): for instance /lemanze/ (literally *the-eating*) in French L2 can mean both 'food' and 'eat'; conversely, in an utterance like *Charlie eingang* (literally *Charlie entrance* in German L2) the nominal expression *eingang* could be reconstructed either as a noun or as a verb, while in *Charlie weg strasse* (literally *Charlie away street*) it is the invariable particle *weg* which conveys the concept of movement. Given the absence of clear verb

forms, this stage is defined as based on *nominal* utterance organization, but it could also be called *preverbal* utterance organization (cf. Klein and Perdue, 1992). Utterance constituents may seem unconnected, but they are regularly related by a pragmatic principle: constituents having background status precede those having focus status (*focus last*). The following narrative passage, a film retelling, exemplifies some typical features of a prebasic learner's production:⁴

- (1) petit chien et garçon + à glace
small dog and boy + to/on ice
- et garçon + boum glace
and boy + boom ice
- et chien ++ sos
and dog ++ sos

At this stage learners' personal or fictitious narratives show the regular use of the Principle of Natural Order⁵ like in (1): events are recounted following their chronological order of occurrence. In the absence of any explicit linking device between propositions, this principle allows the inference of consecutivity between events. Thus, although there is no temporal expression in (1), an implicit AFTER relation holds between the events mentioned: a boy and a dog go to a frozen lake, then the boy involuntarily breaks the ice layer, then the dog helps him. In contrast to fully fledged languages, where the principle of natural order also applies, learners do not have any formal means to overrule it.

Prebasic learners' production generally needs the native speaker's scaffolding. The prebasic repertoire, however, always includes some explicit means to express the temporal reference of the situation talked about (its Topic Time). The temporal span for which a situation holds is usually unmarked when it corresponds to the deictic utterance time or to a temporal interval introduced in previous discourse, but noun-like or adverbial-like items – in particular CALENDARICAL expressions like *Sunday*, *tomorrow* or *1970* – are used

⁴ The following conventions are adopted to transcribe learners' production: + means an unfilled pause; ++ a longer unfilled pause; *...* encloses a sequence in a language other than the target language; NS stands for Native Speaker.

⁵ This discourse organizational principle is assumed to be the more natural way to recount events (or the unmarked way for linearizing complex information), as it facilitates the retrieval of events from memory by the speaker as well as inferences by the hearer (cf. Levelt 1989: 308).

very early to fix a different time reference.⁶ This mechanism is clearly exemplified in (2): the temporal anchoring of the first utterance is maintained as topical information from the native speaker's question, and therefore left implicit (like the topical entity *husband*), while the calendrical expressions *tomorrow* and *Monday* of the following utterances make explicit the temporal shift from the initial deictic *now*.

- (2) (NS: what about your husband?)

*en el * hopital

*Sp. *in the** hospital

demain ++ permis...

tomorrow permit (=to leave the hospital)

et lundi à l'hôpital

and Monday to the hospital

As for main constituents, the POSITION of temporal expressions in the utterance mirrors their pragmatic status: *tomorrow* and *Monday* are placed in the utterance-initial position to express the time interval for which the predicate is asserted, while they would occupy an utterance-final position if the temporal information they conveyed were the focal element.

To summarize, the prebasic system is on the whole heavily context-dependent: the interpretation of learner utterances demands strong pragmatic inferences in order to retrieve the relations holding between entities at sentence level (cf. rarity of identifiable verb forms) and between utterances (cf. rarity of connectors). In spite of these expressive limitations, learners quickly develop explicit means to express 'temporal displacement', in other words they find ways to overcome the dependency on the contextual *here&now* or the native speaker's contribution (cf. also conclusions in Perdue, 1993: 103).

2.3.1.2 Basic Variety

The following stage is marked by the emergence of clearly recognizable verb forms and their arguments, around which the utterance gets structured. The presence of thematic verbs allows the learner to make use of different types of

⁶ In principle any NP referring to a situation having a temporal dimension can be used for this purpose. In *pause film + ausgang mit freund und fräulein* (film break + exit with friend and young lady; Dietrich et al., 1995: 82), it is the NP 'film break' that signals the temporal span for the action 'leaving the cinema'.

valency: the semantic principle *agent first* is thus added to the still predominant *focus last*. Verb morphology, if present, is not yet functional (hence the label of 'verbal' or 'non finite utterance organization'): learners use either a unique form in different temporal contexts or variable forms in free alternation. In (3), for example, the learner produces a verb form (transcribed in phonetic symbols), which is pronounced like the target language present tense form, while the assertion concerns the past.

- (3) (NS: what are you doing here? Are you working?)
avant je [travaj] / maintenant non
before I work / now no

The system is still very simple: it shows a transparent interplay of semantic and pragmatic principles, while grammatical devices such as case marking, functional verb inflection (marking agreement, tense or aspect) and subordination are still absent (cf. Klein and Perdue, 1997). Learners can, however, express a dense web of temporal relations via the following means:

- In addition to their structuring power as for utterance organization, UNINFLECTED VERBS and their arguments make explicit the inherent temporal features of the situation talked about, its **Aktionsart**, making it possible to distinguish between states and activities/events, punctual or durative situations;
- Items of verbal or adverbial nature (verb stems like *start*, *finish* or *stop* in English, but also adverbial forms like *fertig* in German L2), sometimes even unanalyzed chunks (like *çayest* in French L2), are added to the system to mark the left or right **boundary** of a situation (e.g. *work finish* roughly corresponding to *when work is over*);
- An increasing number of **temporal adverb(ial)s** enrich the prebasic repertoire. Following a functional classification they minimally include:
 - temporal adverbials expressing the POSITION of the situation on the time axis in an absolute (*Sunday, 1975*), deictic (*last week*) or anaphoric way (*later, after, before*);
 - a few temporal adverbials expressing the FREQUENCY of situations (*always, often, twice...*) and their DURATION (usually bare nouns as *2 hours, 4 days*).
- Items equivalent to AFTER and BEFORE express relations of order between situations; the presence of an overt marker for two (partially) overlapping situations (*when*) is subject to individual variation (cf. Dietrich et al., 1995). With respect to the previous stage, these items

allow the speaker to signal breaks in the chronology of events (*before*) or to provide a complex temporal reference (*when*) for the upcoming predicate.

The contribution of temporal adverbials and boundary markers is highlighted in (4)-(5), which are typical discourse fragments of this stage:

- (4) nine o'clock in er + work *start*
half past two *finish...*
monday I gone in the hospital and speak doctor

- (5) (about the learner's husband)
el de vacances *el* mois de juillet
Sp. he *some holidays**Sp. the* *month of July*

et moi /fe/ de le cours
and me do the course (=she has to follow a course)

y août moi de vacances *y el* de travail
Sp. and *August me holidays and* *Sp. he* *(some?) work*

The sequential ordering of constituents is still mainly determined by principles of information structure (cf. Dimroth et al., 2003): accordingly, temporal adverbials establishing the Topic Time are very often utterance-initial, as they have scope over the entire proposition (as *before* in (3) or *August* in (5)), while temporal adverbs expressing the TSit (as *month of July* in (5)) or quantifying the situation are in non-initial position, because they belong to focus information (cf. also Starren, 2001). Linear position thus mirrors semantic influence in a transparent way.⁷

In comparison to the previous stage, the BV displays rich potential for the expression of temporal relations, *implicitly* via a combination of discursive and pragmatic principles and *explicitly* thanks to essentially lexical means. Time reference is explicitly realized by an increasing repertoire of time adverbials, but spatial expressions can also contribute to its expression: thus *Punjab I do agricultural farm* is to be interpreted as '*when I was in Punjab...*'. The temporal anchoring of the utterance is however still left UNMARKED, as in the prebasic stage, (i) when it is topical information maintained from previous discourse, (ii) when it is inferable from discourse organizing principles like the

⁷ The same sort of semantic transparency holds for negation: the negator precedes the constituent it has scope over (cf. also de Swart, this volume).

principle of natural order (= PNO) in narratives), or (iii) when it corresponds to the deictic utterance time (*default present reading*), unless contrasted with another temporal span (as in (3)). Although this system gives way to frequent misunderstandings during interactions with native speakers, the BV in itself is rather effective for the localization of situations in time; this said, it presents some severe shortcomings as far as aspectual perspective is concerned: situations can be quantified (if repeated) or marked as 'completed', but there are no specific means to give another aspectual viewpoint, nor to mark simultaneity. As pointed out in Dietrich et al. (1995: 273) an utterance like *when in Italy I go Rome* can be attributed different readings: a 'single case' reading (*when I was in Italy I went to Rome*), an 'habitual' reading (*when I was in Italy I used to go to Rome*) or a 'generic' one (*whenever I am in Italy I go to Rome*). Despite the above shortcomings, many adult learners stop the acquisitional process here, i.e. they may add other lexical items to their repertoire, but the system as such remains stable (fossilization): its communicative possibilities are apparently rich enough to get along in most everyday situations.

2.3.1.3 Postbasic varieties

Further development leads to the emergence of the target language specific features for utterance organization (emergence of the subject function, subordination, cleft constructions, etc.) and of grammatical means to encode TENSE and/or ASPECT. Several studies point to the development of an '(inflected) AUX + (ininflected) Vlex' structure before main verbs are inflected (cf. for example Parodi, 2000; Perdue et al., 2002) if both are present in the environmental language, but these structures can also be used to convey idiosyncratic meaning far removed from the target (cf. von Stutterheim, 1991; Starren, 2001). Moreover, some specialized lexical markers may appear to convey special time configurations in a complementary or alternative way with respect to verb morphology.⁸

Learners' paths thus vary as they approach the target language. The crosslinguistic variation can, however, be captured by some overall regularities. On the *means* level there is an initial preference for analytic forms – i.e. free morphemes (auxiliaries, periphrastic constructions and invariable specialized lexical markers) + a non-finite lexical verb – over synthetic ones, which is

⁸ The continuative meaning of 'STILL' may be used to trigger an imperfective reading of the predicate; conversely, items equivalent to 'ALREADY' + non-finite verbs can contribute in conveying reference to a completed and/or past situation or to a past in the past (cf. Benazzo 2003, Benazzo & Starren 2007 for L2; Comrie 1985 for fully fledged languages).

related both to reasons of perceptual salience in the input and to a learner-specific tendency to keep semantic transparency. On the *function* level, priority is given to express grammatically the temporal opposition *present/past* (constructions relating two reference points in time, like "PlusQuamPerfect" (= PQP) of "PastPerfect", are late acquisitions) and the aspectual notions of *ongoingness* vs. *accomplishment* (or the imperfective/perfective distinction), which imply a dissociation between the topic time and the Tsit.

We see in this developmental sketch not only the same 'communicative logic' at work in earlier stages – 'develop' means to express communicatively important functions (= overcoming constraints of the previous system), but also the first traces of some learners' attempt to approximate the formal organization of a target: here language is no longer being created anew.

2.3.2 Temporality in homesign systems

2.3.2.1 Child homesign systems

The emergence of homesigns (henceforth HS) and their language-like properties have been extensively investigated by Goldin-Meadow and colleagues (Goldin-Meadow and Mylander, 1990; Goldin-Meadow, 2002, 2003, etc.) in the longitudinal data of children covering an age range from 1;4 to 5;9. The deaf child gradually develops a lexicon of stable gestural forms organized in paradigms: the gesture/meaning relation acquires arbitrary aspects (within an iconic framework) and gestures are progressively differentiated for the grammatical functions they serve (noun, verb/adjective, marker). Utterances grow in size and scope: the child starts with 'one gesture' utterances (akin to the one-word stage), which consist either of a pointing gesture or of an iconic one, then combines two gestures, and later builds multipropositional sentences. Gestural utterances display underlying predicate frames, whereby word order signals thematic roles. In addition to the (morphological and syntactic) elaboration, the gestural systems are described as serving an increasing range of functions (cf. Goldin-Meadow, 2002: 34, 2003: 186). Gesturing is used to:

- (a) make requests, comments and queries about the present (Here&Now Talk);
- (b) communicate about the past, future, and hypothetical (Displaced Talk);
- (c) tell stories about self and others (Narrative);
- (d) communicate with oneself (Self-talk);
- (e) refer to one's own and others' gestures (Metalanguage).

In the following, the focus will be on **displaced talk**, i.e. the ability to refer to information that is spatially and temporally displaced from the location of the speaker and the hearer, that is out of their perceptual field. This language

property is developed in three main steps (cf. Butcher et al., 1991; Morford and Goldin-Meadow, 1997):

- (i) After an initial period where pointings and iconic gestures refer to real world objects present in the immediate environment, children start mentioning non present objects, actions, attributes and locations. They can point to a present object that looks very much like the absent one they want to refer to (an empty jar of bubbles as a stand-in for the full one), or at the habitual location of the entity to which they intend to refer: one child for example points to a chair as stand-in for the child's father, who usually sits on it, and then produces a 'sleep' gesture to tell that his dad is asleep in another room.
- The production of gestures referring to non-present objects and actions seems to correlate with a turning point in the language-like properties of the system. Non-literal pointing (which can be considered as the realization of true *symbolic* function) coincides with the emergence of two levels of structure in the gesture organization: within the sentence (akin to *syntactic* structure) and within each gesture (akin to *morphology*); at this stage the distinction between nouns and predicates starts being expressed via word order and space inflection.⁹
- (ii) Later, children make reference to proximal events that are still tied to present context: they either anticipate what will happen or express events that have just taken place. A relevant example is the deaf child gesturing 'bubble – EXPAND' after blowing a large bubble.
- (iii) Finally, they refer to distant or non-actual events, i.e. reference to events in the past or in the future, and to potential or fantasy events (starting around 3;5). All of them made reference to past events, only some to future or hypothetical ones.

The explicit devices used to this end are the following ones:

- A **POINTING** gesture (pointing over the shoulder to indicate past reference): for example one child points over his shoulder [=past], then points at a flashcard depicting a dog [=dog], then point to the floor [= here]. The past interpretation is confirmed by the child's mother reaction who says: *yes, we used to have a gray poodle, huh?*
- A gesture glossed as **AWAY** (a palm or pointed hand extended or arched away from the body). Thus, David (age 5;3) comments on

⁹ The basic distinctions between nouns and predicates (verbs/adjectives) is first expressed by the use of different gestures: points for nouns and iconic gestures for predicates; then, the same distinction applies via word order and space inflection (around 3;3). Evidence for a grammatical category arises, however, in a successive stage, where N/V do not exclusively refer respectively to objects and actions (cf. Goldin-Meadow et al., 1994).

his father's car accident by the following utterances: BREAK- away – dad – CAR GOES ONTO TRUCK (flat hand glides onto back of flat left hand) / CRASH – away (= dad's car broke and went onto a tow truck. It crashed). AWAY is first interpreted as a marker of both spatial and temporal displacement (Morford and Goldin-Meadow, 1997), later as a narrative marker (Goldin-Meadow, 2003);

- A gesture glossed as **WAIT** (holding up the index finger) that children used to identify their intentions, i.e. to signal immediate future. One child for example gestured WAIT (future) TOYBAG, and then walked over to the toybag to fetch a new toy to play with.

These gestures are either novel (like *away*), 'invented' by the child and apparently not repeated by the caregivers, or gestures existing in the cultural environment (like *wait*, conventional gesture to ask a brief delay or time-out) that the child adapts for new functions.

It is not clear to what extent deaf children made use of these markers, in particular if reference to distant or non-actual events was signaled in a more or less systematic way, but the underlying developmental pattern is clearly defined: deaf children start pointing in their immediate environment; then the function of 'displaced reference' emerges, whereby they can mention non-present entities/actions, but the situations are still linked to the *here&now* (or closely tied to it); finally, they can talk about situations 'displaced in time and space'. This cognitive development is accompanied by a first verbalized opposition concerning the temporal anchoring of the situations talked about: present or proximal events are left **unmarked** (it becomes the default reading), while **overt markers** are acquired for temporally (and spatially) displaced events.

The last developmental step relevant for temporality concerns the **relative ordering of events** in narratives (Goldin-Meadow, 2003: 144-5): 3 children out of 4 started recounting events in the order in which they actually occurred around the age of 5. Two remarks seem relevant with respect to this point: the first one is that despite the adjective qualifying the chronological order as 'natural', it has to be developed and this seems to happen rather late; the second one is that the child HS system does not include any temporal connectors yet, so that the reconstruction of their relative ordering is left completely to pragmatic inferences.

2.3.2.1.1 Child Homesigns and L1 acquisition

Morford and Goldin-Meadow (1997) also compare deaf children's production with that of English-speaking children. They conclude that, at a cognitive level, both groups follow the same developmental pattern, i.e. adding increasingly

abstract categories of displaced reference. The main difference lies in the onset time and frequency: deaf children refer to the non-present much less frequently and at later stages than the hearing children. This delay is related to the behavior of the deaf children's caregivers, who made reference to distant events less frequently than the caregivers of hearing children, and marked temporal displacement only in their speech production (cf. the concept of *unwilling* communicative partner, Goldin-Meadow, 2002). It is useful, however, to underline the fact that unlike in the case of hearing children, only reference to **distant** or **non-actual** events is marked overtly by explicit devices: thus for reference to proximal events the authors compare the hearing child sentence 'see, I flipped over' immediately after she has done a flip on the couch, with the deaf child gesturing 'bubble-EXPAND' after blowing a large bubble. The conceptual operation (making reference to proximal events) can be defined as similar, but the spoken utterance contains a linguistic marker of past (-ed) which is absent from the gestured one.

The comparison provided by Morford and Goldin-Meadow focuses on the cognitive development of the deaf and hearing subjects rather than on the linguistic means used. This procedure is understandable and justified, given that the grammatical devices of the specific target language (e.g. verb inflection) emerge very early. Moreover, the process of **form/function mapping** seems to go in the opposite direction in the two cases: in normal L1 acquisition *form* often precedes *function*,¹⁰ while the lack of a model for the homesigners forces them into the development of new linguistic means once (or after) they have elaborated a given conceptual function and feel the need to express it (in fact, the deaf children initiated more of their communication about non-present than their caregivers).

Despite such differences, some intriguing parallels with L1 acquisition can be seen at the linguistic level by looking at the stage preceding the use of finite verbs.¹¹ The study of Gretsch (2004) on finiteness and root infinitives points to a developmental pattern very similar to the one observed in child HS: using the metaphor of cell divisions, she explains the first step towards a TAM system as consisting of an initial fission between a *default here&now* vs.

¹⁰ In L1 acquisition the child's task is to pick up forms from the environment and find out which function they serve. The order of acquisition (of grammatical morphemes) can be predicted according to (a) the cumulative complexity of semantic distinctions, (b) the formal complexity of how such distinctions are mapped onto forms, and (c) their frequency in the input. However, form usually precedes function in that new forms are often used when the children have not yet worked out exactly what they mean (cf. Clark, 2003: 194-195).

¹¹ It would of course be interesting to take into account the development of temporal reference in deaf children acquiring a conventional sign language, but this is still an unexplored domain of research.

another point in time; the second fission gives directionality to the TT different from here&now (backward for past and forward for future), while proper aspectual distinctions, where TT and Tsit are dissociated, need a third fission. In tense-oriented languages (like German and Dutch) the first fission is expressed by the morphological opposition between finite forms (= here&now) vs. infinitival ones (not here&now), while in aspectual-oriented languages (like Russian) it is the perfective/imperfective opposition which is used to convey the same basic distinction in temporal reference by implication. Leaving aside differences in age between hearing and deaf children (due to the creative task), the developmental tendency is conceptually the same, but the chosen **option of what is left unmarked** is reversed: the former use morphologically marked verb forms for the here&now while for the latter this is the default unmarked context (like in early stages of L2).

2.3.2.2 Adult homesign systems

Deaf children born to hearing families may grow up and continue to live in environments which do not provide them with exposure to institutional sign languages. Studies on adult homesigners are few in number, but they all suggest that, with age, the means used to express temporal concepts become more diversified. From the pioneer studies of Yau (1992), Kendon (1980) and Mc Leod (1973) it can be observed for example that adult home signers have at their disposal some means to express at least the passage of time (deictically based time lines + skyline), to quantify time entities and to contrast situations referring to present context with respect to another time interval (cf. signs for parts of the day and for 'another day'¹²). Tense inflection is not developed, and the default reading for utterances without any tense marker is the present (or recent past). The focus of such studies, however, was not the expression of temporality.

The main source of evidence for temporality in adult HS will be therefore the study of Fusellier-Souza (2004), who describes in detail the expression of temporal relations in the communicative systems of 3 deaf subjects living in Brazil: Jo (aged 26), Ana (aged 20) and Ivaldo (aged 53). Their gestural systems are structurally very similar and consistent with the properties described by Goldin-Meadow for child HS: they consist of a stabilized lexicon of gestural signs (with a quantifier, nominal, verbal/adjectival value), highly iconic gestures and pointing gestures, which are organized to form utterances following predicate frames. Table 2.1 reports the

¹² Yau (1992) reports for example Miss Pettwiki's strategy to express *an(other) day* (hence temporal displacement) by a hand movement to the side (cf. *away* in child home signs).

repertoire of stabilized gestural signs with a specific temporal or aspectual value, which were attested during a 15-minute free conversation between each deaf subject and his/her preferential speaker (the quantification takes into account the production of both speakers).

Table 2.1: Stabilized gestural signs with a temporal value (adapted from Fusellier-Souza 2004: 278)

<i>Repertoire of gestural signs</i>	Semantic glosses	<i>Ana</i>	<i>Jo</i>	<i>Ivaldo</i>
Gesture of accomplishment with both hands	Finish	5	26	8
Pointing over shoulder or rotational movement of the hand	Before (<i>before x or past</i>)	1	12	5
Pointing or circular movement in the opposite direction	After (<i>after x or coming = future</i>)	13	7	5
Pointing downwards	Now/Here	-	2	4
Repeated sleeping gesture	Every day (<i>generic or habitual reading</i>)	1	-	-
Fingers snapped repeatedly	Long time (<i>indefinite duration</i>) Long time ago (<i>distant past</i>)	3	-	5
Various gestures for calendrical expressions: e.g. gesture of a cross = Sunday	Designation of a specific month (<i>June, December, etc.</i>) and of a specific day of the week (<i>Sunday</i>)	1	-	14/4*
Various gestures for time units: e.g. gesture for sleeping = day; gesture for December = year	x days, x years, x months	1	3	2

*14/4 stands for token/type ratio.

The communicative exchanges recorded are rather rich in temporal expressions. The repertoire includes a wide range of means to localize situations in time:

- Gestures to indicate basic 'TIME UNITS', like *day*, *month* or *year*, plus their quantification;
- Gestures identifying a specific temporal span (CALENDARICAL expressions) like *June*, *September*, *December* or a specific day of the week like *Sunday*;¹³
- Gestures corresponding to 'AFTER' and 'BEFORE' (the opposition is expressed either by pointing on a time line crossing the subject, over the his/her shoulder or in front of it, or by making a repeated circular movement with the hand in opposite directions), which can be used adverbially to express a 'generic past / future' or in adposition to calendrical expressions to indicate a specific time span (*before + June; 6 days + after = in 6 days*).
- Pointing downwards to the space in front of the speaker to mean either 'HERE' or 'NOW'.

The above gestures can also be combined with 'time lines' to construct complex temporal references. Thus in (6), in order to fix an appointment for the following Wednesday early evening, the speaker first signs 'Sunday', whose signing location becomes the starting point of a time line where 3 working days are placed, then 'sunset' (movement of the sun) and finally 'go'.

- (6) SUNDAY [starting point of a time line] WORKING-DAY 3 (= 3 days later) SUNSET GO

The temporal properties of situations can be specified by:

- A gesture glossed as 'FINISH' (very productive in all subjects), which is a clear marker of accomplishment;¹⁴
- A gesture glossed as 'LONG TIME' (apparently the reinterpretation of a Brazilian hearing community's gesture) which can mark either the

¹³ Different strategies are attested to create a calendrical expression: a specific time span can be associated with the cultural or habitual activity taking place during it (e.g. *cross* meaning *Sunday*, the day when people go to church; the sign for sleeping for 'day') or with one of its perceptually salient details (*December* or Christmas time is represented by gesturing flashing lights by Ana, and by gesturing Santa's beard by Ivaldo).

¹⁴ A gesture equivalent to 'finish' (firm clap of the hands) is the most arbitrary sign reported in MacLeod (1973).

- 'indefinite duration' of activities (e.g. walk for a long time) or a 'distant past' (roughly equivalent to *long time ago*),¹⁵

- A gesture glossed as 'EVERY DAY', which corresponds to the repetition of the 'day' gesture without specifying a precise quantity. It is the indefinite quantification of days which triggers a generic or habitual reading.

It should also be noted that all subjects produce predicates referring to static (*see, listen, like*) and dynamic, atelic (*eat, sleep*) and telic processes (*die, cut, leave*), whereby the repetition of the movement designating an action is an explicit device to express reiteration or duration of the same activity.

Some discrepancies in the repertoire of the three subjects can be attributed to the different conversational topics they discussed,¹⁶ but on the whole the linguistic means they used for temporal relations, while showing a continuity with child HS, are not very different in nature from the ones stated at BV level, at least to the extent that they allow the speaker to cover the same basic functions stated for L2 at this stage. Besides the inherent properties of situations, inferable from the lexical content of the verb (lexical aspect), speakers have at their disposal expressions in order to –

- **locate situations on the time axis** (with deictic, anaphoric and absolute value), making reference to an indefinite future/past or a definite time span (calendrical expression);
- **order situations** with respect of each other;
- quantify minimally the **frequency** of situations (reiteration, habituality) or their **duration**, be it definite (*x days*) or indefinite (*long time*);
- mark the **right boundary** of a situation (*finish*).

The similarities extend to the functioning of these expressions in discourse: the temporal reference for which the predicate holds is very often left unmarked if retrievable in context, i.e. (a) either set in previous discourse or (b) corresponding to utterance time (default present reading); a deictic *now*, however, has to be expressed when it takes a contrastive value (compare (7)-(8) taken from Fusellier, 2004: 282, with (3) from L2).

¹⁵ Fusellier-Souza reports also a contextual interpretation equivalent to *since long time*, where the gesture would set reference to an activity started in a distant past and going on until utterance time. This interpretation seems, however, to be dependent on the discourse context and on the atelic nature of the verbs.

¹⁶ Reference to the future (the 'coming' meaning of *after*) is for example only attested in Ana's production, who comments on events that have to take place in the village and on things she will do later. In contrast, Jo and Ivaldo refer more to past situations, hence the larger number of references to past or accomplished situations.

- (7) (Ivaldo about his working situation)
 before [pointing over shoulder] GOOD
 now [pointing downwards] SO SO (more or less)
- (8) (about a football team)
 before [rotating hand backwards] WIN [sign for win/victory]
 now [pointing downwards] FINISH

The above utterances also show some regularities in **word order**: the speaker builds a time reference before predicating some properties for the constructed time interval. The utterance initial position can be considered iconically motivated as word order matches the semantic scope of the adverb. Conversely, the temporal expression seems to be utterance final when it represents focal information, as in the following utterance (Fusellier-Souza, 2004: 285):

- (9) (answering a question about a journey: how many nights/days did it take to go there?)
 GO me [pointing at himself] NIGHT [or day: sleeping sign] THREE

The position of temporal expressions thus seems to be determined by the same pragmatic and semantic principles found in early L2. In the list of similarities we can also add the extensive use of the **principle of natural order** (PNO) in narratives: if events are recounted in their chronological order, the consecutive relation is not marked.

The adult systems show both a structural continuity with child HS and an important development in their expressive power for temporal relations. This complexification can be attributed to the cognitive maturation taking place with age, combined with the presence of favorable conditions for the use of language. Actually, the 3 subjects observed by Fusellier-Souza are isolated from a deaf community, but at least partially integrated into the hearing environment (two of them exert a professional activity). In particular one member of their hearing family functions as a preferential speaker (if necessary interpreter vis-à-vis hearing people), which means that each deaf subject has at least one communicative partner who fully shares the HS system.¹⁷

¹⁷ Notice the difference between the parents of the American deaf children, who insisted on an oral method and did not consider the child's gesture as language (hence the concept of unwilling partner, Goldin-Meadow 2002), and the families of Fusellier-Souza's subjects, who had a positive attitude towards HS (cf. also Morford and Kegl 2000 about the parents of Nicaraguan HS children).

2.3.2.1.2 Modality specific features?

In the introduction it was hypothesized that the specifics of the expressive mode could have an impact on the developed system: in contrast to the spoken one, the signed modality potentially offers the simultaneous availability of multiple resources (hands and facial mimicking). In this respect, Fusellier-Souza mentions the use of 'eye gaze', which seems to play a role in making the difference between a specific and unspecific time reference, although in an unclear way (an utterance is for example interpreted with a generic/habitual reading because the speaker does *not* build a time reference and refer back to it by his gaze). More interestingly, the 'role shift' from narrator to protagonist that takes place in narrative stretches, whereby the signer's own body becomes the referential index of a character, allows the speaker to represent simultaneously two overlapping activities. In Fusellier's data this is attested on two occasions: during the narration of an accident, Jo represented with the hand his movement towards the hurt person, while his face mimicked that he was meanwhile watching everything; Ivaldo referred to his son noticing a young girl (facial mimick and eye gaze) while he was drinking a coke (one hand keeping a drinking straw). Such a possibility for expressing simultaneity seems however to be exploited only in highly iconic passages, when meaning is constructed by 'showing' (Cuxac, 2005), and for a limited repertoire of actions. In comparison to the spoken one, the manual modality probably also offers a greater potential to exploit *lexical aspect* (cf. for example repetition of the same gesture to express reiteration), thanks to the iconic component of visual representation. On the other hand, it is not clear to what extent beginning L2 learners also resort to gestures because of their limited spoken repertoire in the L2.¹⁸

In sum, from what could be reported in Fusellier-Souza's study, the differences related to the expressive modality seem to be rather marginal for the domain of temporality. Not specific to modality but to the task of inventing items, are: (a) the direct link between gestures and the perceptual experience (for example the sleeping sign meaning both *day/night* and the time unit of 24h) and (b) conversely the difficulty of expressing arbitrary time units (for example months) or absolute time spans, which in HS give way to long periphrastic constructions.

¹⁸ Gullberg's study on gestures in L2 underlines that they do not replace speech but accompany it. Their higher frequency in L2 'suggests a need on the part of the learner to be over-explicit and redundant' (1996: 72), but the dominant modality is speech. The analyzed learners of her study, however, are rather advanced and we do not know of any study on gestures in early stages of L2 acquisition.

2.3.3 Some final remarks on the windows considered

The developmental sequences sketched in the previous sections show striking similarities and some important differences between L2 varieties and HS systems. In particular, it is not easy to put the **earlier stages** of each process on a par, i.e. prebasic varieties in L2 and child homesigns. The cognitive development that takes place in the deaf child and his/her initially limited communicative needs make child homesigns, if anything, more suitable for a comparison with L1 acquisition. On the other hand, child HS make visible a stage preceding the expression of any temporal relation that adult L2 acquisition cannot show: the progressive use of the symbolic function, i.e. mentioning entities that are out of the immediate perceptual field. For temporal relations, however, there is a first step common to each process (L2, L1, HS): the transition from a system that is initially context-dependent (or limited to contingent situations) to the development of some means to go beyond the here&now. In both cases the deictic speech time is left unmarked, while the first temporal devices explicitly mark the **(spatio)-temporal displacement** of the situations talked about. In doing so, children seem to privilege indefinite markers (clustering ambiguously another time and another space), while definite ones come later.

Further development leads to a **convergence** between the systems involved in the two processes. The formal repertoire and the communicative possibilities that characterize the Basic Variety and adult homesigns are indeed very similar. From what can be attested in the literature, in both cases a repertoire of lexical expressions arises (i) to locate situations in time (in a deictic or absolute way), (ii) to quantify their frequency and duration (be it definite or indefinite), (iii) to signal boundaries (thus overruling the inherent semantic properties of predicates) and (iv) to order situations with respect to each other (in particular *before*, necessary to overrule the PNO). We can also list, as shared features, the organization of temporal information in the utterance (linear position mirroring information status and semantic influence) and in discourse (leaving unmarked the temporal information recoverable from the situational context, from previous discourse or from discourse organizational principles). As a result, there is no obligatory element to identify the time reference of each predication or its aspect. Their main features for temporal relations come close to pidgins and we can subscribe to Labov's remark about time in pidgins when he says:

This system may seem primitive but it is hard to prove that it is inadequate ... the pidgin system may be cumbersome, but in most

discourse situations it proves to be quite efficient to designate time relations: specifically when called for, otherwise not (1990: 18).

Yet, the systems described can be considered both 'simpler' (as for the means) and 'restricted' (as for the temporal notions getting expressed) with respect to their fully-fledged spoken or signed counterparts. L2 postbasic varieties, while approaching the target language, present a wider range of formal means in the temporal-aspectual domain which make it possible to express more sophisticated temporal notions (for example simultaneity, past in the past, aspectual viewpoints other than 'completion'). Sign languages, which can be considered as the natural target of HS (or conversely HS as emergent Sign Languages, cf. Cuxac, 2005) seem rarely to inflect for tense, but they always present a rich system of grammaticalized aspectual marking.¹⁹ Studies on the emergence of the Nicaraguan Sign Language attest the presence of specific means to express iterative, completed and progressive aspect (which are already beyond individual HS) even in what is presented as a peer-group pidgin developed by the first cohort of homesigners.²⁰ Language diversity implies the unequal grammaticalization of aspectual and/or temporal notions,²¹ while the system of adult homesigners and L2 learners at Basic Variety level present the means to express **just a subset** of them.

Various extralinguistic factors can explain the limited amount of formal means stated in BV and HS. In the L2 case, the presence of an L1 can represent a blocking factor to further development: after all the learner already has a

¹⁹ According to Pfau and Steinbach (2006), signed verbs do not inflect for tense (with some exceptions): temporal information is conveyed by time adverbials (use of the so-called time lines) and lexical tense markers, or it is inferred from the context; conversely, Sign Languages are known to have at their disposal complex systems of aspectual marking. French Sign Language includes for example aspectual markers for completion, prospective, recent past, experiential and habituality (cf. Fusellier-Souza and Leix 2005).

²⁰ The study of Kegl, Senghas and Coppola (1999) reports how some signers of the peer-group pidgin mark certain aspectual information with mouth gestures often accompanied by vocalizations that are visually detectable: a rapid protrusion and retraction of the tongue while vocalizing /blʌɪʌɪʌ/ for *iterativity* and an unvoiced bilabial trill for *completion* (p. 183). The authors also mention the presence of sign reduplication to mark the *progressive* in the pidgin used between hearing individuals and deaf signers (p. 185). Their main point is to show that aspectual marking is encoded in a more sophisticated way by the following cohorts; nonetheless iterativity, completion and progressive are already expressed, by different means, as of the peer-group pidgin stage.

²¹ On this point, Chinese and German could be mentioned as representing the extremes: the former lacks grammatical tense but presents a set of grammatical aspectual particles, probably combined with assertive functions, while the latter has grammaticalized tense in verb inflection but lacks a grammatical marking of aspect.

language community sharing his/her mother tongue and can be satisfied when basic communication for everyday life takes place in the L2. On the other hand, the adult homesigner only has his/her gestural system with which to communicate, but is exposed to a limited number of exchanges and lacks a community of peer interlocutors to further grammaticalize the system. Both processes give way, however, to stable communicative systems which are remarkably similar despite the different circumstances characterizing their emergence and the expressive modality. This statement leads to two important remarks. First, it reconfirms the idea that the simple systems analyzed are not a simplified or reduced version of fully fledged languages, rather the latter are but elaborations of the former, obtained by increasing the formal repertoire with supplementary means, and making their expression possibly obligatory (cf. Corder, 1977; Klein and Perdue, 1997).²² Secondly, given their convergence on a functional level, the similarities attested can be attributed to the pressure of similar **communicative needs** (getting more sophisticated in adults) which, in a favorable environment (= interaction with communicative partners) and in presence of basic cognitive capacities (to segment, analyze and recombine elements perceived in a meaningful context²³), push the human language faculty towards the same direction. The projections onto early language start with the assumption that similar driving forces were also at work in language evolution.

2.4 Implications for temporality in early language

2.4.1 The logical sequence

In modern languages, temporality crucially involves three basic semantic operations: localize situations in time, express their distribution over time and order them with respect to each other. The development observed in emergent L2 and HS systems suggests a relative hierarchy in their expression: explicit means for 'localizing situations in time' are attested *before* specific means to 'give an aspectual perspective' on them or to 'order' them. This priority is directly inferable from L2 development – temporally displaced reference is expressed before the emergence of clear verb forms or of any boundary

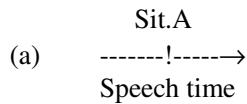
²² On the basis of similarities between pidgins, foreigner talk, baby talk and L2 varieties, Corder (1977) prefers to 'treat standard languages as 'complicated' forms of a 'basic' simple language'. The same idea is defended by Klein and Perdue (1997) specifically for the BV. Formal elaboration arises from the broadening range of communicative function within the speech community and the need to reduce the ambiguity inherent in simple systems.

²³ Cf. conclusions given for HS in Goldin-Meadow and Mylander (1990) and Senghas, Kita and Ozyurek (2004), and for early L2 varieties in Perdue (2006).

markers – and indirectly in the analyzed HS systems: the most elaborate means deaf adults have at their disposal (deictic, anaphoric and absolute) are specialized for this function, while the deaf children produce signs explicitly marking the (spatio)-temporal displacement but there is no report on the presence of any aspectual markers. The natural sequence thus described involves two main steps in the expression of temporal relations: anchoring situations in time < giving an aspectual viewpoint on them. Both stages must, however, have been preceded by a previous one where symbols were simply disconnected from the presence of their referents.

(i) *Mere displaced reference*

Displaced reference is considered to be an essential function of human language. It is useful here to distinguish between mere 'displaced reference' – making reference to entities in their absence (= the symbolic function of language) – and 'temporally displaced reference', i.e. marking that a situation does not refer to the present temporal span or specify to which temporal span it applies. It seems reasonable to assume a stage where a lexicon of symbols referring to situations or speech acts were combined and interpreted by pragmatic principles before the emergence of any explicit temporal marking (cf. child HS). Utterances would correspond to speech acts related to the here&now or close to it, as in (a).

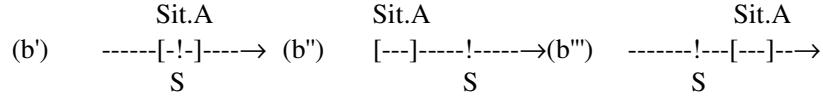


(ii) *Anchoring situation in time: from contextual dependency to temporally displaced reference*

The conceptual category of temporality would display a first basic partitioning between situations referring to the here&now vs. (spatio)-temporally displaced reference (metaphor of cell divisions, cf. Gretsch, 2004). In continuity with the previous stage, the origin of this deictic system – 'speech time' or 'close to speech time' – may be left unmarked as it belongs to situational, contextual and shared knowledge (present default interpretation). An item designating a deictic *now* or *here* must, however, be available in the system in order to mark the contrast to the other temporal (spatial) entities.

An initial stage of contextual dependence (absence of explicit temporal reference) would thus be followed by the development of a minimal deictic system, where it is possible to overtly mark speech acts for past, present or upcoming temporal spans. Note that the temporal system at this stage implies a

relation between two parameters – the Topic Time and the Time of Utterance – which can coincide ($b' \text{ TT}=\text{TU}$) or be dissociated ($b'' \text{ TT}<\text{TU}; b''' \text{ TT}>\text{TU}$).



The expression of directionality in temporal displacement could be preceded by a stage where the opposition concerns only the here&now and its negative counterpart (cf. L1 acquisition and child HS).

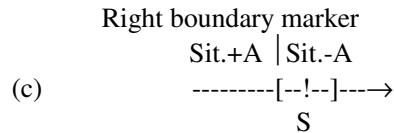
Different scenarios may be envisaged to be involved in the process of creating the abstract notion of time. Temporal displacement may first be expressed by spatial specification: mentioning another place is a clear strategy still used to convey the idea of another time (cf. L2 varieties and, for HS, pointings ambiguously meaning 'here' or 'now' and the gesture 'away' implying both another time and another place). The visual perception of space makes it probably less abstract than the concept of time, but also everyday natural events like sunrise/sunfall and the day/night alternation belong to ordinary perceptual experience that can have served as a source to quantify time and express temporal displacement.

Once deictic items identifying an indefinite past (*before now*) and an indefinite future (*after now*) are available, they can also be used anaphorically for **ordering situations** with respect to each other (*before x* or *after X*; cf. adult HS).

(iii) *Giving a viewpoint on situations: from lexical aspect to boundary markers*
The system just described implies setting a **static** time reference for a situation viewed as a **whole** (such as 'at time X holds situation A'), which can probably also be quantified or repeated, but does not enable any distinction of its inner constituency. A further step would be represented by the development of means giving a dynamic/aspectual perspective on the situation talked about, and boundary markers seem to play a crucial role in this process.

As we have seen, in emergent L2 and HS systems a first temporal characterization of situations arises with the emergence of verb forms: the semantics of lexical verbs and argument structure convey properties like punctuality, duration or telicity. The introduction of boundary markers (in particular items for completion equivalent to *finish*) allow the speaker to overrule the natural semantics of the predicate (cf. for example the combination of *finish* with atelic processes with no natural endpoint). At the same time, they represent an increase in conceptual structure: putting a right (or left) boundary to a situation (such as 'at time span X situation A is over') implies reference to

different phases of the same situation, plus indicating their orientation on a temporal scale: for *finish* the transition goes from a positive (+A) to a negative phase (-A), whereby only the latter is expressed.



The use of items meaning completion (like *finish* or *over*), inchoativity (like *start*) or continuation (like *keep on*), give a dynamic perspective to temporal reference and lead to the introduction of a third temporal span: the time of the situation itself (in contrast to the asserted one). The data of L2 acquisition and HS constitute evidence on the primacy of right boundary markers (cf. also Bickerton on pidgins²⁴), even if any of them could potentially start the mechanism of aspectual perspective. Once the system includes lexical means for such notions, aspectual categories like ongoingness or perfectivity – where TT and Tsit do not exactly coincide – can develop by ordinary processes of grammaticalization (cf. for example Bybee, Perkins and Pagliuca, 1994 for a crosslinguistic study on lexical sources of tense/aspect markers).

In the logical sequence just sketched, we can see how a system made of non-situation-specific symbols designating entities, actions and properties, can acquire more abstract meaning and be progressively used to express the basic semantic operations involved in temporality.

2.4.2 *Projection on existing models of 'protolanguage'*

The developmental sequences observed in emergent L2 varieties and HS systems have enabled us to extrapolate a logical sequence of operations concerning the expression of temporal relations in early language. How does such a sequence fit existing models of language evolution? Which prerequisites in the complexity of the system (and which specific means) are required to express temporal relations? In other words, which features of the system must co-evolve?

²⁴As Bickerton puts it: 'Pidgins usually have two expressions that mean, respectively, "earlier/completed" and "later" (*pau* and *baimbai* in Hawaiian Pidgin, *pinis* and *bai* in Melanesian Pidgin). Reflexes of what were probably expressions meaning "earlier/completed" in their antecedent pidgins (*don* in English creoles, and *fin* in French creoles, *kaba* in Portuguese creoles) are found in almost all creoles and are all, like the Hawaiian and Melanesian examples, derived from verbs with the meaning "finish" ' (1990: 183).

The described sequence is compatible with scenarios whereby language evolution takes place progressively by incremental steps. Since Bickerton (1990), 'Protolanguage' has become the recurrent term to depict a precursor of modern language (cf. Comrie, 2000; Jackendoff, 1999; Arbib, 2003; Wray, 1998, etc.); such a form of early language is assumed to have been by definition 'simpler' than modern language (lacking for example morpho-syntactic structure), but other features and/or intermediary steps vary according to the authors. A first contrast opposes **synthetic** models to **analytic** ones: the former (for example Wray, 1998) assume that early language would have emerged from entirely arbitrary strings of sounds with an holistic meaning, that were later fragmented into meaningful components, while the latter (for example Bickerton, 1990; Jackendoff, 1999, 2002) posit the emergence of single symbols that were afterwards combined. On this point, our data are more compatible with the analytic models.

Though agreeing on the analytic structure of protolanguage, Bickerton and Jackendoff end up with different conclusions about its features, despite the fact that both authors ground their speculations on similar sources of empirical evidence (i.e. trained primates, pidgins, child speech under 2, Genie, late L2 acquisition, speech of agrammatic aphasics). Bickerton (1990) proposes two main steps in the evolution of the human capacity for language: protolanguage and language. As reiterated more recently, protolanguage would almost exclusively consist of: 'nouns and verbs, without modifiers – if adverbs appear, they are usually whole-utterance modifiers, not modifiers of single words. If adjectives appear, they are a few of the more common ones, probably acquired with nouns as unanalyzed chunks [...]. All units are of equal value' (Calvin and Bickerton, 2000: 41). In negative terms, protolanguage is very often defined as *structureless*. As a first approximation, it is language minus syntax: it lacks function words, utterances do not show any consistent word order, arguments can be missing and syntactic embedding is absent. The transition towards syntax takes place via argument structure: the regular pattern introduced by the obligatory presence of arguments would constitute a template for hierarchical phrase structure and syntactic embedding (Calvin and Bickerton, 2000). The author is rather laconic about temporality: inflections expressing tense, mood and aspect are unlikely candidates for protolanguage, but he speculates on the possible presence of expressions meaning *earlier/completed* (regularly attested in pidgins, cf. note 24) derived from verbs meaning *finish*, which would represent 'an analysis of time more primitive than the tense analysis of true language' (1990: 183).

If we consider the repertoire involved for the expressions of the three temporal functions described in section 2.4.1, it is fully compatible with

Bickerton's protolanguage: it just requires nouns, verbs and adverbs. A protolanguage with such a 'simple repertoire' of lexical means is therefore not necessarily confined to the *here&now* or highly context-dependent; it actually allows the speaker to express a dense web of temporal relations. The analysis of L2 and HS also leads to a criticism of the idea that the lack of syntactic organization equals a random word order: the position of utterance constituents (and temporal expressions) can be determined by their information status and can mirror their semantic scope. Moreover, the development of argument structure *may* function as a template for syntactic embedding, but it seems implausible that it immediately triggers it, as assumed by Bickerton: both BV and HS use argument structure but lack formal means for subordination.

Jackendoff (1999, 2002) elaborates on Bickerton's model, proposing several incremental steps instead of one main leap. In his view, the repertoire of protolanguage is made up of 'symbols' used in a non-situation specific way and combined by pragmatic/semantic principles (Agent first, Topic last, Grouping); grammatical categories and symbols for abstract semantic relations – prepositions expressing spatial relations, temporal terms like *now*, *yesterday*, *before*, *after*, *until*, as well as markers of illocutionary force and modality – emerge rather late, after the sentence shows the presence of hierarchical phrase structure, i.e. in an intermediary stage between protolanguage and modern language. The evolutionary schema presented by Heine and Kuteva (this volume) also suggests that temporal-spatial displacement is realized only after the elaboration of phrase structure and the emergence of several grammatical entities.

Once again the means involved in the development sketched for temporal relations are compatible with a stage that would precede modern language in Jackendoff's model, but the *timing* of their co-evolution with respect to grammatical categories is less straightforward. If we focus on the first temporal operation attested – the displacement of temporal reference from the *here&now* or the localization of situations in time – child HS produce items expressing temporal displacement after their system has developed the distinction between Nouns (for entities) and Verbs (for actions), even though such a distinction is still semantically based (= symbols for abstract semantic relations follow or co-evolve with grammatical categories); L2 adult learners, on the other hand, realize such a temporal operation even before the production of relational items equivalent to verbs (= symbols for abstract semantic relations precede a clearcut distinction of grammatical categories).

The mismatch just pointed out has been attributed to the specifics of each ontogenetic process: as opposed to the child, a cognitively mature and socially integrated subject cannot be confined to utterances limited to the *here&now*.

The divergence in the empirical sources can thus be accounted for in terms of speakers' unequal cognitive-social development and communicative needs, but it also raises a fundamental question for projections on language evolution: What degree of cognitive development and what kind of communicative needs are attributed to human beings creating early language? Are children or adults the initial language-makers?

A closely related question has been formulated about **language innovation**. Contra Bickerton's Bioprogram Hypothesis, Slobin (2002) underlines the child's lack of true creativity in normal language acquisition, whereas 'much of linguistic innovation is due to individuals who are advanced in cognitive and social development'; he recognizes that children can create a communicative system with language-like properties in the absence of a conventional model (HS), although its grammaticalization implies the intensive language use induced by the presence of a peergroup community.²⁵ In sum, despite age-related differences, both adults and children have the capacities to innovate/create language to a certain extent. Notice however that, when it comes to the advantage represented by the emergence of language in evolution, most of the functional reasons adduced – be it planning joint ventures like sea-crossings (Coupé and Homber, 2005), foraging (Bickerton, 2002) or regulating social behavior (via grooming for Dunbar, 1996, via narrating for Victorri, 2002) – suggest adult-like needs and cognitive capacities.

If our windows on language evolution leave open the initial question about the emergence of grammatical categories with respect to the expression of temporal displacement (and the subsequent one on the initial language-makers), they unambiguously indicate that 'complex functions' can be expressed by 'simple means'. In particular:

- (a) It is not necessary to presume a high level of syntactic development as a pre-requisite for the expression of (complex) temporal relations. The basic semantic operations in temporality are compatible with a protolanguage repertoire still lacking many of the syntactic features displayed by modern language. This observation clearly goes against conclusions drawn in several studies which attribute fully syntactic

²⁵ It is actually subject to debate how far language development can go over the ontogenetic lifespan in the absence of a conventional model. Morford (2002) distinguishes convincingly between 'innovation' (individual deaf subjects developing linguistic structure out of inconsistent gestural input) and 'grammaticalization', requiring structured linguistic input and intensive language use (for example Nicaraguan signers having the first cohort's HS as input). Fusellier's data seem to confirm this statement: even if the oldest subject, with more diversified social contacts (hence wider practice of language) displays a richer production in comparison to the other two, his repertoire seems to be larger in terms of lexicalized signs, not in terms of grammar.

- language on the grounds of evidence for symbolic behavior, like burial rituals or personal decoration (cf. Henshilwood et al., 2004 on shell beads²⁶);
- (b) What seems crucial for temporality in early language is not the complexity of syntactic development, but rather the pre-existing conceptual structure for its representation (cf. Wilkins and Wakefield, 1995) and the need to express it in a linguistic way. This statement reconfirms, to a certain extent, that the big step in language evolution is the emergence of a lexicon for symbolic function (cf. Deacon, 1997) – in particular the ability to disconnect the symbol from the presence of its referent – preceded by or combined with the development of pragmatic capacities, by which other individuals are recognized as intentional agents (cf. the concept of joint attention in Tomasello, 2003, as well as the pre-adaptations listed in Hurford, 2003).

2.5 Conclusions

The goal of this chapter was to gain insight into temporality in early language, using the indirect evidence offered by some present-day spontaneous developmental processes. To this end we have compared how temporal relations are progressively expressed in early stages of adult untutored L2 acquisition and in (child and adult) homesign systems.

The first question was whether there are common developmental patterns despite the different circumstances of emergence and expressive mode. The answer is affirmative: the comparison highlighted some process-specific features, but also many striking similarities, such as a remarkable convergence between BV and adult HS, both in terms of the formal repertoire and their expressive power for temporal relations. The presence of a similar sequence of developmental steps suggests a relatively low impact of environmental factors (like previous experience of language and expressive mode, the main difference being cognitive development); it conversely highlights the communicative logic underlying both processes, e.g. a hierarchy in the expression of temporal notions, which was used as an empirical basis to propose a logical sequence of conceptual operations in early language.

Another question concerned the means necessary to express the fundamental operations identified. By contrasting some models of

²⁶ The authors report on the discovery of personal ornaments (perforated shell beads) from Middle Stone Age and conclude 'fully syntactic language is arguably an essential requisite to share and transmit the symbolic meaning of beadworks and abstract engravings such as those from Blombos cave' (2004: 404).

protolanguage with the simple systems analyzed it was possible to refine the potential expressive power of a protolanguage repertoire. The expression of basic relations, like temporal displacement (which is already far beyond primates communication), does not demand syntactic complexity *per se*, but rather the previous development of the conceptual structure necessary for its representation. Projections on early language always have a speculative flavor, but the study of modern-day developmental processes can help in constraining the hypotheses.

Acknowledgements

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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 $\neg p$ 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 \neg 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 $\neg p$. 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 \neg . 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 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 $\neg p$ 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 NP₁-V or NP₁-V-NP₂ or NP₁-Copula-NP₂/Adj or V-NP₂. 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).

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)
(the, 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 demānd] à la dame *por* [māZe] (Giuliano, 2004: 126)
 (Elle demande à la dame pour manger.)
 'She asks for the lady to eat.'
 SF *y* [*nepade*] l'argent *por* [pāZe]
 (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 l'jel 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 $\neg p$	Form S	FNeg *	*Neg
$\neg \neg p$	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 $\neg p$ 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.
 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 grammaticalized 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 <i>not(p)</i>	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 <i>X_{top} not_{foc}</i>	Form	FNeg	*Neg	FocusLast
	X	*		
☞	X NEG		*	
	NEG X		*	*

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

Form NEG	X	Meaning	FNeg	*Neg	FocusLast
	X		*		
☞	$X_{\text{top}} \text{ not}_{\text{foc}}$			*	
	$X_{\text{foc}} \text{ not}_{\text{top}}$			*	*

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 X_{foc}	Neg	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	*		
	$X_{\text{top}} \text{ Neg}_{\text{foc}}$		*	
☞	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 red 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 <i>not</i> 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 $\neg x_{\text{top}}$ $[V y]_{\text{foc}}$	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 $\neg x_{\text{top}}$ $[V y]_{\text{foc}}$	Form	FNeg	*Neg	NegFirst _f
	NP V NP	*		
	NEG NP V NP		*	*
$\not F$	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 NEG V NP	NP	Meaning	FNeg	*Neg	NegFirst _f
		$x_{\text{top}} [V y]_{\text{foc}}$	*		
☞		$\neg x_{\text{top}} [V y]_{\text{foc}}$		*	
		$\neg x_{\text{foc}} [V y]_{\text{top}}$		*	*

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 \neg , 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, grammaticalized version)

Meaning $\neg x_{\text{top}}$ $[V y]_{\text{foc}}$	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, $\alpha < \beta$ /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 grammaticalized 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 $*\text{Structure} \gg \text{Faith}$ 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 $*\text{Structure}$ 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 $\text{FNeg} \gg *\text{Structure}$ 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 $*\text{Neg}$, and we obtain the order $\text{FNeg} \gg *\text{Neg}$. 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 discursal negation without the use of words. This only confirms that the concept of (pre-logical) negation predates 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 (grammaticalized 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	$*\text{Structure} > \text{Faith}$	conceptual stage
Stage 1	$\text{FaithNeg} \gg *\text{Neg}$	holophrastic stage
Stage 2	$\text{FaithNeg} \gg *\text{Neg}, \text{FocusLast}$	Protolanguage
Stage 3	$\text{FaithNeg} \gg *\text{Neg}, \alpha < \beta/\text{NegFirst}$ (focus)	language with semantic recursion
Stage 4	$\text{FaithNeg} \gg *\text{Neg}, \text{NegFirst}$ (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 $*\text{Structure}$, and postulating a related markedness constraint $*\text{Neg}$ 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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4. The creation of pidgins as a possible window on language evolution

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Abstract

For some two decades now, linguists have given serious attention to the idea that restricted systems – *inter alia* 'modern' pidgin languages – provide a 'window' on certain facets of the emergence of language in the human species. Botha (2003: 197-201, 2006b) has identified a number of difficulties that would have to be overcome in constructing a pidgin window capable of yielding insights into language evolution. The window is still, at best, very much 'under construction,' for it lacks in its present forms various core components: 'Developing these components would require a substantial amount of work of a technical sort' (2006b: 12). But, he concludes, 'a well-constructed pidgin window on language evolution will reward us with insights and perspectives that are incentive enough for facing up to just those difficulties' (2006b: 13). This paper represents an attempt to restart work on the pidgin window construction project. My fundamental position is that the creation of 'modern' pidgin languages does indeed provide such a window on language evolution, though not along the lines that have been proposed to date.

4.1 Preliminaries

When one tracks the scholarly literature on language evolution, it becomes apparent that writers are not necessarily discussing the evolution of the same thing. One needs to be explicit about what one understands by the two terms that are constitutive of the compound noun *language evolution*. Botha (2006a: 131) characterizes *language* as a concept that designates 'a human capacity, referred to by such expressions as "the human language capacity" and "the human language faculty"; and the system(s) referred to by such expressions as "the first human language", "ancestral language", "the first form of human language"' (Botha, 2006a: 131). In this sense *language* does not include speech or the mechanisms involved in its production and perception (which may have their own evolutionary histories). As for *evolution*, I understand (again following Botha, 2006a: 132) a process comprising various phases, 'central to which are the two referred to as "origin, emergence or first appearance (of

language in the human species)"; and "subsequent development (of language in the human species)".

There is no direct evidence for early forms of language until the invention of writing systems – most importantly Sumerian cuneiform and Egyptian hieroglyphs – approximately 5,000 years ago. By then, we are dealing with fully developed 'modern' language (Jackendoff, 2002: 232). As for timing the emergence of language, the physical record again yields no direct information. To establish relative chronologies, researchers have examined features of early hominids – brain size and configuration, vocal tract configuration, patterns of behavior, and artifacts – that are accessible and could plausibly be supposed to correlate with language development in some way (e.g., Bickerton, 1990: 133-45, 2003: 91-92).

To appreciate the chronology problem, one need only ponder some of the time lines that have been proposed. Corballis (2003: 205), to cite but one proposal, supposes that 'language developed beyond protolanguage, probably gradually (Pinker and Bloom, 1990), over the past two million years.' He argues that language developed first as a primarily gestural system, with increasing vocal accompaniment.¹ Speech became the dominant mode following the emergence of *Homo sapiens*, within the last 170,000 years (p. 205). Autonomous vocal language, with a largely nongestural component, may have arisen sometime between 100,000 and 50,000 years ago in Africa (p. 217). MacWhinney (2002: 235), however, would push the temporal scope of inquiry even further back into the remote past. His thesis is that language evolution 'operated across the full six million years of human evolution, not just the last 100,000 years.' His model distinguishes four major periods, defined by different configurations of co-evolutionary pressures or challenges. These are the attainment of bipedalism (from 8MYA to 4MYA), the solidification of group structure during face-to-face vocal interaction (from 4MYA to 2MYA), 'the linkage of a broad set of symbolic processes to neural control mechanisms' (2MYA to 100KYA), with the linkages involving 'the growth of prosody, chant, gesture, dance, and a variety of other largely social expressions of language functioning,' and, finally, the linking of language to the production of material culture, which began in earnest about 60,000 years ago. During this last period language assumed its 'current dual patterning with organization on the phonological and syntactic levels,' although many abilities are traceable to precursors in the third period.

¹The hypothesis that language initially arose in a gestural-visual modality finds endorsement from Givón (1995: 430-34, 1998: 88-89) but is opposed by Bickerton (1990: 142) and – if only for expository convenience – Jackendoff (2002: 236).

The extreme time depth and the lack of extant data would appear to pose insurmountable obstacles to serious scientific inquiry into language evolution (cf., for example, Gould, 2002: 790; Slobin, 2002: 389). However, the problem has been taken up anew in recent years and approached in a number of interesting ways from the perspective of several disciplines, including linguistics, even if somewhat gingerly.² Botha (e.g., 2003, 2006a), in particular, has contributed in a decisive way to the development of foundational concepts for the study of language evolution. Contrary to received opinion and intuition, the main obstacle to a better understanding of language evolution is not a paucity of factual information but rather a 'poverty of restrictive theory' (2003: 7).³ In regard to the amelioration of 'evidential paucity,' he points out that accounts of the evolution of human language 'must, by their very nature, entail claims of a historical sort' that 'are put forward in the absence of direct evidence ... about events and factors that may or may not have been involved' (2006a: 130). The approach that linguists have embraced is to identify phenomena that can be observed in (or deduced from) actual instantiations of language and propose that they mirror or preserve the origins of language in *Homo sapiens* and its subsequent development. Comrie (2000), for example, considers situations in which people have created a language or part of a language *ex nihilo*, availing themselves only of certain minimal requirements for linguistic development. These situations involve feral children and related cases, creoles (albeit controversially), deaf sign language (in particular Nicaraguan Sign Language), and possibly twin languages. Other linguists have proceeded from a presumption that 'living linguistic fossils' discernible in 'modern' language can provide some insight into the processes by which human language emerged (Bickerton, 1990: 106). Restricted linguistic systems such as early child language, early adult second language acquisition, pidgin languages, and homesigns created by deaf children of nonsigning parents have been cited in the literature as 'fossils' of earlier stages of language.⁴

Such contentions are at the heart of what Botha (2006b: 130) calls the 'windows approach' to the study of language evolution. In general terms 'a phenomenon X is considered (to offer) a *window* on a distinct phenomenon Y

²Cf. Bickerton, 1990: 105-6, 2003; Hurford, 2003: 51-52; Newmeyer, 2003; Carstairs-McCarthy, 2007: 503.

³A theory will be restrictive to the extent that its characterization of a given entity 'makes it possible to discriminate in a non-arbitrary way' between that entity 'and all things which, though they may be related to it, are in fact distinct from it' (Botha 2003: 8).

⁴Linguists have adopted various other approaches, too, including argumentation based on complex design (e.g., Pinker and Bloom, 1990) – complexity being characteristic of human language – and computer modeling.

if by "looking at" X it is possible to "see" something of Y. A window on language evolution, accordingly, is a phenomenon that has properties believed to offer a 'view' on properties of some aspect or aspects of language evolution' (Botha, 2006a: 132). As we shall see in the following section, *pidgins* have been thought to offer such a 'window' on the evolution of language, but the term has not always been precisely defined. As a consequence, linguists who have been involved in the present discourse may not be referring to the same kind of contact variety (cf. Botha, 2006b: 2-3). By *pidgin language* I understand the linguistic creation of a new contact community that has need for a common means of communication for specific purposes but does not share a preexisting language that can fulfill this function. A pidgin is a restricted linguistic system that is used in limited domains (such as trade, labor) by people who retain their native languages. A pidgin language, therefore, has no native speakers (Bickerton, 1995: 29n.; Mühlhäusler, 1997: 6). One should bear in mind, however, that these criteria are necessary but not sufficient for a restrictive definition of the term. The related concept *creole language* has commonly been understood as an apparent 'synthesis *di novo*' by the first generation of native speakers who received [a] Pidgin as their data input and proceeded to "create the grammar" (Givón, 1979: 224). However, there is, as Baker (1995: 4) observes, 'currently no definition of *Creole* which is acceptable to all the people who study these languages.'

4.2 Deconstructing the conventional pidgin window

4.2.1 Pidgins as a potential window on protolanguage

In his book *Language and Species* (1990), Bickerton proposes that the human capacity for language evolved in two stages. The first stage probably took place with the emergence of *Homo erectus*, roughly 1.5 to 2 million years ago (Bickerton, 1990: 136-40; similarly, Carstairs-McCarthy, 1999: 74, 98; Newmeyer, 2003: 69). *Homo erectus* developed what Bickerton calls *protolanguage*, a first approximation of which could be thought of as 'modern language minus syntax' (Jackendoff, 2002: 235) or 'just handfuls of words or gestures strung together' (Calvin and Bickerton, 2000: 137). More precisely, protolanguage designates a form of communication that contains arbitrary, meaningful symbols but lacks any kind of syntactic structure (for details see Bickerton, 1990: 122-26). The next stage of language evolution is supposed to have coincided with the appearance of *Homo sapiens* between 140 and 290

thousand years ago (Bickerton, 1990: 165, 175).⁵ During the last 100,000 years, modern *Homo sapiens* displaced *Homo neandertalensis* at the same time that the archeological record shows a marked increase in the production of artifacts, which presupposes the possession of language by our species (Bickerton, 1990: 175-77; Carstairs-McCarthy, 1999: 98). This second stage marks the emergence of language as we know it, or what for clarity one could call *true language* (Bickerton, 1990: 177), *modern language* (Jackendoff, 1999, 2002: 235), *full language* (Carstairs-McCarthy, 1999: 98), *full modern language* (Botha, 2006b: 1), *full human language* (Bickerton, 1998), or *fully developed human language* (Bickerton, 1990: 137).

Bickerton (1990: 177-81, 1995: 68-75, 1998, 2000: 276, 2007: 520-21) believes that the transition from protolanguage to full language must have occurred suddenly in our species. He explicitly rejects the possibility of a gradient transition or intermediate stage that might have served as a bridge between protolanguage and full language. The emergence of various syntactic elements needed to happen virtually simultaneously: 'The principles involved are across-the-board principles: they apply everywhere, to all structures. At any given time, either they were in place or they weren't. Once they were in place, what was to stop syntax becoming immediately like it is today?' (Bickerton, 2003: 91). Bickerton (1990: 177) suggests a narrowing of the temporal range for both 'catastrophic' events – species origin and the emergence of full language – to a date of around 200,000 years ago.

Full language built on protolanguage rather than superseding it. The transition to full language involved the development of systematic grammar, which would entail the sharpening of rudimentary protolinguistic nonreferential items into grammatical items (Bickerton, 1990: 181-85) and the exaptation of thematic roles out of a 'social calculus' to 'set up the categories AGENT, THEME, and GOAL' and produce the basis for syntax (Calvin and Bickerton, 2000: 136; similarly, Bickerton, 1990: 185-88, 2000: 268-70). Syntax began with the mapping of thematic roles onto 'protolinguistic output' (Calvin and Bickerton, 2000: 137) in such a way that led to the imposition of the hierarchical structures defined by the X-bar theory and to recursivity (Bickerton, 1990: 191; Calvin and Bickerton, 2000: 138; but see Calvin and Bickerton, 2000: 223). Standing alone, argument structure cannot remove all ambiguity from syntax. In more recent work Bickerton has revised the evolutionary sequence to include a third phase, during which 'our ancestors must have been competing with one another to produce devices that would

⁵Following Crowe (1998), Corballis (2003: 213) dates this second "speciation event" to around 170,000 years ago.

make ... syntax more readily parseable, hence easier to understand automatically' (Calvin and Bickerton, 2000: 146).⁶

What is supposed to elevate Bickerton's story above mere speculation is his claim that protolanguage has left traces of itself in the contemporary world (Bickerton, 1990: 105-29). It is manifest in situations when full language has not developed: (i) on the one hand in the language of children under two years of age (Bickerton, 1990: 110-15) and (ii) on the other hand in experiments in teaching languagelike systems to apes (Bickerton, 1990: 105-10). It also surfaces when full language is disrupted. The more rudimentary a variety, the greater its window potential should be. Examples are (iii) cases of feral and abused children like Kaspar Hauser (Louden, 1999) and Genie, who are isolated from human contact and have no opportunity to acquire language during the critical period (1990: 115-18; cf. Heine and Kuteva, 2007: 203-5), (iv) pidgin languages in their early stages (1990: 118-22), and (v) possibly aphasia (1990: 127-29). Attributes of protolanguage are also discerned in the speech of nonproficient L2-learners (Calvin and Bickerton, 2000: 257).

Just as the transition from protolanguage to full language must have been 'catastrophic' in evolutionary terms, the transition from pidgins to creoles is (according to Bickerton) likewise abrupt, at least in the 'interesting' cases.⁷ Bickerton (1981: 2, 4; 1990: 169; similarly, Calvin and Bickerton, 2000: 33) uses the term *creole* to refer to a language which arose out of a prior pidgin (created by adults) that had not existed for more than a generation and was acquired as a native language by children on plantations using polyglot slave labor (contract labor in the case of Hawaii). The structural distance between a pidgin and its associated creole is immense. Characteristic of Hawaiian pidgin English, for example – and, presumably, protolanguage – are five properties that cluster together: (1) 'guesswork' identification of null elements, (2) variant word orders unrelated to function, (3) a lack of structural means for embedding

⁶For a critical appraisal of the 'exaptationist theory' articulated in Calvin and Bickerton, 2000: ch. 10, see Botha, 2003: 76-81.

⁷*Mutatis mutandis*, of course. Bickerton (1990: 171-72) cautions that all this does not furnish conclusive evidence that the original transition from protololanguage to full language took place in a similar way: 'First of all, evolutionary abruptness is not the same as everyday abruptness. An evolutionary change may be considered abrupt if it takes place in a few thousand years as opposed to a few hundred thousand. Second, while the existence of some distinct transitional mode in the contemporary world would have increased the probability that some similar mode would have existed in the past, the absence of such a mode tells us merely that, in principle, it is possible to do without one.' That said, Bickerton is nevertheless inclined to swipe the intermediate stage hypothesis with Occam's razor (further on this point in Bickerton, 1990: 177-81), though one can make cogent arguments for the opposite view. The issue of catastrophism versus gradualism in phylogeny is a contentious one.

and adjunction, (4) random absence of subcategorized arguments, and (5) the presence of some nonreferential items, but only at the 'meaningful' end of the range (Bickerton, 1990: 169). Creoles differ substantially from their antecedent pidgins in that they have all the basic features of established human languages: (1') unambiguous identification of null elements through rule-supplied patterns rather than context, (2') word order permutations clearly related to function, (3') freely available devices for sentential expansion, (4') fully subcategorized arguments in place or linkable 'to their appropriate places by regular processes,' and (5') a full array of nonreferential elements (e.g., a 50-50 proportion of grammatical to lexical items in Hawaiian Creole English) (Bickerton, 1990: 170-71).

The central point is that in the early stages, 'which are the relevant ones for present purposes, pidgin structure is not just impoverished but nonexistent, and the pidgin itself is not a true human language in the sense of the present discussion' (Bickerton, 1995: 29n.; similarly, 1990: 169, 1995: 37, 2007: 511, 516; Calvin and Bickerton, 2000: 33, 137, 257). Bickerton assumes that the diverse immigrant slave population, lacking a common lingua franca, pidginized the superstrate (European) language, to which they had only limited access. The primary linguistic data for children of their issue would be this 'chaotic and virtually structureless' pidgin itself (Bickerton, 1995: 37).⁸ While slave children may have had access to the heritage languages of their parents, there was little incentive to acquire them in such a milieu. Yet, it is striking not only how creole children are able to compile a full-fledged language on the basis of input that is 'radically mixed and degenerate' (Bickerton, 2007: 513), but also how the grammar of a creole bears the closest resemblance not to grammars of indigenous and/or immigrant (substrate) languages, nor to that of the dominant (superstrate) language, but rather to the grammars of creole languages in other parts of the world. In previous work (1981, 1984) Bickerton explained these (in neither case undisputed) facts by appealing to a 'bioprogram' for language that harks back to the emergence of *Homo sapiens*: 'Creole grammar constitutes a kind of 'inner core grammar' from which more

⁸Hurford (2003: 50) comments that 'modern linguistics has tended to characterize the overt phenomena of language, the spatio-temporal events of primary linguistic data (PLD), as "degenerate.'" If the input for L1-acquisition is defective even in ordinary circumstances, then linguistically diverse creole societies would have had to confront children with conditions that were extreme indeed. Even if we grant Bickerton his claim that the earliest cohorts of creole children were subject to exceptionally restricted primary linguistic data, they may not have lacked any more *relevant* input than their counterparts in 'normal' settings, as Lightfoot (e.g., 2006) has argued.

complex and varied grammars may have evolved' (1984: 188); and further: 'Creole languages form an unusually direct expression of a species-specific biological characteristic, a capacity to recreate language in the absence of any specific model from which the properties of language could be 'learned' in the ways we normally learn things' (Bickerton, 1990: 171). In his latest published statement to date, Bickerton reaffirms his position that the rapid deficit repair and apparent cross-linguistic parallels among creole languages illustrate the 'robustness of the biological template' (2007: 514).

Givón (1979: 223-26; 1995: 359-62, 402-4; 1998: 56-58) characterizes pidgins – along with early child language and agrammatic aphasia – as an extreme case of what he has called the pragmatic or pregrammatical mode of communication. Creoles possess a syntactic (or grammatical) mode of communication, like any other full language. Pidgins – at least in plantation societies using slave labor – exhibit 'an enormous amount of internal variation and inconsistency both within the output of the same speaker as well as across the speech community. The variation is so massive to the point where one is indeed justified in asserting that the Pidgin mode has *no stable syntax*' (Givón, 1979: 224, emphasis in original; similarly, Givón, 1995: 30, 1998: 60). But Givón (1998: 60-61, 93-96) attempts to show that pidgins do conform to several 'rules' that may be called 'pre-grammar' or 'proto-grammar.' These rules reflect cognitively 'natural' (i.e., transparent, iconic) meaning-form pairings that are characteristic of the pregrammatical mode. Examples are: 'Units of information that belong together conceptually are kept close temporally'; and 'predictable – or already activated – information [is] left unexpressed' (loc. cit.). Interestingly, protogrammatical rules are embedded in the grammatical mode of communication and often integrated with the morphosyntactic rules of full languages. Critical steps in the evolution of grammar, which is arguably the last major developmental phase in the evolution of language, would entail a progression from holophrasis and mono-propositional communication, to the appearance of protogrammar and multi-propositional discourse (akin to the pregrammatical pidgin mode), and then to the integration of protogrammar into the more 'arbitrary' (i.e., symbolic) encoding of the emergent grammatical mode (Givón, 1998: 92-99).

Jackendoff (1999, 2002: 235-61) argues that we can extrapolate from modern human language a sequence of partially ordered evolutionary steps or stages in the emergence of language in our species. Some of these stages are prior to protolanguage in Bickerton's sense, and some later; each is an improvement in terms of expressive power and precision. Following the lead of Bickerton and others, Jackendoff looks for traces of these stages in 'degraded' forms of modern language and relates the stages to what apes have been trained

to do (2002: 236). 'Degraded' forms of language include child language, late language acquisition, aphasia, and pidgins. In some instances Jackendoff claims to show not just that these earlier stages are still present in the brain, 'but that *their 'fossils' are present in the grammar of modern language itself*, offering a new source of evidence on the issue' (2002: 236, emphasis in original). He adds: 'It is of course never clear how relevant such evidence is for evolutionary concerns – in particular, to what degree ontogeny really does recapitulate phylogeny. Nevertheless, this is all the evidence we've got, so we must make the most of it, while recognizing that it should be taken with a grain of salt' (2002: 237).

Protolanguage 'fossils' include single-symbol utterances (holophrasis), Agent First, Focus Last (the natural mirror image of which is Topic First), Grouping (modifiers tend to be adjacent to what they modify), and nominal compounding. These semantically motivated phenomena are observable in pidgin languages and in the Basic Variety (BV) posited by Klein and Perdue (1997), which is 'a kind of minimalistic acquisition of a foreign language up to a level where basic communication can take place but no further' (Johansson, 2005: 239). In its technical sense, BV is to be understood as 'an instantiation of the essential properties of the human language capacity, and ... as the "initial fossilization point" of adult second language acquisition' (Meisel, 1997: 374).⁹ Like (early) pidgins BV is fairly close to what Bickerton (1990) describes as protolanguage (Jackendoff, 1999: 276, 2002: 249). Bickerton (1990: 120, 122–23) imputes to protolanguage a less stable word order than that in BV. Jackendoff opines that this may be partly because Bickerton's evidence comes from incipient pidgins, 'which are heavily influenced by the native language(s) of their users' (1999: 276; similarly, 2002: 249).

Some parts of language are not subject to critical-period limitations and are immune to degradation when the transmission of language is disrupted, in particular the acquisition of vocabulary, the concatenation of words, and simple semantically based principles of word order. The survival of these features – and not others (such as the details of phonology, phrase structure, and especially inflectional morphology) – in degraded forms of language may serve as evidence for their 'evolutionarily more primitive character' (Jackendoff, 1999: 276). Jackendoff's conclusion is that Universal Grammar is not simply

⁹That BV reflects creative processes underlying the human language faculty and linguistic organization independent of specific languages is not uncontested. Meisel (1997) suggests a rather different view of BV, having found evidence that casts some doubt on the claim that it is an I(ternal)-language. BV is essentially a type of early L2-interlanguage that is constrained by Universal Grammar but driven by nongrammatical cognitive processes.

'on or off in abnormal situations. Those subcomponents that are particularly prone to disruption are 'significantly, the same ones in case after case. The robust remnant is protolanguage' (2002: 264). Jackendoff differs from Bickerton by portraying grammar not as a single unified system but as a 'collection of simpler systems,' many of which are built up as refinements of preexisting interfaces between components. Hence, the evolution of the human language faculty can be seen as 'deeply incremental' (loc. cit.).

4.2.2 *Discussion*

Bickerton's language bioprogram hypothesis was initially very influential and provocative of further research. But it was also highly controversial and ultimately won few supporters in creolistics, even while enjoying a more sympathetic reception in other areas of linguistic inquiry, including some work on language evolution.¹⁰ The issues are well known and call for only brief recapitulation here: (a) Contrastive studies have found less similarity among creoles than Bickerton has claimed. (b) The typological similarities that do exist across creoles find better supported alternate explanations. (c) Longitudinal studies indicate that creoles developed some of their features over longer periods of time than Bickerton has wanted to believe.¹¹ (d) Contemporary theory has moved away from the conventional notion of creoles *qua* nativized pidgins requiring the special intervention of children and from the proposition that creoles have a special status, reflecting Universal Grammar 'in a direct or privileged fashion' (Lightfoot, 2006: 152; cf. also Ragir, 2002: 282-83; Mufwene, 2008: 1n., 23-24). Slobin (2002: 386-87) is not convinced by any of the evidence or arguments for Bickerton's bioprogram. He calls the reader's attention to a body of data that shows how 'languages that are considerably more complex than pidgins can arise in interaction with adults,

¹⁰Cf., e.g., Nocentini, 1999: 472-74, albeit with some reservations and qualifications. Pinker (2003: 22-23) examines the question of whether human language resembles culturally acquired abilities or looks more like a part of the standard human phenotype. As evidence for the latter view and citing Bickerton (1981), he offers the proposition that creole children 'did not passively have the pidgin culturally transmitted to them, but quickly developed creole languages, which differ substantially from the pidgins and have all the basic features of established human languages' (p. 23). Other types of evidence marshaled by Pinker will carry the larger point, but as we shall see presently, creolization cannot be assumed to be a special kind of L1-acquisition. Kihm (2002) offers a not unsympathetic but far more cautious assessment of the language bioprogram hypothesis and its implications for the study of language evolution.

¹¹The gradualist position on creole formation appears to have made its way to evolutionary linguistics, e.g., Aitchison, 1998: 24. Tellingly, Li (2002: 91, my emphasis) writes: 'If creolization is a hint, *a few generations* probably constitute sufficient time for a grammar to emerge as speakers begin to sequence words together to form larger communicative units.'

before there are native speakers' (p. 386). The first generation of native speakers 'smoothes out' the language rather than creating new forms (Slobin, 2002: 386; similarly, Mufwene, 2008: 3, 7, 16-23). The learning processes, he concludes, are normal 'and do not reveal special capacities of the language-learning child beyond what is already known about the acquisition of 'full-fledged' languages. A creole language develops over time, in contexts of expanding communicative use of a limited pidgin language. Child learners help to push the process forward, arriving at a grammar that is more regular and automated – but they do not appear to be the innovators' (p. 387; cf. also Mufwene, 2008: 12). The transition from pidgin to creole grammar does not therefore lend support to Bickerton's postulation of a relatively abrupt transition from protolanguage to full language. If creole lexis and grammar come largely from the contributing languages and/or from adult innovation, then creole languages 'cease to be of interest for our present enterprise, since neither in lexicon nor grammar do they illustrate creation anew of a language' (Comrie, 2000: 995).

Independently of whatever probative value the formation of creole languages may or may not be for the study of language evolution, there remains the idea that pidgins have the characteristics that are most likely to have been present in early forms of human language. Pidgins were developed largely through interactions between adults who are in possession of a fully developed *faculté de langage* and have native proficiency in one or more full modern languages. These facts raise the question of how the similarities between pidgins and early human language structure 'can be related to one another in systematic way, especially since it remains unclear how the structure of pidgins is affected by the presence of the various lexifier and substrate languages that characterize the genesis of pidgin languages' (Heine and Kuteva, 2002: 393). Unlike pidgin speakers, the creators of protolanguage would not have had preexisting full languages from which to draw resources (Mufwene, 2008: 14n.).

Botha (2006a: 134-36) examines Jackendoff's position that traces of ancestral language are recoverable from 'degraded' forms of modern language. The occurrence of certain properties in the latter is taken by Jackendoff as evidence for the conclusion that protolanguage was likewise characterized by these very properties. The thesis falters on Botha's criterion of *groundedness*, which requires that the attributes of a proposed window phenomenon be well understood (Botha, 2006a: 134). Jackendoff merely offers an ad hoc list of modern exemplars, without addressing the question of what it is about a form of language that makes it 'degraded.' It will turn out that 'degradedness' should be distinguished from restrictedness. In Botha's critique (2006a: 136-37) it is

further demanded that inferences about language evolution drawn from a putative window phenomenon be *warranted*. A windows approach should provide justification for drawing inferences about facets of language evolution from modern data that represent different kinds of entities. It is not sufficient merely to assert *ipse dixit* that 'degraded' forms of language are evolutionarily primitive or language fossils. Botha's third window evaluation criterion is that of *pertinence* (2006a: 138-40). The conclusions that Jackendoff arrives at through his 'degraded' language window are, in Botha's estimation, clearly about 'the right thing,' namely the evolution of language (vis-à-vis the evolution of an entity that is distinct from language or an aspect of language that is distinct from its evolution, 2006b: 138). The essential point is that to achieve pertinence, each 'pane' in Jackendoff's window must be individually grounded and warranted. That would involve, *inter alia*, underpinning by a restrictive theory of what a pidgin is, a matter that we shall take up in section 3.

Mufwene's (2008) criticism of the pidgin (and creole) window concentrates on many of the foregoing points. He denies that creoles developed from pidgins at all (2008: 4, 12, 15) and prefers a strictly sociohistorical definition of *creole languages*, which are a group of vernaculars that emerged from the seventeenth through the nineteenth centuries under similar geographic, demographic, and economic conditions, *viz.* in (usually) tropical colonies settled by Europeans who typically spoke nonstandard varieties of metropolitan languages and who put in place plantation economies that utilized nonindigenous slave labor (Mufwene, 2000: 78). He emphasizes that what little the development of pidgins and creoles tells us about the evolution of language is *not* what has been claimed in the literature. The histories of these languages in (respectively) European trade and plantation colonies of the Early Modern era 'present nothing that comes close to replicating the evolutionary conditions that led to the emergence of modern language. Nor are there any conceivable parallels between, on the one hand, the early hominids' brains and minds that produced proto-languages posited by Bickerton (1990, 2000) and Givón (1998) and, on the other, those of both the modern adults who produced (incipient) pidgins and the modern children who produce child language, even if one subscribes to the ontogeny-recapitulates-phylogeny thesis' (2008: 2-3).

Mufwene (2008: 14, 36) does make allowance for deeper-seated structural elements that are likely to survive the collision of languages during pidginization. Incipient pidgins can be expected to preserve those structural components that are 'the most robust' and 'perhaps the most deeply entrenched' in evolutionary terms. He readily acknowledges the probable correctness of Givón's (1998: 92, 105) observations regarding gradualness in the co-evolution of language and the cognitive infrastructure necessary to carry it (2008: 3),

adding that the development of creoles and pidgins is similar only in being a gradual process (2008: 33). Here, Mufwene's position is itself problematic, for the time scales of evolutionary processes and of the processes of pidginization and creolization are incommensurable (Botha, 2006b: 8). Aside from survivability and graduability, the one other parallelism between the development of pidgins and creoles and the evolution of human language lies in inter-individual variation, the convergence of idiolectal systems through mutual accommodation, and the competition and selection of features during the emergence of communal norms (Mufwene, 2008: 2, 31, 35).

4.3 Reframing the pidgin window

At issue is whether key aspects of pidgins and pidgin formation could have had analogues in certain facets of language evolution. Arguments – *pro et contra* – have engaged the following factors: (i) the environments in which pidgins formed, (ii) the cognitive capacities of the people who created these codes, (iii) the linguistic properties of pidgins, (iv) the role of pragmatics, (v) the general nature of the processes involved in the formation of pidgins (e.g., graduability, competition and selection of features), and (vi) the specific developmental processes involved (Botha, 2006b: 4). When reading the literature on what restricted linguistic systems might tell us about language evolution, one is struck by the emphasis on factor (iii) and the lack of an explicit recognition of pidgins as dynamic systems.¹² In this section I argue that a properly constructed pidgin window would look out not onto language structure per se but onto process, namely, the sequence of linguistic developments that led to the elaboration of minimal codes into more complex systems.

The prevailing occupation with recovery of the remotest conceivable language structure out of which modern complex forms emerged has fixed attention on 'early-stage' pidgins, the properties of which are supposed to mirror protolanguage. These highly restricted codes are what some linguists would prefer to call *jargons*, which are ad hoc, unstable, individual solutions to the problem of interethnic communication (*secondary hybridization* in the model of Whinnom, 1971). Jargons are characterized by a lack of morphology and syntactic rules (Mühlhäusler, 1997: 134). The principal communicative strategies are holophrasis, pragmatic structuring (often involving two-word concatenations), context-dependency, universals, and L1-transfer; cultural and personal factors appear to play a role as well (Mühlhäusler, 1997: 56, 119, 128). There are no social norms, nor are jargons transmissible to subsequent

¹²A notable exception is Heine and Kuteva (2007), which was published in late 2007 and was unavailable to me when I prepared the prefinal version of this article.

generations in any consistent way; they are to a great extent invented and reinvented by individuals (Mühlhäusler, 1997: 119, 138). Even if jargon speakers do not, at the outset, seek to acquire a preexisting language as a whole language, social integration or increased contact may afford them with opportunities to modify their speech in the direction of a target language.

Pidgins are the result of language creation rather than impaired or partial second language acquisition. Jargon speakers interacting with one another develop more complex, qualitatively different linguistic systems out of minimal, ad hoc codes, as communicative requirements become more demanding (*tertiary hybridization*, in the model of Whinnom, 1971). Pidgins are communal rather than individual solutions to the problem of interethnic communication. The transition from jargon to (stable) pidgin coincides with the formation of a language community and the emergence of socially accepted linguistic norms, which occurs when none of the languages in a heterogenous milieu serves as a target language (Mühlhäusler, 1997: 6, 138, 162).¹³ Linguistically, pidgins differ from jargons in the following way: 'Generally speaking, stabilization implies the gradual replacement of free variation and inconsistencies by more regular syntactic [and] lexical structures. In the former area, a pragmatic mode of speaking begins to give way to a grammatical one, whereas in the latter lexical dependency on outside resources is supplemented with internal means of lexical expansion. Most important, new grammatical devices are independent of a speaker's first language or other individual language learning strategies' (1997: 138). That pidgins with no shared history exhibit recurring similarities in structural make-up suggests that 'people appeal to innate linguistic universals when under pressure for communication' or, alternatively, the observed similarities are relatable 'to more general pragmatic and problem-solving capacities found with human beings' (Mühlhäusler, 1997: 162-63). Moreover and critically, when a highly diverse population participates in language construction, the L1-transfer that is characteristic of the jargon stage should not be of great significance for subsequent stabilization: 'The more different their areal linguistic background, the less likely is substratum influence, and the more speakers rely on universal strategies' (Mühlhäusler, 1997: 119). Unlike jargons, which can become targeted in the direction of preexisting whole languages, directionality in pidgin formation is internal; that is, the real target in these circumstances is the linguistic system that speakers

¹³Whinnom's claim that pidgins are unlikely ever to have crystallized in other than multilingual situations (1971: 104, 106; similarly, Mühlhäusler, 1997: 138) is doubtless too strong. I adopt here the weaker claim that *most* pidgin situations involve three or more groups of people, with a two-language situation leading to the development of a pidgin only when there is a 'profound social separation' of the two groups of speakers (Thomason and Kaufman, 1988: 197-98).

are actually developing (Whinnom, 1971: 105; Baker, 1997: 104; Mühlhäusler, 1997: 138; cf. also Thomason and Kaufman, 1988: 178).

In the present framework the distinction between jargons and pidgins does not represent a binary opposition. Rather, these contact varieties are part of a continuous spectrum between pragmatic and syntactic modes of communication, with jargons at the one pole, full languages (including creoles) at the opposite pole, and pidgins defining the mid-range. In three important aspects – rudimentary attempts at intergroup communication by fully languaged *individuals* versus *group* language construction, the role of L1-transfer, and the potential for targeting in the direction of a full language (resulting in interlanguage continua) – jargons differ significantly from pidgins under the restrictive definition of the latter term. Yet, some linguists who work on pidgin and creole languages 'have not regarded the distinction between jargon and stable pidgin as one deserving great attention: the two stages are often lumped together and compared jointly with creoles, which develop at a later stage' (Mühlhäusler, 1997: 138). To the extent that the distinction is drawn at all in the literature on language evolution, it is the jargon stage that is assumed to be of relevance.¹⁴ Conceptualization of an asyntactic protolanguage along the lines of 'modern' jargons seems reasonable and could even be correct. But such a window on language evolution would be grounded in a phenomenon that is actually quite distinct from stable pidgins, which are more advanced along a developmental continuum. To illustrate this point, let us briefly revisit the literature on our subject.

As is clear from Jackendoff's discussion (2002: 247), the features of BV do seem to parallel those of jargons: (a) lexical competence, (b) absence of inflectional morphology, (c) omission of contextually supplied arguments, (d) no subordination, and (e) largely semantically-based principles of word order, most prominently, Agent First and Focus Last. In a subsequent passage Jackendoff (2002: 264) writes of the severe impairment that occurs in late language learning, yielding BV and incipient pidgins (by which he must mean jargons). Benazzo (2008, this volume) writes that the initial systems of adult language learners do not seem to be strongly influenced by their L1: 'A target language-like lexicon is organized on the basis of pragmatic and semantic principles which are largely independent of the Source/Target language specifics.' The earliest stage of L2-acquisition involves neither a process of

¹⁴Unlike most linguists who have been concerned with the pidgin window, Heine and Kuteva (2007: 166) do not confine themselves to jargons but also deal with pidgins that have reached more advanced stages of development. Their principal case study, Kenya Pidgin Swahili, does not fall neatly along the jargon – (stable) pidgin – extended pidgin continuum but shows a great range of variability, including lects that approach Coastal Swahili (2007: 170).

relexification nor 'piecemeal imitation' of a native-speaker model. The differential treatment of BV and jargons would seem unwarranted. Both variety types represent a kind of minimal pragmatic response to communicative exigencies upon initiation of interlingual contact. Both originate in a common 'pre-basic' mode of intergroup communication, at which point utterances are organized as nominal structures without verbs (cf. Heine and Kuteva, 2007: 301). And both cease to be representative of early processes of human language formation as soon as L1-imposition and/or at least partial targeting become factors.

An interesting way of conceptualizing the very earliest stage of human language is suggested by Heine and Kuteva (2002: 390-91, 2007: 29-31). Their view of language change is uniformitarian, that is, they presume that diachronic processes (*primary hybridization* in the terminology of Whinnom, 1971) were the same in the past – even the very remote past – as they are in the present. With regard to language structure, however, their view is distinctly nonuniformitarian. On the basis of evidence from grammaticalization, whereby lexical items acquire specialized grammatical meanings in a unidirectional progression, they propose that what they refer to as 'early language' (2007: 4, *passim*) – language at the point at which the forces of historical change came into being – had a structure that was less complex than that which is characteristic of modern languages (2007: 30). Early language can be thought of as an essentially lexical stage of language evolution that saw the emergence of – first – one type of wordlike units 'denoting thing-like, time-stable entities, that is, nouns,' and – secondarily – another type of units 'denoting non-time-stable concepts such as actions, activities, and events, i.e., verbs' (2002: 390; similarly, 2007: 300, 302). But at this developmental stage, human language must have lacked function words and grammatical morphemes to express syntactic relations, spatial orientation or possession, and distinctions of personal deixis (pronouns) (Heine and Kuteva, 2002: 390-91, 394; 2007: 302-3). Once a noun-verb distinction crystalizes, 'many other design features can crystallize around it (Jackendoff, 2002: 259), and grammaticalization now becomes the driving force of grammatical evolution' (Heine and Kuteva, 2007: 303).

In a similar vein Hurford (2003: 52-53) wishes to show how language systems could have become increasingly complex once humans had achieved a state of language readiness. Language can be viewed as a 'cyclic interaction across generations' between I(ternal)-language and E(xternal)-language (p. 51). This way of looking at diachrony has been of importance for grammaticalizaton theory. Hurford offers a number of suggestions about what earlier stages of human language were like, based on the unidirectionality of

grammaticalization and on the premise that functional items originated in lexical stems. This leads him to hypothesize that the earliest languages had no articles, no auxiliaries, no complementizers, no subordinating conjunctions, no prepositions, no agreement markers, no gender markers, no numerals, no adjectives. In addition he speculates that the earliest languages had no proper names, no illocution markers, no subordinate clauses or hypotaxis, no derivational morphology, less differentiation of lexical categories (perhaps not even N, V), and less differentiation of subject and topic (2003: 53).¹⁵

The structure hypothesized for early language resembles that of 'early' or 'unstable pidgins' (Heine and Kuteva, 2002: 391-92; Hurford, 2003: 53). Beyond the jargon phase, however, pidgins display at least some grammaticalized elements (e.g., expressing negation, aspect, deixis) and hierarchical structure.¹⁶ Restricted though they may be compared to full languages, stable pidgins are not as linguistically primitive as what one might reasonably suppose the earliest conceivable human language to have been on the basis of grammaticalization theory. At its primal stage, Heine and Kuteva (2002: 394) conclude, human language does not appear to find a parallel in modern pidgins or other varieties that arise in situations of 'communicative stress'.¹⁷ It may be correct to suppose that pidgins exhibit degrees of grammaticalization that early language could not have shown, but such a conclusion would be reached from the perspective of a static outcome.

In their most recent statement, however, Heine and Kuteva (2007: ch. 4) have explicitly cast pidgins as dynamic, developing systems, which is precisely the position that is taken here. In their view the question of whether one can establish reasonable analogues between early language and pidgins yields a decidedly mixed answer. There are four main reasons why pidgins are relevant for the reconstruction of early language, all of which have to do with the way in which a language having little grammatical complexity gains complexity: (i) the rise of functional categories through the combination of existing material in novel ways; (ii) the relatively quick rate of innovation (within a few generations as opposed to centuries); (iii) the emergence of 'auxiliary' functions among regularly used collocations of two lexical items leading to the creation of grammaticalized forms; and (iv) the potential for newly evolving patterns

¹⁵Hurford (*loc. cit.*) notes that one could apply similar ideas to semantics (e.g., no polysemy, no metaphor, fewer hyponyms) and phonology (simple vowel systems, CV syllable structure).

¹⁶Mufwene (2008: 4n.) finds no evidence that idiolects of which pidgins are constituted are not internally systematic.

¹⁷Givón (1979: 225, emphasis in original) defines *communicative stress* as follows: 'The Pidgin-speaking community is thrown together *without a common language* but has urgent tasks to perform.'

and categories to arise independently of resources in the languages available to pidgin speakers (Heine and Kuteva, 2007: 195-98). Factors that differentiate modern pidgins from the situation of early language and appear to militate against a pidgin window are the following (Heine and Kuteva, 2007: 193-95): (v) Pidgins begin their life cycle as heavily reduced and simplified versions of full languages; the direction of change (from grammatically complex to less complex forms of language) is exactly the opposite of how language evolution must have proceeded. (vi) There are usually a number of preexisting linguistic features that survive pidginization; that is, these features are drawn directly or adapted from full languages in the mix. (vii) Pidgin speakers had at all times at least one 'functionally adequate' language from which to draw resources. (viii) Frequently, though, individual multilingualism is the rule in social encounters that give rise to pidgins. (ix) Leaving aside the issue of whether early-language speakers would have been able to access the same cognitive endowment as modern-language speakers, Heine and Kuteva (2007: 195) aver that 'pidgin speakers were able to draw on cognitive skills that would enable them on the basis of the communicative networks they were exposed to – in particular skills that were available to them to establish and express relations among different concepts.' (x) Pidgins are limited to a small number of social domains. There is no reason to suppose that early language was so restricted. As regards points v-x, I believe that the contrasts drawn between modern pidgin formation and the transition to full modern language from a protolinguistic state will prove largely illusory, if one proceeds from the restrictive definition of *pidgin* that is proposed above and from a constructive model of pidgin formation.

4.4 A constructive model of pidgin formation

Baker observes that a common thread through different accounts of how pidgin and creole languages were formed is failure: 'People tried to acquire a European language and failed, or they tried to maintain their traditional language and failed'; either way, these contact languages 'were the result of failure' (1995: 6; similarly, 1990: 107, 1994: 65-66, 1997: 91). Most pidgins and creoles, Baker believes, should not be seen as imperfect and incomplete attempts at second language acquisition. They are, initially at least, 'self-evidently successful solutions to problems of human intercommunication – languages made by and for their users over generations, drawing on the range of available resources, and tailored to their users' specific and changing communicative needs' (1990: 117; similarly 1995: 6, 13).

A no-less common theme through different accounts of language evolution is that pidgins are restructured and radically stripped down forms of preexisting full languages (cf. Jackendoff, 2002: 236; Heine and Kuteva, 2002:

393, 2007: 168; Mufwene, 2008: 13). Heine and Kuteva (2002: 391), for example, situate pidgin formation in the following context: 'In languages used in stress situations, where linguistic communication is seriously impaired, where people have only "inadequate" linguistic models at their disposal, everything that is not vital tends to be stripped off and hence language structure may be reduced to its most essential, and least dispensable, characteristics. Such characteristics are the ones most likely to have been present also in earlier forms of human language.' As regards developmental processes, Botha (2006b: 9) points out that on a priori grounds, it would seem unlikely that reduction (loss of referential and nonreferential power) and simplification (regularization) would have played a role in the first appearance of language. Conceptualization of a pidgin as a 'degraded' variety entails the unexamined assumption that its lexical source language constitutes a target language, even if access is limited: 'To comment on an all-too-frequent misconception – simplification of the lexical source language by people who did *not* know it could play no role at all, because you can't simplify what you don't know' (Thomason and Kaufman, 1988: 178, emphasis in original). If it turns out that pidgin speakers were not attempting to acquire a preexisting language, then 'degradation' is merely an artifact of contrastive analysis.

Baker's 'creativist' or 'constructive' approach (1990, 1994, 1995, 1997, 2000) rejects entirely the propositions that each pidgin and (subsequently)/or creole can be regarded as a restructured form of a preexisting language and/or the product of a special kind of second-language acquisition. The process is one of language creation (Baker, 1990: 111, 1995: 4, 1997: 91, 2000: 48); that is, pidgins and creoles are in essence what those who created them wanted them to be (1995: 13, 2000: 48). Whenever two or more groups of people lacking a common language enter into sudden and sustained contact and have a mutual interest in both intercommunication and maintenance of group identity, they are likely to start constructing a basic 'medium for interethnic communication' (MIC), although for present purposes we should perhaps want to adjust this term to 'medium for intergroup communication' or simply 'medium for intercommunication.' Their 'real, if unconscious, aim' was the development of a new language, suited to their immediate communicative needs, which they 'subsequently expanded and adapted ... as their growing or changing needs demanded, drawing at all times on the resources available' (1990: 111; similarly, 1997: 96) and by innovating.

The main function of the MIC is to serve as a supplementary code that enables communication between people who do not share a preexisting full language and for whatever reason cannot or do not acquire one. Local conditions may extend the functional role of the MIC beyond supplementation

to less marked contexts and bestow upon it a measure of social indexicality. In colonial plantation societies, for example, locally born slaves would have had far more in common with one another, due to their upbringing in the same territory, than with slaves imported from abroad. Among their shared knowledge would be proficiency in a more elaborated form of the MIC. In fact the emerging language of locally-born slaves would have become not only a more developed form of the MIC but what Baker calls a 'medium for community solidarity' (MCS), which is 'a form of speech closely related to the basic [or elaborated] MIC but sufficiently different from the latter to serve as a badge of identity for locally-born slaves enabling them to recognize each other as such on the basis of speech alone' (Baker, 2000: 54). The conventional distinction between pidgins and creoles based on whether they are the first language of some of their speakers serves no useful purpose (Baker, 1995: 4, 1997: 91, 2000: 48n.). All pidgins and creoles are – or were, formerly – MICs; many subsequently became MCSs (Baker, 2000: 48n.).

Botha (2006b: 9) refers to Baker's views in his own assessment of pidgin languages as a putative window on language evolution and expresses regret that 'what his creativist account of the genesis of pidgins and creoles might enable us to learn about the first emergence and subsequent development of human language is a question that he is not concerned with.' In the following section I explore the logical basis of the pidgin window within a constructive framework, in the sense that the analysis I outline will satisfy Botha's (2006a) three evaluation criteria: groundedness (the window proceeds from a restrictive definition of *pidgin*), warrantedness, and pertinence.

4.5 Are there creative linguistic processes in pidgin formation?

Botha (2006b: 9) suggests that 'in an assessment of the windowhood of pidgins, it may be useful to draw a distinction between the creation and recreation of linguistic objects.' Processes of creation would produce new linguistic structures and grammatical categories *de novo*, that is, without reference to other, preexisting linguistic objects. Processes of re-creation, by contrast, would produce new linguistic objects by 'doing something' to other, preexisting linguistic structures and categories. If creative processes can be shown to have played a role in the instantiation of a MIC, 'the next pertinent question would be whether they are likely to have had analogs in the evolution of language' (Botha, 2006b: 10).

In the literature, re-creation often denotes the replication of language systems in normal, intergenerational language transmission. Of course, these systems are not perfectly replicated across successive generations of speakers.

They undergo modifications that are (or are not) stabilized by selection. Initially, selected innovations are manifest in structured variability, which a speech community can maintain indefinitely. However, actual usage and/or social valuation may gradually bring about the elimination of one of the competing variants. In targeted second language acquisition speakers attempt to re-create a preexisting language, even though the primary aim may be more one of effecting communication than of achieving full, nativelike proficiency. Replication 'errors' in interlanguage versions of the target language will reflect the imposition of L1-elements as compensation for speakers' limited proficiency, alongside adaptation of target-language resources (e.g., overgeneralization, neologism) and avoidance of features that are difficult to perceive and parse (most famously inflectional morphology, tonal distinctions). The general view probably is that most, if not all features of pidgins and creoles derive from preexisting languages and are of the re-creative type (cf. Baker, 1994: 65, 1997: 96). Mufwene (2008: 26) goes so far as to assert that 'one is hard pressed to find in creoles any grammatical features that have not been selected from the nonstandard varieties of relevant European vernaculars or in their substrate languages.'

In principle the 'resources available' during pidgin formation include all of the languages known to the participants, as well as certain universal aspects of the human linguistic capacity. In practice, however, the contribution of nonlexical input materials depends on the contact environment. In many contact situations the lexifier (superstrate) language is socially remote. Recall, too, that the more diverse the group that bears the burden of constructing a MIC, the greater the degree of discontinuity between the developing system and languages in the mix. A highly heterogeneous linguistic environment tends to prevent the selection of linguistic forms characteristic of any single group of speakers: 'Put differently, in the absence of sufficient overlap and agreement among the speakers of the various jargons in such a situation, universally motivated solutions need to be adopted' (Mühlhäusler, 1997: 138).

Creative processes would produce new objects out of content morphemes and their pragmatically motivated juxtaposition. To substantiate this claim, we should want to examine the formation of a basic MIC, but once again, there is a significant empirical obstacle. Such a phenomenon has never been studied *in situ* and is recoverable only through reconstruction.¹⁸ Longitudinal studies of some extended pidgins (especially Tok Pisin) and creoles (Hawaiian Creole English) in the Pacific have yielded data closer to the initial point of contact (Baker, 2000: 48; cf. also Thomason and Kaufman,

¹⁸According to Baker (2000: 48), no data from the first half century of contact are currently known for any Atlantic territory where an English-based creole is subsequently attested.

1988: 181, Mühlhäusler, 1997: 187).¹⁹ My own research program on the formation of a MIC in southern Africa during the second half of the seventeenth century and its subsequent elaboration in the eighteenth century provides important supporting evidence for the constructive model.

A caveat is perhaps in order here. In several respects my position runs contrary to prevailing views on language contact in colonial southern Africa during the Dutch East India Company era. Den Besten (2006b) sees the formation of the Cape Dutch Pidgin mainly in terms of substrate choices and superstrate choices, both of which would, of course, indisputably presuppose existing structure. He does acknowledge that creative solutions to the problem of intergroup communication played a role and may tell us something about language evolution. 'Yet,' he asks, 'even these instant grammaticalizations presuppose structure. However is creation *ex nihilo* possible at all?' In what follows I shall address myself to this specific question by tracing the development of the earliest attested meaningful entities in the Pidgin.

From the 1590s, English and Dutch ships en route between Europe and the Indies regularly put in at Table Bay, for the refreshment of tired and sick crews. The Dutch East India Company established a permanent outpost there in 1652, which inevitably, perhaps, proved expansive. The indigenous Khoikhoi used jargonized and in some cases more advanced interlanguage versions of Dutch. With the introduction of a slave-labor economy in 1658, the contact situation in the Cape Colony gave rise to a basic, stable MIC by roughly 1713, which we shall call the Cape Dutch Pidgin. Slaves were drawn first from Angola and Dahomey. Subsequently, the Cape Colony turned east for most of its slaves – to the Indonesian archipelago, the Indian subcontinent, Ceylon, Madagascar, the Mascarene Islands, and Mozambique, acquiring the most diverse slave population of any known slave society (Shell, 1994: 40-46). Moreover, this society interacted not only with the dominant European caste and among themselves, they also had to communicate with native peoples in a bonded workforce. Proletarianization of indigenes commenced with the seasonal employment of itinerant Khoikhoi as wage laborers and culminated in their enslavement by the last quarter of the eighteenth century (cf. Shell, 1994: 26-34). Many San (Bushmen) people were kidnapped by armed settler commandos and forced to work on farms. Members of a labor caste – enslaved, enslaved, and impressed – created and elaborated a MIC not through the targeted, albeit imperfect acquisition of the Dutch spoken by the dominant

¹⁹The principal case study of Heine and Kuteva (2007: ch. 4), Kenya Pidgin Swahili, 'was spoken in up-country Kenya in the 1960s and 1970s, when the first-named author had a chance to work on it' (p. 207).

European caste but rather by constructing a system that suited their communicative intent.

At the initial point of contact, all parties used reduced versions of their own languages together with gestures in order to achieve basic communication. These encounters led to the negotiation of sound-meaning correspondences that are a prerequisite for the construction of an actual MIC. To illustrate this process, let us consider some data from the rudimentary Dutch-English-Khoikhoi trade jargon that arose in precolonial southern Africa. On September 9, 1601 the fleet of Sir James Lancaster put in at Saldania, as Table Bay was known to mariners at the turn of the seventeenth century.²⁰ An anonymous diarist describes how his comrades used gestures supplemented by vocalizations thought to be universally understood in order to obtain livestock from the Khoikhoi:

- (1) Then [the General] himselfe went presently a-land to seeke some refreshing for our sicke and weake men; where hee met with certaine of the Countrey people, and gave them divers trifles, as Knives and peeces of old Iron and such like, and made signes to them to bring him downe Sheepe and Oxen; for he spake to them in the Cattells Language (which was never changed at the confusion of Babel), which was *Moath* for Oxen and *Kine*, and *Baa* for Sheepe... . Now within twelve dayes they ceased to bring us any more Cattell. But the people many times came downe to vs afterward; and when we made them signes for more Sheepe, they would point vs to those wee had bought [grazing] ... The people of this place are all of a tawnie colour, of a reasonable stature, swift of foot, and much giuen to picke and steale: their speech is wholly uttered through the throate, and they clocke with their tongues in such sort, that in seven weeks which wee remained heere in this place, the sharpest wit among us could not learne one word of their language; and yet the people would soone vnderstand any signe wee made to them (Raven-Hart, ed., 1967: 23).²¹

While individual, ad hoc verbal solutions to the problem of intergroup communication would be the expected development during the jargon phase,

²⁰After the Portuguese admiral Antonio de Saldanha, who anchored his fleet in the present Table Bay in 1503. A century later, the Dutch applied the surname to what is today Saldanha Bay, which lies roughly 90 kilometers northwest of Table Bay.

²¹Cognates are presumably attested in Nama *gamab* 'ox', *gamas* 'cow', *gūb* 'wether', *gūs* 'ewe' (Rust 1969: 69, 136), Korana *gomab*, *gomās*, *gūb*, *gūs* (Meinhof 1930: 83-84).

there are early on indications of lexicalization. Edward Terry, a chaplain in an English fleet that landed at the Cape in 1616, relates how

- (2) there are great store of cattle, as little beeves, called by the barbarous inhabitants *Boos*; and sheep, which they call *Baas*, who bear a short coarse, hairy wool (Raven-Hart, ed., 1967: 82, my italics).

English and/or Dutch onomatopoetic words imitating the lowing of cattle and bleating of sheep were quickly conventionalized as trade terms for these animals.²² The lexicalization of these terms for 'ox, cow' and 'sheep' is confirmed by the witness of other European travelers: *bou* 'an ox', *bae* 'a sheep' (Cornelius Matelief, 1608, in Raven-Hart, ed., 1967: 38), *booes* 'beeves', *baas* 'sheepe' (Christopher Farewell, 1614, in Raven-Hart, ed., 1967: 66), *boe* 'an ox', *ba* 'a sheep' (Hondius 1652 [1952: 29]). Nienaber (1963: 411-12) related *boo/bou* to an English variant *boo(h)* for the lowing of an ox, which is supported by Dutch *boe* 'moo'.

By the establishment of the Dutch East India Company refreshment station at the Cape in 1652, another form, *boeba* has appeared and is consistently glossed as 'ox or cow' (Ten Rhyne, 1686 [1933: 154]) in our source material.

- (3) vraeghden hun off se ossen off ***boebas*** hadden; daerop een hunner alleen (synde doen met haer 15 à 16 sterck) antwoorde, seggende: 'Caep, Caep,' daer uijt te verstaen was met de ***boebas***, schaeps ende cramerij, alsoo hier voor haer ende 't vee (soo se mede wesen) niet te eteen viel, vertrocken waren (extract from the journal kept by the bookkeeper Fredrick Verburgh, November 3, 1652, in Van Riebeeck, *Daghregister*. Bosman and Thom eds., 1952: 399)
 'Asked them whether they had any oxen or *boebas*, to which one of them all (they were 15 or 16 strong) answered, saying: 'Cape, Cape.' From this was to be understood that they had left with the *boebas*, sheep, and wares, there being nothing here (as they showed us) to eat for them and their cattle.'
- (4) Bravas com Kapiteyn, die Kapiteyn ons van witte ***boeba*** geme (Ten Rhyne, 1686 [1933: 140]) 'Great is that chief, the chief (who) will give us white oxen.'

²²Cf. Nienaber, 1963: 214-15, 411-12, 447; Den Besten, 1986: 197, 1987: 15, 1989: 219.

The sigmatic plural marker in *boebas* (3) reflects the gratuitous addition of the Dutch writer; the actual pidgin form is *boeba* in (4). Den Besten (1986: 197, 1987: 15, 1989: 219) derives *boeba* from Dutch *boe* 'moo', to which the Khoikhoi inflectional morphemes *-b-* (masc. sg.) and *-a* (acc.) appear to have been affixed.²³ Integration of *boe* into local Khoikhoi dialects as a loan word is certainly thinkable, though one would then be hard-pressed to explain an apparent reinflection in *buba-a* [sic] (Valentyn 1726 [1973: 80]), presumably with the same accusative suffix, and possibly also in *bubaâ* (Kolbe 1719 [1727: 1.430]). There is no plausible reason to suppose that *boe* was borrowed into Khoikhoi and then reintroduced into the Cape Dutch Pidgin with L1-morphology. It is far more likely that *boeba* was generated in the MIC out of the raw concatenation of *boo/boe + baa*, to denote 'livestock, collectively cattle and sheep'. Ten Rhyne (1686 [1933: 134n.]) reported *boebaes toebak*, which I would interpret as the MIC exponent of 'livestock tobacco', referring to one of the commodities that Europeans offered in exchange for Khoikhoi oxen, cows, sheep, and skins.²⁴ The interpretation of this compound is informed by the composite meanings of the morphemes, pragmatics, and context.

The larger point is the arbitrariness of linguistic signs, the capacity for which is central to language and a prerequisite for language genesis (cf. Comrie, 2000; Hurford, 2003: 48), and their mutability over time. The nascent Cape Dutch Pidgin early on acquired two referential morphemes – themselves the product of sound symbolism – from which its users then created a compound of an exocentric type. *Boeba* is independent of the morpheme-source languages (Dutch and English) and the substrate Khoikhoi dialects (cf. Nama /*goan* 'livestock', Rust, 1969: 114). Taking the philological record at face value, one surmises that the cohort of Europeans which landed at the Cape in 1652 under the command of Jan van Riebeeck construed *boeba* as the local term for 'cattle'. Indigenes appear to have accepted the narrowing of the compound's semantic scope for trading purposes, perhaps after the introduction

²³Nienaber (1963: 412) interpreted *boeba* as containing an onomatopoetic expressive sign but did not attempt to parse it further.

²⁴According to Ten Rhyne (1686 [1933: 134]), 'mercaturaे peritum, quandoque plures cum aliquot militibus ad eos delegat *Gubernator* nostras cum *tabaci*, vel *Virginiani*' (the governor, our countryman, sends to them [i.e., the Khoikhoi] one [person] or more experienced in trade, accompanied by some soldiers, with tobacco, actually Virginian). In a footnote explaining 'cum *tabaci*, vel *Virginiani*', Ten Rhyne added 'Boebaes toebak illis dicti' (*boebaes toebak* [is] said by them [i.e., the Khoikhoi]). Nienaber (1963: 476) rightly wondered whether Ten Rhyne has correctly identified *boeba*, which he listed among the 'Mere *Hottentottonica*' and glossed as 'ox or cow' (Ten Ryhne 1686 [1933: 154]); similarly, Valentyn and Kolbe, loc. cit.). The sigmatic element in *boebaes toebak* could be the West Germanic genitive singular ending, as Den Besten (2006a: 119) believes.

of Dutch *schaap* into the developing MIC, as in *etom schaep* 'eating sheep' (Dutch *eten* 'eat') in reference to the gift of a prime wether presented to the leader of a Dutch trading party as a gesture of good will (Ten Rhyne, 1686 [1933: 136n.]). In order for semantic shift to bring about a noncompositional relexicalization (with two pidgin words becoming one), the phonological form of *boeba* in the meaning of 'livestock' cannot have retained any iconic similarity with attributes of its referent.

As pointed out above, the influence of preexisting full languages is most likely to occur in the jargon phase, especially when only two languages are involved and none of the parties are concerned with accurate replication. European and Khoikhoi influences have been cited as the major factor in the generation of the syntactic compound *boebasibier* 'milk', which Ten Rhyne (1686 [1933: 154]) listed under the rubric 'Corrupta Belgica.' Nienaber (1963: 383) proposed two possible resolutions: *boebasi-bie(r)* 'cow-ADJ beer/drink/milk' in which *-si-* is to be equated with the Dutch adjectival suffix *-s* (inflected form *-se*), or *boeba-si-bie(r)* 'cow POSS beer/drink/milk' in which *si* is a monophthongized allomorph of the Early Modern Dutch possessive pronoun *sij(n)* 'his, its' (*zijn/z'n* in contemporary spelling) or (more plausibly in Nienaber's view) a Khoikhoi possessive morpheme *di*, of which *ti* and *si* are variant forms. Den Besten (2006a: 118, 2007: 152-53) favors an adaptation of the Dutch possessive construction [DP_i – pron._i – NP], as in *die hond z'n neus* (that dog POSS nose), out of which arose the Afrikaans construction with invariant *se* (*die kinders se boeke* [the children POSS books] 'the children's books'). Nienaber (1963: 383) related the third constituent of the compound to a Khoikhoi stem *bi-* (cf. Korana *bī-b* 'milk', Meinhof, 1930: 81), which Europeans may have misapprehended as *bier* 'beer' (cf. Den Besten, 1989: 221).

Yet, substrate and superstrate calquing cannot be regarded as the primary means of lexical expansion in the Cape Dutch Pidgin. The philological record shows evidence of pidgin-internal, word-level compounding in the nonce form *boeba kros* 'ox skin', which is preserved for posterity in the journal of Pieter van Meerhoff from 1661 (Godée Molsbergen, ed., 1916: 54). The writer directly quotes two pidgin-speaking Khoikhoi companions who have called his attention to a party of armed Namaquas standing above them on a hill. *Kros* is derivable from Khoikhoi root *khō-* 'skin, hide' (Nama *khō-b*, Korana *khō-b*) plus the diminutive suffix *-ro* and the feminine singular termination *-s* (cf. Nienaber, 1963: 332-33; Den Besten, 1987: 15). The form entered the Cape Dutch Pidgin and eventually Afrikaans as monomorphemic *karos* ~ *kros* 'kaross, i.e., a wrap, cloak, or blanket made of skins'. What Van Meerhoff's Khoikhoi interlocutors refer to are actually shields made of dried ox hide.

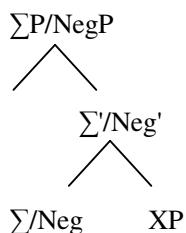
Boeba kros is correctly assigned its semantics from context, but unlike *boeba* 'livestock', it is not the product of free or 'unregulated' concatenation (the term is from Jackendoff, 2002: 250). At this more advanced point in the development of the Cape Dutch Pidgin, the mapping between semantic roles and linearly ordered form is mediated by the principle that groupings of meaningful elements can be structured from heads.

By all accounts, the presyntactic mode of communication is lexically driven; the provision of a minimal lexicon containing regularly used items is a prerequisite for language formation (Givón, 1995: 30, 360, 1998: 56, 92; Comrie, 2000: 1000; Mufwene, 2008: 25). With tertiary hybridization, stabilization of myriad jargons into a pidgin implies a transition from noncombinatorial juxtapositions of meaningful elements to true phrase structure. The primary mechanism by which larger objects are created is the interpretation of concatenated lexical items as asymmetric structures organized around a head. The X-bar-theoretic format and category labels are available to MIC creators through Universal Grammar, while communicative success determines the selection of features (semantic and formal) for individual lexical items and their relations with other elements.

From the second half of the seventeenth century, developers of the Cape Dutch Pidgin expanded their MIC structurally as well as lexically in response to changing communicative needs. The first step to actual syntax was the crystallization of the Head Principle, which enabled a basic merge operation combining two lexical items, one of which projects a functional or lexical category. Syntactic combination was augmented by a simple move operation.

The basic structure of a Cape Dutch Pidgin sentence may be reconstructed as a speech-act or assertion projection, the value of which could either be either positive (ΣP) or negative ($NegP$):

(5)



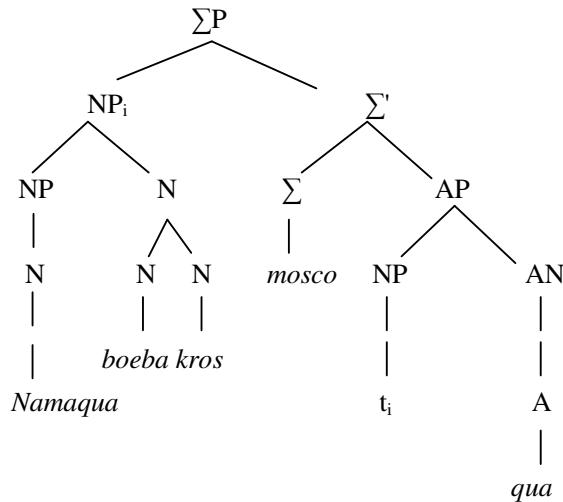
This structure is not drawn from any of the full languages represented at the old Cape. It is the result of a process of creation that is wholly independent of the 'available resources,' save for lexical sourcing.

Consider our old friend *boeba kros* 'ox skin' in its full context:

- (6) Mr. Pieter, Namaqua . . . Namaqua boeba kros moscoqua (Journal of Pieter van Meerhoff, 1661; in Godée Molsbergen, ed., 1916: 54).

Resolution of *moscoqua* has been a traditional crux, and arguments buttressing the present interpretation are reserved for a full discussion elsewhere. The constituent *qua* may be plausibly seen as Dutch *kwaad* 'angry' (Godée Molsbergen, ed., 1916: 54n; Den Besten, 1986: 214-15, 1987: 15, 38n.), the apocope of final *-d* being a common phonotactic adjustment among Khoikhoi speakers (Nienaber, 1963: 361). The morpheme *mosco*, which alternates with *moeske* and *musku* in our Cape Dutch Pidgin source material, represents the agglutination of Khoikhoi *mu-ts ko* (see-2 sg. ASP) 'Have you seen?' (cf. Meinhof, 1930: 61). The structure of the Cape Dutch Pidgin sentence in (6) is shown in (7):

(7)



Cape Dutch Pidgin *mosco* and its variants have the illocutionary force of a question ('Haven't you caught sight of X? Don't you see that X is the case?'), affirmation ('You are surely aware that X is the case'), or command ('Look!'), with the intended perlocutionary effect of making the interlocutor pay heed to what is in plain sight or establishing what should be shared knowledge or a familiar truth. A full and complete rendering of (6) would be: 'Master Pieter, Namaquas! Look! You can see that the Namaquas have shields made of dried ox hide and are hostile (or dangerous)'.

4.6 The pidgin window within a constructive model of language genesis

We turn now to the matter of furnishing a warrant or license for inferences drawn about facets of language evolution from phenomena of pidgin formation. Botha (2006b: 12) articulates this requirement as follows: 'Why is it justified at all to draw conclusions about facets of language evolution – language evolution being the kind of entity that it is – from data about properties of aspects of pidgins – pidgins being the different kind of entity they are?' In other words what is needed is a bridge theory for moving inferentially from the domain of pidgins to that of the development from simple to more complex systems subsequent to the first appearance of protolanguage.

The presence of a lexicon that allows for arbitrary sound-meaning correspondences is presumed to be the minimal requirement for the creation of grammar. The constructive model of pidgin formation postulates a lexicon (however impoverished) as a minimal level of input for a basic MIC within a sufficiently large community. The pressures driving the stabilization of pidgins in European colonies where tertiary hybridization is a factor can be related to a need for predictability and learnability. Having created a basic MIC, participants in contact situations could gradually expand the potential of the developing system 'unless or until changing circumstances deprived it of its usefulness or desirability' (Baker, 1995: 13). If a pidgin is deployed in new domains, its users will generate the linguistic objects necessary to meet the communicative exigency. True enough, pidgin speakers have one or more fully developed languages from which to draw resources. In contact situations bringing together highly diverse populations, however, innovative solutions to the problem of interethnic communication are preferred over the adoption of patterns that are characteristic of one group. Simply put, 'people can create new rules' (Baker, 1995: 8). Transfer from preexisting full languages is relatively limited. The contribution of the contact languages seems to depend on how far the MIC has developed and what speakers of these languages could offer to advance that development (Mühlhäusler, 1997: 182, 186; Baker, 1997: 106).

The bridge theory licensing the application of inferences from the creation and elaboration of pidgins to the development of modern language out of protolanguage would begin with a dominant postulate in evolutionary linguistics, namely, the emergence of a lexical component prior to the syntactic one (Bickerton, 1990: 131). Recent 'holistic' proposals that words arose out of secondary fractionation of longer, noncompositional utterances have been challenged on empirical and conceptual grounds; see the extensive and thoroughly documented discussion in Tallerman (2007). We may plausibly suppose a synthetic model of protolanguage in which nouns and verbs are

categories that already have a mental representation in early hominids and have come to be represented as words (Tallerman, 2007: 580). A theory of protolanguage needs only to account for the development of nouns and verbs (Tallerman, 2007: 596); all other syntactic categories and the principles that put words together into structures are presumed to have come later.

A second aspect of the bridge theory would follow from the observation that 'the selection pressures driving evolution from one stage to the next, can be related to the increasing complexity of proto-human society' (Johansson, 2005: 239). If this assertion is defensible, then it is reasonable to derive the following corollary: Human language commenced with the emergence of more or less discrete communication patterns among and within small groups between which there was little contact at the outset.²⁵ It is the establishment of cross-group communication networks that triggered the structural elaboration of linguistic systems commensurate with the emergence of new communicative domains among our hominid ancestors. As with pidgin formation, the negotiation of these systems implies the creation of and competition among linguistic features, which were selected and grouped together according to their communicative efficacy and social functions.

Here, one should recall that pidgins are typically used in a limited set of domains requiring communication between groups of people who do not share a common language. It is the interlingual function that is at the core of a restrictive definition of *pidgin*. Heine and Kuteva (2007: 195) can find no reason to assume that early human language was similarly restricted. Perhaps, but it does not follow that an elaborated protolanguage serving as an auxiliary code would have been immediately institutionalized beyond the narrow social context of intergroup communication among early hominids. It would be difficult to deny that pidgins are 'incapable of filling the needs of first-language communicators and inadequate even for some of the requirements of their second-language users' (Mühlhäusler, 1997: 162). But then it must also be true, *mutatis mutandis*, that elaborated protolanguage might have been a rather more powerful device than would have been necessary to meet ordinary, in-group needs prior to the permanent establishment of broader communicative networks.

Whereas agents of pidgin formation are equipped with a modern language faculty, early hominids probably lacked more than an inchoate version of that endowment. The question that presents itself is whether the same or similar creative processes discernible in pidgin formation could have

²⁵Even Mufwene (2008: 8) concedes that what 'the relevant colonial histories' show is not only that contact 'has generally played a central role in recent language speciation,' but 'most likely also in earlier stages of language evolution of the past 10,000 years or so.'

taken place with a relatively less evolved language faculty. At some point in the evolution of syntax a transition was made from noncombinatorial to combinatorial organization. All relevant cognitive capacities being in place, we should expect the same processes to have effected a variety that was developmentally more advanced than protolanguage. Contact between groups of early hominids expanded the repertoire of meaningful elements and facilitated the creation of new combinations. Early hominids could then arrive at an analysis of regularly occurring collocations as constituents of larger objects. This analysis would have begun with 'the most local relation' (Chomsky, 1995: 397), viz. the head-complement relation. For a given pair, α and β , one or the other projects and is the head, while the other serves as a complement, whence $[\alpha [\alpha, \beta]]$ or $[\beta [\alpha, \beta]]$. This basic configuration was subsequently associated with an operation (merge) that would form larger objects out of those already extant. At a still later evolutionary stage, this simple structure became a more complex object constructed from additional elements, most notably, morphemes that implement the specifier relation to the head. In modern full language heads become the labels of the complexes formed (Chomsky 1995: 398). In evolutionary terms these labels obtain from semantic primes such as 'affirmation,' 'negation,' 'time-stable,' 'non-time-stable,' 'temporal location anterior to the time of reference' that are reified in modern language as ΣP , NegP, NP, VP, T(ense)P, and the like.

4.7 Summation

The creation of pidgin languages does indeed provide a window on language evolution, though not along the lines proposed by Bickerton (e.g., 1990), Jackendoff (1992, 2002), and others. The essence of pidgin formation is language construction rather than targeted, albeit imperfect L2-acquisition. Of greatest probative value is the instantiation of pidgin structures that are not selected from pre-existing 'input materials' but reflect language-independent solutions to the problem of intergroup communication. This type of linguistic creation occurs during tertiary hybridization, when a lexifier language is socially remote, and the linguistic milieu is highly diverse.

The pidgin window proposed here looks out not onto an antecedent protolanguage, that is, the stage characterized by the 'development of a phonological combinatorial system to enlarge open, unlimited class of symbols (possibly first syllables, then phonemes)' and 'use of symbol position to convey basic semantic relations' (Jackendoff, 2002: 238). Rather, the window offers a view on the progression of the first forms of language to more elaborated, interconnected linguistic systems, with hierarchical relations and lexical and functional categories.

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5. The genesis of grammar: on combining nouns

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Abstract

That it is possible to propose a reconstruction of how grammar evolved in human languages is argued for by Heine and Kuteva (2007). Using observations made within the framework of grammaticalization theory, these authors hypothesize that time-stable entities denoting concrete referential concepts, commonly referred to as 'nouns', must have been among the first items distinguished by early humans in linguistic discourse. Based on crosslinguistic findings on grammatical change, this chapter presents a scenario of how nouns may have contributed to introducing linguistic complexity in language evolution.

5.0 Introduction

In Heine and Kuteva (2007), a scenario of grammatical evolution is proposed, leading from lexical to functional forms and structures. Applying grammaticalization theory as a tool for reconstructing the rise and development of grammatical forms and constructions, these authors argue that generalizations about grammatical change in modern languages can be extended to the reconstruction of early language evolution by extrapolating from the known to the unknown, and they conclude that this evolution can be described in terms of six stages or layers, as summarized in table 5.1.

The goal of the present chapter is to look at one specific issue arising from the conclusions reached in that work: We will be concerned with what may happen when there is only one type of word and the only way of expressing new concepts is by combining different tokens of this type. To narrow down the scope of this problem, discussion is restricted to stage I and to one specific combination, namely that of two nouns. Our choice of nouns is deliberate: On the basis of the reconstructions listed in table 5.1, nouns, or noun-like time-stable referential entities are hypothesized to have been the first linguistic entities to have arisen. The question to be looked into in this chapter is what one can do with nouns, more specifically with combining two nouns, and what people in the past may have achieved by doing so.

Table 5.1: Layers of grammatical evolution (Heine and Kuteva, 2007).

<i>Layer</i>	<i>New categories introduced</i>	<i>Hypothesized main grammatical innovations</i>
I	Nouns	One-word utterances
II	Verbs	Mono-clausal propositions
III	Adjectives, adverbs	Head-dependent structures
IV	Demonstratives, adpositions, aspect markers, negation	Elaboration of phrase structures
V	Pronouns, definite (and indefinite) markers, relative clause markers, complementizers, case markers, tense markers	Temporal and spatial displacement, the beginning of clause subordination
VI	Agreement markers, passive markers, adverbial clause subordinators	Obligatory expressions, elaborated clause subordination

5.1 Types of combining

In order for new grammatical categories to arise there is one necessary requirement: There have to be at least two different linguistic forms that are combined. Most, if not all, languages have productive patterns of combining two nouns, A and B – be that in the form of compounding, of attributive possession, or of any other morphosyntactic or pragmatic construction. Underlying these patterns there appear to be semantic strategies giving rise to at least four different types of combining. These types are illustrated in (1) with examples from English compounding; as we will see below, compounding is not the only way in which nouns can be combined.

(1)	English compounds		
	Type of combining		Example
a	Modifying		<i>apple tree</i>
b	Additive		<i>whisky-soda</i>
c	Appositive		<i>poet-doctor</i>
d	Alternative		<i>egg head</i>

We will now briefly look in turn into the main distinguishing properties of these four types of combining.

Modifying. In this type of combining, illustrated in (1a), A is a modifier of B, that is, [A - B] is a specific kind of B or, alternatively, A delimits the kind of referents that B stands for – in other words, the resulting C is more specific in meaning than B. Thus, in the compound *apple tree*, *apple* modifies *tree*, and

an *apple tree* is a kind/type of tree. Modifying combining has been described as being endocentric and involving a modifier-head structure; thus, in the compound *apple tree*, *apple* is the modifier (A) and *tree* its head or hypernym (B); similarly, in the Korean compound *nwun-mwul* (eye-water) 'tears', *nwun* is the modifier and *mwul* the head (Sohn 1994: 416). Rather than a modifier-head, modifying compounds may have e.g. an argument-predicate structure, as in *truck driver* (object verb). Modifying combinations differ from some other kinds of combining in that A and B tend to have different argument status (e.g., different case markings). In the literature on compounding, modifying combinations, also called subordinating compounds or sub-compounds, determinative compounds, or referred to by the Sanskrit word *tatpurusha*, are assumed to be worldwide the predominant type of compounds.

Additive. Additive combining consists of two (or more) parts expressing "natural coordination" of semantically closely associated concepts that are expected to co-occur, as in Korean *son-pal* (hand-foot) 'hand and foot', Mordvin *t'et'a.t-ava.t* (father.PL-mother.PL) 'parents', Tagalog *araw-gabi* 'day and night', Tibetan *srab-mthug* (thin-thick) 'density'; Khalkha *xaluun xijten* (heat cold) 'temperature', and the two members A and B represent referentially distinct units (see Wälchli 2005 for detailed discussion). Thus, the compound *whisky-soda* consists of two separate entities, *whisky* and *soda*. The meaning of additive combinations is taxonomically superordinate in respect to its parts A and B. Nevertheless, it need not, and frequently is not, restricted to A and B but may include other items of the same class as A and B. In the Trans-New Guinea language Sentani, pigs and dogs are prominent domestic animals and the word for 'animal' is *obo-joku* (pig-dog), which is not restricted to these two kinds of animals. Similarly, the compound KNIFE-FORK in American Sign Language (ASL) means 'silverware', that is, it is not restricted to knives and forks;¹ in fact, generalizing coordination of this kind constitutes crosslinguistically the most widespread sub-type of additive compounding (Wälchli 2005: 80). But the meaning of an additive compound can also be more specific than that of its members; the compound *haŋam-buŋia* ('old man-old woman') 'old couple' of the Austroasiatic Munda language Mundari, for example, is restricted to one specific sub-set of old men and women (Sinha, s.a.: 112-4). In works on compounding, additives are also referred to as co-compounds or – somewhat misleadingly² – by the Sanskrit word *dvandva*; they are particularly common in easternmost Europe, Asia, and New Guinea (Wälchli 2005: 8, 19-20).

¹ Note that English *silverware* is not restricted to items made of silver (Fritz Newmeyer, p.c.).

² The Sanskrit term *dvandva* is derived from *dvam̄-dva* (two.two) 'pair', which is not an additive (or co-compound) but a word reduplication (Wälchli 2005: 17).

Appositive. The two members A and B are referentially not distinct but intersective, where each one limits the meaning of the other: A *poet-doctor* is conceived as both a poet and a doctor, but not any kind of a poet and not any kind of a doctor, a *servant girl* is one individual who is both a servant and a girl, and *King Richard* is both a king and a person named Richard, but he is not any king nor any person named Richard – in other words, A and B represent different facets of the resulting unit C, which is taxonomically subordinate, or hyponymic, to its parts A and B (Bauer 1978: 68; Wälchli 2005: 161).³ Unlike in modifying combinations, in appositive ones the two members have the same participant status, receiving, e.g., the same case marking. In the literature on compounding, the Sanskrit term *karmadharaya* tends to be used for appositive combinations.

Alternative. The meaning of an alternative combination C is largely or entirely independent, or "outside" of that of A and B, it cannot be derived literally from the latter. An *egg head* is neither an egg nor a head, nor a combination of eggs and heads, and the compound *yún-yǔ* (cloud-rain) 'sexual intercourse' of Mandarin Chinese or *giǎng-hoa* (moon-flower) 'flirtation, ephemeral love' of Vietnamese (Wälchli 2005: 150) bear little direct resemblance to their respective components A or B. The grammatical form of an alternative construction can frequently not be derived from its constituents or their combination. Thus, a *must-have* is not a verb but a noun, and while *egg head* is a noun, it does not show morphological agreement with *head* (e.g., *The egg head blew *its nose*; Bauer 1978: 13). Alternative combinations frequently derive from metonymic or metaphorical processes whose non-figurative origin may no longer be transparent. The Sanskrit term *bahuvrihi* used for alternative compounds, which are also called indirect compounds, is itself an alternative compound: *bahu-vrihi* (much-rice) means 'rich person' – a person who owns a lot of rice. But there need not be metonymic or metaphorical processes involved. In the homesign variety of Nicaragua, homesigns for 'fruits' are a sequence where preparation of the fruit for eating is followed by the sign EAT, as in (2).

(2) Fruit names in the homesign community of Nicaragua (Morford 2002: 333)	
PEEL EAT	'banana'
RUB-ON-SHIRT EAT	'apple'
SLICE-OFF-TOP-WITH-MACHETE EAT	'pineapple'

Underlying the process leading to noun combining there appear to be specific goals of creating novel concepts by combining existing forms in new

³ Appositives thus contrast with additives in that there is no natural semantic relationship between A and B, and C is taxonomically subordinate in respect to A and B.

ways. These goals have to do e.g. with sub-classifying existing concepts (modifying combining), conflating two concepts into a new one having properties of both (appositive combining), coordinating two concepts (additive combining), or creating entirely new concepts (alternative combining).

Such new concepts may arise in many different ways, e.g. via technological innovations, e.g., when German speakers drew on the compound *Fahrrad* (ride wheel) to designate bicycles or *Kraftfahrzeug* (power.ride.thing) to designate cars, or via new environmental stimuli, e.g. when German speakers created the modifying compound *Waldsterben* (forest.dying). Or they may result from the replication of models of combining found in other languages, e.g., when speakers of some European languages drew on alternative combining to form equivalents of the English term *skyscraper*, cf. German *Wolkenkratzer* (lit.: 'clouds scratcher'), French *gratte-ciel* ('scratch-sky'), etc.

While compounding is the grammatical domain which is most commonly associated with this process, it is not the only one. For example, appositive combining is crosslinguistically more likely to involve appositional constructions than compounding, as in the following English example containing two instances of appositive noun phrase combining: *I don't know Newman the actor, but I do know Newman the linguist*. Additive combining in English is typically expressed by means of the linking element *and*, e.g. *kith-and-kin*, but it may as well involve simple juxtaposition, that is compounds, as in expressions for drinks (*vodka-Martini*, *whisky-soda*) or joint ventures (*Rank-Xerox*, *Shell-BP*, *Daimler-Chrysler*).

Combining nouns appears to be a fundamental human activity. It surfaces in language use on the one hand in the form of conventionalized or fossilized words or phrases; on the other hand it is present in the form of a productive strategy used to constantly create new concepts. The evidence available suggests there is a fairly unidirectional process from latter to the former, whereby new combinations of nouns constantly emerge for the expression of novel concepts, and where some of these combinations end up as conventional grammatical constructions or as unanalyzable lexicalized expressions.

In the following sections we will be concerned with some manifestations of this process, in accordance with the basic question that is the subject of this paper, namely what one can do when combining two nouns. This is a wide field and we will therefore need to impose a number of restrictions on our treatment. One such restriction concerns the number of nouns to be combined: Especially in additive combining, more than two nouns may be involved, as in example (3): In American Sign Language there is a type of additives (co-compounds) which may consist of three to four signs for basic-level concepts strung

together (optionally followed by a sign for 'etc.') in order to form superordinate-level concepts.

- (3) Additive compounds in American Sign Language (Wälchli 2005: 19-20)
 - a APPLE-ORANGE-BANANA-ETC. 'fruit'
 - b BEANS-CARROTS-CORN-ETC. 'vegetable'
 - c RING-BRACELET-NECKLACE-EARRINGS-ETC. 'jewelry'

But perhaps more importantly, noun combining need not be but frequently is recursive, where one noun is embedded in another noun which again is embedded in yet another noun. The magnitude of productivity that modifying noun combining may have can be illustrated with example (4), involving German compounding. We have never heard any German speaker uttering this compound, and it probably never will be uttered; still, (4) is a grammatically correct instance of productive recursive compounding.

- (4) German
 - Auto- bahn- rast- platz- toiletten- reinigungs- personal- bedarf-
car- line- rest- place- toilette- cleaning- staff- need-
 - abstell- schrank- schlüssel- dienst- telefon- nummer
storing- locker- key- service- phone- number
'the phone number of the key service for lockers of the cleaning staff of
public conveniences of rest places of highways'

In much of this chapter, however, we will be concerned only with combinations of two nouns.

Another restriction concerns the different types of combining that we discussed above: Wherever possible we will confine discussion to only one of these types, namely modifying combining. In English and other Germanic languages, this is the prevalent type of combining, but this is not necessarily the situation to be found in many other languages.

5.2 Compounding

The question that we are concerned with in this section is how the combining of two nouns or noun phrases may lead to compounding. Definitions of compounding have either a morphological or a semantic nucleus. In the former case, a compound tends to be defined simply as a word (or free morpheme or lexeme) that consists of more than one word, while in semantically based definitions it is proposed that a compound has a meaning that is not the same as the sum total of its constituent words. Neither of these definitions is really

unproblematic; still, we are satisfied in assuming that a given expression qualifies as a compound if it corresponds to both kinds of definitions.

Compounding is sometimes not easy to delimit, in that the boundary between compounding and possessive constructions may be gradual. In Koyraboro Senni, a Nilo-Saharan language of West Africa, for example, there is a distinction between tight and loose compounds; in the former, the initial and the final constituents form a composite noun stem, while in the latter the two constituents can independently have definite and plural marking and "are not reliably distinguishable from possessives" Heath (1999b: 107). Similar problems exist with the boundary between compounding and derivation: In modifying compounds, high-frequency heads may have properties of derivational elements, and for some of them an analysis in terms of derivation seems to be preferable; we will return to this issue below.

While not being the only kind of noun-noun combining, compounding constitutes the process most commonly associated with noun-noun combining. The English examples that we provided in (1) illustrate the four major types of noun-noun compounds to be found in the languages of the world, and table 5.2 summarizes salient properties of these types. Note, however, that this does not conclude the types of compounds that have been distinguished; mention should be made specifically of incorporating compounds, where a noun is incorporated into a verbal root (e.g. *backstabbing*, *breastfeeding*). This is not really a common phenomenon in English; but in some other languages incorporating compounds are highly productive. Compounding may be right-headed, as in English, or left-headed, as in Vietnamese.

Table 5.2: Distinguishing semantic properties of noun-noun compounds (A, B = members of a compound, C = meaning of the compound; corresponding Sanskrit terms in parentheses).

Modifying (<i>tatpurusha</i>) (1a)	Appositive (<i>karmadharaya</i>) (1b)	Additive (<i>dvandva</i>) (1c)	Alternative (<i>bahuvrihi</i> , "possessives") (1d)
A is a modifier of B	A and B are both kinds of C. C is one referent consisting of the intersection of A and B	A + B = C, where A and B are distinct referents	C is neither A nor B, nor A + B. As in (1a) there is a head-modifier structure, but the meaning of C is external to the structure A + B

From noun combining to compounding

All evidence available suggests that noun-noun compounding typically arises via a process whereby free, referential nouns are combined in accordance with established conjoining patterns of the language concerned. This process tends to be referred to as condensation, which starts with loose combinations that are gradually transformed into tighter ones. And it is by and large a unidirectional process: The development from morphosyntactically loose combinings of nouns to tight compounds forming phonologically and semantically one single word is ubiquitous, while a development in the opposite direction is fairly rare.

One common strategy of combining – one that is available in some form or other in most languages – can be seen in attributive possession ("genitive constructions"), where specific attributive head-modifier combinations of free nouns turn into regularly used noun-noun compounds (e.g. [B's A]). This is the process that can be held responsible crosslinguistically for many instances of modifying compounds but it is not confined to this type of compounds.

A second established conjoining strategy consists of coordination (i.e., [A *and* B], typically though not necessarily involving some linking device, such as the conjunction *and* in English (*kit- and-kin*)). Coordination is crosslinguistically the main source of additive compounds (Wälchli 2005: 250), but it may as well give rise to alternative compounds, cf. English *bread-and-butter*.

The third major strategy of forming noun-noun compounds is provided by simple juxtaposition. Juxtaposition can be ad hoc, but more commonly it follows structural templates as they exist for apposition or for linking contrastive discourse functions such as presenting given vs. new, or less specific vs. more specific information. Juxtaposition is the paradigm strategy for creating appositive compounds.

Evidence for the hypothesis that noun-noun compounding has its origin in the combination of independent nouns is of the following kind. First, in a number of languages, modifying compounds exhibit morphosyntactic relics of possessive constructions. One such relic can be seen in case morphologies. Quite a number of German compounds contain the genitive case suffix *-s* (GEN) whose presence is hard to account for unless one assumes that the diachronic source of the compound is a modifier-head construction of attributive possession. This relic⁴ is not restricted to modifying compounds (5a), it is in the same way found in alternative compounds, cf. (5b). Such

⁴ These German segments inserted between two parts of a compound are not always morphosyntactic relics. For example, *Geburtstag* (birth.day) has a feminine modifier noun *Geburt* 'birth', but feminine nouns do not take the genitive suffix *-s* (Fritz Newmeyer, p.c.).

possessive case markers may still be functional, but they may as well have been lost, surviving only in compounds. In Swedish, the genitive case ending *-s* also appears in compounds, e.g., *bord-s-ben* (table-GEN-leg) 'table leg', but there is also an older genitive form that is no longer used but has survived in compounds, e.g., *kyrko-gård* (church.GEN-yard) 'churchyard' (Dahl 2004: 225).

(5) German

a	Kalb.s.braten	(veal.GEN.roast)	'roast veal'
	Schwein.s.leder	(pig.GEN.leather)	'pigskin'
b	Esel.s.brücke	(donkey.GEN.bridge)	'dog's ear'
	Kind.s.kopf	(child.GEN.head)	'silly ass'

Additive compounds may bear witness of their origin in coordinating constructions in relics of linking elements: In some languages there are also fossilized comitative markers, additive focus particles, or verbal sequence markers, suggesting that additive compounds (or co-compounds) developed from coordination or similar constructions (Wälchli 2005: 249). Using such relics as evidence, it has been possible to demonstrate that in the transition from (Early) Vedic to Sanskrit, additive compounds developed from coordination (Wälchli 2005: 17, 247).

Another kind of relic consists of word order properties, in that a compound may exhibit a type of word order that can only be explained with reference to its possessive genesis (Wälchli 2005: 246ff.).

A second piece of evidence comes from historical observations: In a number of instances it is possible to establish that a given compound cannot be traced back to earlier phases of the history of the languages concerned while the nouns making up the compound can. Thus, the English alternative compound *skyscraper* presumably did not exist prior to the appearance of the relevant buildings whereas its constituents were there earlier as independent words. Even in languages for which we have no historical records it is possible to show that independent nouns were combined into compounds, while a process in the opposite direction does not seem to occur. For example, in the Niger-Congo language Ewe of Ghana and Togo there is a wide range of compounds which must have arisen after Ewe speakers came into contact with European civilization, e.g., *ga-ŋkúí* (metal-eye.is.it) 'spectacles', *ga-só* (metal-horse) 'bicycle', or *ga-mó* (metal-way) 'railway', while the constituents of these compounds, *ga* 'metal', *ŋkúí* 'eye', *só* 'horse', and *mó* 'way', already existed as independent nouns prior to this contact situation.

But perhaps the main piece of evidence comes from synchrony: In many

languages, compounding forms a productive process, where independent nouns can be combined creatively into new nouns expressing new meanings. Accordingly, we constantly witness how new compounds arise and evolve. This process can be observed in actual language use, in that novel compounds are emerging all the time. Conversely, a process whereby compounds regularly develop into simple nouns is uncommon. To be sure, it may happen that in the course of time some specific compound may be lexicalized to the extent that it is no longer conceived as a compound and is reinterpreted as a simple noun. But even in such cases, the earlier development was one where independent nouns were combined into compounds.

The process leading to compounding is first and above an instance of lexicalization, whereby new lexemes are formed. But it can also be interpreted as a manifestation of grammaticalization, in that it leads to more grammatical forms and constructions and involves a process that is largely unidirectional. For example, when combinations of nouns turn into modifying compounds, this involves the following grammaticalization parameters (see Heine and Kuteva, 2007: section 1.2):

Extension: The use of a noun is extended to one specific context – that is, in combination with some other noun, and in this context its meaning may be modified.

Desemanticization: The modifying noun loses in referential and semantic properties. Furthermore, the compound acquires a meaning that is either more specific or entirely different than the combined meanings of the constituents.

Decategorialization: The modifying noun loses seminal nominal properties – it may not be modified or receive affixes such as plural markers, thus turning into an invariable form.

Erosion: The two nouns tend to lose their individual stress or intonation patterns, taking a pattern that is characteristic of single nouns. Furthermore, one or both of the constituents may lose in phonetic autonomy, merging with or being assimilated to the other constituent. For example, the English noun *man* occurs commonly as a head of modifying compounds, e.g., *businessman*, *draughtsman*, *Dutchman*, *fisherman*, *foreman*, *hitman*, *policeman*, *postman*, *salesman*, or *spokesman*, and in some of these combinations it differs from the lexical noun *man* in showing a reduced vowel [mən].⁵

⁵ Fritz Newmeyer (p.c.) draws our attention to the fact that intonation in English compounds is complex. For example, for most American speakers (maybe British as well) it is APPLE cake, but apple PIE, or MAPLE Street, but Maple ROAD.

5.3 Noun modification

As we saw above, a paradigm case of noun combining is provided by modifying compounds. But this is not the only way in which noun combining may lead to modification. An alternative way can be seen in the rise of a structure where the two nouns remain distinct words but one assumes the function of a modifier, typically that of an adjectival modifier. Crosslinguistically, there are specific conceptual domains, such as sex, plants or plant parts, and metals, that tend to provide the source for a development whereby a combination [noun-noun] gives rise to a modifying combination [noun-adjectival modifier], in that one of the nouns gradually acquires properties of a modifier of the other noun.

Nouns typically denote tangible and/or visible things that refer, while adjectives denote qualities relating to such conceptual domains as dimension ('large', 'small'), age ('old', 'young'), color ('green'), or value ('good', 'bad'). In many languages a diachronic process can be observed whereby specific groups of nouns are grammaticalized to adjectives, such groups concerning nouns stereotypically associated with some specific quality. Thus, we find in English names of flowers such as *orange* or *pink*, or metal names such as *bronze*, *brass*, or *silver* that have been grammaticalized to adjectivals. Another group of nouns widely grammaticalized to adjectivals concerns sex-specific human items such as 'man' and 'woman' or 'father' and 'mother', which in many languages are recruited to express distinctions in sex. Thus, in the Swahili examples of (6), the nouns *mwana(m)ume* 'man' and *mwanamke* 'woman' are restricted in their meaning to denoting the qualities 'male' and 'female', respectively, and they occur in the syntactic slot reserved for adjectives, namely after the noun they modify, and they agree in number with their head noun.

(6) Swahili (Bantu, Niger-Congo)

kijana	<i>mwana(m)ume</i>	'boy'
youth		man
kijana	<i>mwanamke</i>	'girl'
youth		woman

This process involves on the one hand the parameter of desemanticization, whereby the nominal meaning is bleached out except for some salient property, referring to the color or sex of the item concerned. On the other hand it involves decategorialization, in that nouns in such uses lose in morphosyntactic properties characteristic of nouns, such as taking modifiers, determiners, and inflections and occurring in all the contexts commonly associated with nouns.

To conclude, there is a diachronic process to be observed crosslinguistically whereby adjectival modifiers can emerge as a result of the grammaticalization of noun-noun combinations and, in accordance with our extrapolation procedure, we hypothesize that such a process may also have taken place in early language evolution.

5.4 Derivation and inflection

We argued in section 5.2 that the combining of free nouns can lead to compounding. But compounding is not necessarily the end of development: Nouns serving as heads in modifying compounds may gradually lose in nominal properties and acquire the properties of derivational forms. The following example illustrates the way this may happen. The English nouns *style* and *fashion* have attained some currency in their use as heads of modifying compounds; Bauer and Renouf (2001: 106-7) found examples such as *Turkey-style*, *windmill-style*, *bunting-style*, or *frog-fashion* in his text collection, and he observes that in such combining formations, *-style* and, somewhat less, *-fashion* are grammaticalizing to affix-like heads, acquiring a grammatical function paraphrasable as 'in the manner of an X'.

We do not know whether English *-style* or *-fashion* will develop further into productive functional categories, but this example shows how the process begins: The head of a modifying compound is used productively in contexts where its nominal meaning is backgrounded and a schematic function is foregrounded. This process is not restricted to compounding in spoken languages, it is also found in signed languages. In American Sign Language the noun for INDIVIDUAL (or PERSON) is juxtaposed to another word to create a compound structure, and this structure has acquired properties of derivation, where INDIVIDUAL assumes the function AGENT, that is, that of an agent noun marker (Sexton, 1999: 118-21). The modifying member of the compound is either a noun (7a) or a verb (7b):

- (7) American Sign Language (Sexton 1999: 118-21)
- | | | | | |
|---|--------|---|-------|----------------------|
| a | ROCKET | + | AGENT | 'astronaut' |
| b | SERVE | + | AGENT | 'waiter or waitress' |

That this is a gradual process affecting different compounds in different ways is suggested by the fact that the compound structure differs from one instance to another in its degree of decategorialization on the way from compounding to derivation. For example, whereas 'astronaut' and 'waiter/waitress' show no signs of decategorialization, being simply juxtaposed, others, such as 'teacher' (< TEACH + AGENT), are suggestive of cliticization. But this example also exhibits another possible outcome of compounding:

Rather than becoming a productive grammatical form, the head noun can merge with its modifier to become a new, unanalyzable noun. This appears to have happened in ASL with the compound [STUDY + AGENT], which has merged almost completely into a single lexical noun meaning 'student'.

Many languages have gone further than English or ASL in developing modifying noun-noun compounds into new functional categories of derivation. We will now look at a number of such languages to determine the nature of this process.

Ewe. The first language to be considered is Ewe, a Niger-Congo language spoken in southern Togo and southeastern Ghana. There is a highly productive pattern of modifying noun-noun compounds, and like in English, the head follows its modifier. The Ewe noun *tɔ* 'father, owner, master' is used regularly for a range of functions⁶ when used as the head noun in modifying compounds: It is used fairly productively to denote an owner or a person having the properties described by the first constituent, or a member of a nationality or nation, as the examples in (8) show.

- (8) The Ewe noun *tɔ* 'father, owner, master' as the head of compounds.

<i>Form</i>	<i>Meaning</i>	<i>First component</i>
agble- <i>tɔ</i>	'farm owner'	agble 'field, farm'
fe- <i>tɔ</i>	'creditor, debtor'	fe 'debt'
afé- <i>tɔ</i>	'house master'	afé 'homestead'
Eve- <i>tɔ</i>	'Ewe person'	Eve 'Ewe (people)'
Dzáma- <i>tɔ</i>	'German person'	Dzáma 'German (people)'

tɔ is the traditional word for 'father' in Ewe (in modern Ewe it has been replaced by *fofó*), but it is not the only kinship term that exhibits a regular compounding pattern; the examples in (9) show that the noun *nɔ* 'mother' does so, too: As the head of modifying noun-noun compounds it denotes in specific contexts a person who 'is subject to, is ruled by, or suffers from' (Westermann 1930: 173). Unlike *tɔ*, however, it is not really productive.

⁶ The following is an example of the uses this noun has outside compounds: *xɔ sia tɔ* (house this owner) 'the owner of this house'.

- (9) The Ewe noun *nɔ* 'mother' as the head of compounds.

<i>Form</i>	<i>Meaning</i>	<i>First component</i>
<i>dɔ-nɔ</i>	'sick person'	<i>dɔ</i> 'sickness'
<i>ŋkú-nɔ</i>	'blind person, he who has bad eyes'	<i>ŋkú</i> 'eye'
<i>kpó-nɔ</i>	'hunchback'	<i>kpó</i> 'hunch'
<i>tókú-nɔ</i>	'deaf man'	<i>tó</i> 'ear', <i>kú</i> 'die'

In addition, there is a third noun, *ví* 'child (of)',⁷ that has acquired uses as a derivational suffix as the head in noun-noun compounds, denoting a 'young X', where 'X' stands for the category of animate nouns, cf. (10).

- (10) The Ewe noun *ví* 'child' as the head of compounds.

<i>Form</i>	<i>Meaning</i>	<i>First component</i>
<i>ŋútsu-ví</i>	'boy'	<i>ŋútsu</i> 'man'
<i>yevú-ví</i>	'young European'	<i>yevú</i> 'European'
<i>nyi-ví</i>	'calf'	<i>nyi</i> 'cow'
<i>detí-ví</i>	'young oilpalm tree'	<i>detí</i> 'oilpalm tree'

More than the other two nouns, *ví* (-ví as a suffix) has turned into a full-fledged derivational suffix and, in fact, it belongs to the most productive derivational suffixes of Ewe: In addition to denoting animates that are not yet grown up, as in (10), it has a range of grammatical functions, which have been described in detail in Heine, Claudi and Hünnemeyer (1991: 79-97). Most of all, it is a diminutive suffix with inanimate count nouns, used literally (11a) or in a metaphorically or otherwise transferred sense (11b). Other salient functions are: When the first constituent is a non-count noun denoting an abstract or mass concept, -ví tends to express a delineated part of that concept (11c), and when it stands for some socio-cultural or political unit, -ví denotes members of that unit (11d).⁸

⁷ There are two nouns for 'child' in Ewe, where one, *qeví*, is non-relational (e.g., when I say *I see a child*) while *ví* is relational (e.g., *my own child*). It is exclusively the latter that is used in compounds.

⁸ In this respect, -ví resembles -*tɔ* (see above); still, the two nevertheless differ in meaning, see Heine, Claudi and Hünnemeyer (1991: 85).

- (11) The Ewe noun *vi'* 'child' as the head of compounds.

	<i>Form</i>	<i>Meaning</i>	<i>First component</i>
a	kpé-ví	'small stone'	kpé 'stone'
	du-ví	'small village'	du 'small village'
b	afɔ-ví	'toe'	afɔ 'foot, leg'
	ŋkú-ví	'pupil'	ŋkú 'eye'
c	súkli-ví	'a piece of sugar, sugar cube'	súkli 'sugar'
	núnono-ví	'a mouthful of liquid'	núnono 'drinking'
d	dume-ví	'a native of a village'	du(me) 'village'
	Eve-ví	'an Ewe person'	Eve 'Ewe (people)'

Like *-tɔ* and *-nɔ*, *-ví* also occurs in lexicalized uses, that is, in mono-morphemic units; the Ewe noun *xeví* 'bird', for example, can be interpreted reasonably only as one morpheme, even if the non-compounded item *xe* is occasionally used, referring to 'less typical, domestic birds' like chicken and ducks, i.e., vertebrates with wings that live on the ground and do not normally fly – thereby suggesting to speakers that *xeví* is (at least historically) composed of two distinct nouns.

These examples show that there is a process from compounding to derivation in this language: Ewe speakers have exploited the vocabulary of nuclear kinship relations, i.e., 'father', 'mother', and 'child (of)', for developing derivational suffixes out of modifying noun-noun compounds, even if this process has not attained any productivity in the case of *nɔ*, which has given rise to largely lexicalized new words. This is a canonical process of grammaticalization, as can be shown most clearly for *-ví*: (a) The use of the head noun 'child' has been extended productively to new ranges of contexts (i.e., modifying nouns) with which it was previously incompatible (extension), (b) it has been desemanticized e.g. to a diminutive marker with inanimate count nouns (desemanticization), (c) it has lost its autonomy as an independent noun and is now a derivational affix (decategorialization), and (d) it has also undergone erosion, in that the low-high contour tone characterizing the noun *vi'* has been reduced to a high tone (-*v̄i*) in the suffix.

!Xun. That the situation found in Ewe is by no means unusual can be demonstrated by looking at another African language that is neither genetically nor areally related to Ewe. This language is !Xun,⁹ a Khoisan language spoken in Namibia, Angola, and Botswana. Like in Ewe, there is a highly productive

⁹ The following data are taken from the W2 dialect of !Xun, spoken in and around Ekoka near the border of Namibia and Angola.

pattern of modifying noun-noun compounds with the same order modifier-head.

In this language, the noun *kx'àò* means 'parent or relative of a higher generation' or 'owner', but as the head in endocentric modifying compounds it productively serves as a derivational suffix to form agentive nouns, denoting more specifically 'someone who does the action described excessively and/or habitually', cf. (12). Note that it combines with verbs rather than nouns.

- (12) The !Xun noun *kx'àò* 'owner' as the head of compounds.

<i>Form</i>	<i>Meaning</i>	<i>First component</i>
còè-kx'àò	'nurse'	còè 'to treat (a sick person)'
cú-kx'àò	'someone who likes to sleep constantly'	cú 'to lie down (of one person)'
mí-kx'àò	'someone who eats a lot'	mí 'to eat', 'food'
tc'à-kx'àò	'thief'	tc'à 'to steal'
áulè-kx'àò	'hunter'	áulè 'to hunt'

Furthermore, the !Xun noun *g//òq*, plural *n//àē* 'man' is also used productively as the head in compounds, denoting male referents (13a), but it also occurs with some plant names, cf. (13b).

- (13) The !Xun noun *g//òq* (plural *n//àē* 'man' as the head of compounds.

	<i>Form</i>	<i>Meaning</i>	<i>First component</i>
a	dàbà- <i>g//òq</i>	'male child'	dàbà 'child'
	!xō- <i>g//òq</i>	'male elephant'	!xō 'elephant'
	!xō-n àē	'male elephants'	!xō 'elephant'
b	<i>g x'ā-g òq</i>	'manketti tree which does not bear fruit'	<i>g x'ā</i> 'manketti tree (<i>Ricinodendron rautanenii</i>)

In a similar fashion, the item *dē*, an etymological reflex of the reconstructed Proto-!Xun noun **de* 'mother', serving as the head in modifying compounds, has assumed the function of a derivational suffix denoting female referents. It is productive with nouns for humans and animals (14a), to some extent also for plants (14b).

- (14) The !Xun noun *dē* 'mother' as the head of compounds.

	<i>Form</i>	<i>Meaning</i>	<i>First component</i>
a	dàbà-dē	'female child'	dàbà 'child'
	!xō-dē	'female elephant'	!xō 'elephant'
	gùmí-dē	'cows'	gùmí 'cattle'
b	g x'ā-dē	'manketti tree bearing fruit'	g x'ā 'manketti tree' (<i>Ricinodendron rautanenii</i>)

Like in Ewe, there are two nouns for 'child' in !Xun, where *dàbà* 'child (in general)' is non-relational and *mà*, plural *m̩hè* 'child of, offspring', is relational (e.g., *mí mà* 'my [own] child'); and like in Ewe, it is the latter that is commonly used as a head noun in endocentric compounds, cf. (15a), and when the first constituent denotes an inanimate concept, it is used productively as a diminutive suffix (15b) which can be added to virtually any noun.

- (15) The !Xun noun *mà* (plural *m̩hè*) 'child' as the head of compounds.

	<i>Form</i>	<i>Meaning</i>	<i>First component</i>
a	g øq-mà	'boy'	g øq 'man'
	!xō-mà	'young or small elephant'	!xō 'elephant'
b	tc'āō-mà	'small tooth'	tc'āō 'tooth'
	n!āō-mà	'small house'	n!āō 'house'

Discussion

The two languages examined, Ewe and !Xun, are genetically unrelated and are spoken in different parts of Africa, Ewe being a West African Niger-Congo language and !Xun a Khoisan language of southwestern Africa. Still, there are striking similarities in the way certain noun-noun compounds are formed. First, in both languages the head of the compound is placed last (both languages have the syntactic order modifier-head, or possessor-possessee). Second, both have a productive pattern of noun-noun compounding. Third, both languages use the lexicon of nuclear family relations productively as heads to express concepts of other domains of human experience. In this way, nouns for 'father', 'mother', '(own) child' and related concepts are combined with other nouns to express new concepts. Fourth, on account of their frequent occurrence, the use of these nouns is generalized to the extent that they are on the borderline between compounding and derivation.

Fifth, in some cases the head noun merges with the preceding noun to form a new, unanalyzable lexical item. For example, we observed above that the Ewe noun *xeví* 'bird' is composed of the earlier word for 'bird' *xe* plus the relational noun *vi* 'child', but synchronically it is unanalyzable, despite the fact that *xe* survives with the restricted meaning 'domestic bird'. Roughly the same process has occurred in !Xun, where the earlier word for 'bird' *tc'ám* has now the meaning 'domestic bird(s)' or 'poultry' while the new word for 'bird' is *tc'ámmà*, which is composed of *tc'ám* plus *mà* 'child of', but is conceived of as a mono-morphemic lexeme.

Sixth, there is a similarity concerning the fate of some of the head nouns concerned. When regularly used as a head of compounds, the relevant noun may become increasingly restricted to uses as productive markers of compounds, gradually losing its status as an independent lexical item. Thus, Ewe *tó* 'father' has given way to another noun, *fofó*, and the !Xun noun *dē* 'mother' has survived only in compounds and a few fixed expressions (though in northern dialects it still exists as an independent lexical item; cf. *m̄ dé* 'my mother', *ā dé* 'your mother' in the !Xun dialects of Angola.).

Finally, there is another important similarity. We observed above that with increasing frequency of use and extension to new contexts, the head nouns gradually lose in nominal properties and acquire properties of derivational suffixes. The effect is that for items such as Ewe *-tó* or !Xun *-k'áò* there is perhaps less justification to talk of nominal rather than of derivational elements. The problem associated with this situation, to be encountered also in many other languages, is one of linguistic taxonomy: Where to trace the boundary between compounding and derivation?

But this problem does not exist with one of the nouns discussed: In both Ewe and !Xun, the noun for 'child', *vi* and *mà*, respectively, are unambiguously derivational suffixes with diminutive meaning when combining with inanimate nouns – actually, they are the only productive diminutive markers to be found in the two languages.

Grammaticalization

There are no historical records on earlier states of these languages, neither for Ewe nor for !Xun. Still, on the basis of the parameters of grammaticalization (see section 5.2) we can postulate the following development of the construction concerned:

- (a) At the earliest stage there was a noun-noun compounding pattern of the endocentric modifier-head type.

- (b) Some head nouns, such as 'father', 'mother', 'man', 'woman', or 'child', acquired a higher frequency of use, combining with a larger number of other nouns (extension).
- (c) Being used as head nouns with many different other nouns, their meaning became more general and/or schematic, approaching that of functional categories (desemanticization).
- (d) In some cases, most clearly in the case of head nouns for 'child', the meaning was generalized to the extent that the erstwhile nouns turned into functional categories, being decategorialized in the process from noun to diminutive suffix (decategorialization).
- (e) But decategorialization was more dramatic in the case of the modifying nouns: They lost all salient properties of nouns such as taking modifiers or affixes.

To conclude, what started out as a combination of two nouns ended up as a combination of noun plus derivational suffix. In spite of being suffixes when combined with inanimate nouns, Ewe *-ví* and !Xun *-mà* still exhibit some nominal relics, bearing witness to their nominal origin. For example, the !Xun noun *mà* '(own) child' has a suppletive plural, *mìhè*, and this suppletion is retained when this item is used as a derivational suffix, cf. (16); we will return to this issue below.

(16) !Xun, W2 dialect

<i>n!āō</i>	'house, houses'
<i>n!āō-mà</i>	'small house', <i>n!āō-mìhè</i> 'small houses'

In other words, we are dealing with a grammaticalization chain leading from nouns in compounds to functional categories. The question that one might wish to pose is the following: What kind of relationship is required between the two nouns to undergo this process? The data available suggest that the requirement is a modifier-head structure of attributive possession. Evidence for this claim can be seen in the fact that in languages with the reverse order head-modifier (more precisely, possessee-possessor), the order in compounds also is head-modifier. The Chadic language Kwami is such a language (Leger 1994: 95ff.); accordingly, the nouns *láwó* 'child', plural *léwní* 'children', *fúbí* 'father', and *núní* 'mother' precede the modifier in noun-noun compounds, even when these nouns assume the schematic functions 'young', 'male', and 'female', respectively, as in the following examples:

(17) Kwami (Chadic, Afroasiatic; Leger 1994: 95ff.).

<i>Form</i>	<i>Literal meaning</i>	<i>Meaning</i>
láwó shìlò	'child cow'	'calf'
fúbí shìlò	'father cow'	'bull'
núní shìlò	'mother cow'	'cow'

Conceptual shift

We saw above that it is specific concepts serving as heads in compounds that tend to undergo the grammaticalization process sketched above, and the same kind of processes of conceptual shift can be observed crosslinguistically. First, this involves desemanticization: There is a more general process leading from a kinship term with concrete lexical meaning to some more abstract/schematic concept standing for some perceptually salient property relating to size (small vs. normal), sex (male vs. female), etc.

At the same time, each of these kinship terms leads to a different kind of conceptual shift. Nouns for 'father' and 'mother', or 'man' and 'woman' provide a convenient conceptual template for expressing a distinction of sex. Not uncommonly, conceptual shift leads from humans and animals to the plant world, where the distinction 'father' vs. 'mother' tends to be employed to distinguish between big vs. small, strong vs. weak, or barren vs. fruit-bearing exemplars of the same plant species, as for example in the Nilo-Saharan Songhay language Koyraboro Senni (Heath 1999b: 107; see below).

But there are other conceptual templates in addition. 'Father' tends to be associated with ownership and, when used in compounds with inanimate nouns, it may be used to denote 'owner of (property) X', and 'mother' appears to have evoked the concept of 'suffering' in Ewe, in that it combines with other nouns to denote 'a person suffering from a certain ailment'.

The most dramatic patterns of conceptual shift can be found with nouns for 'child'. First, they tend to express 'a young X' when occurring in compounds with animate nouns, and 'a small X' with inanimate nouns. In the latter capacity, 'child' may also denote the subpart of some item. Thus, Ewe *aʃ-ví* 'toe' means literally 'foot-child' and *alɔ-ví* 'finger' is literally 'arm-child', and in the Songhay language Koyraboro Senni, the word for 'finger' is *kabe-ize*, which is composed of *kabe* 'hand' and *ize* 'child' (Heath 1999b: 107). The subpart may also be the smaller of two parts forming one entity. For example, in Koyra Chiini, a 'rifle' is *malfa* while 'bullet' is the 'child (*ije*) of a rifle', and a 'bow' is *toŋgotoŋgo* and an 'arrow' the 'child of a bow' (Heath 1999a: 78).

Another concept commonly derived from 'child' is 'a delineated part of a mass or quantity'. We had examples from Ewe, e.g. *súkli-ví* 'a piece of sugar, sugar cube' (literally, 'sugar child'), in Koyraboro Senni, this concept has given

rise to a singulative marker; for example, the singulative of the noun *himbiri* 'hair' is *himbiri-ize* '(single) hair', literally 'hair-child' (Heath 1999b: 107). In a similar fashion, in the Chadic language Kwami, the noun *lágó* (plural *léwní*) 'child' serves as an individualizing marker in the following example, singling out one (or more) items of a collective entity when used as the head of compounds:

- (18) Kwami (Chadic, Afroasiatic; Leger 1994: 95ff.)
- | | |
|------------|---|
| míyá | 'people' |
| láwó míyá | 'one of the people' (literally, 'child people') |
| léwní míyá | 'some of the people' (literally, 'children people') |

Another kind of conceptual shift leads from 'child' to 'member of a social unit', denoting, e.g., inhabitants of a village, town, or country. For example, in Koyraboro Senni, the noun *koyra* means 'town' while *koyra-ye*, literally 'town-child', means 'citizen, native (of town)' (Heath 1999b: 107); we presented similar examples from Ewe in (11d). On the other hand, this shift is manifested in expressions for professional groupings, as in the Swahili examples of (19), where the noun *mwana* '(own) child, offspring' serves as the head of a compound construction (note that attributive possession in Swahili has the order head-modifier, hence the same order is found in compounding).

- (19) Swahili (Bantu, Niger-Congo)
- | <i>Form</i> | <i>Literal meaning</i> | <i>Meaning</i> |
|---------------------|------------------------|------------------|
| <i>mwana-chama</i> | 'child-party' | '(party) member' |
| <i>mwana-hewa</i> | 'child-air' | 'pilot' |
| <i>mwana-maji</i> | 'child-water' | 'sailor' |
| <i>mwana-sheria</i> | 'child-law' | 'lawyer' |

The significance that the kinship concepts discussed have for structuring certain domains of experience can be illustrated with the following example from the West African Songhay language Koyra Chiini, involving the nouns *ñaa* 'mother' and *jé* 'child' as heads of compounds: There appears to be a fairly productive pattern in the domain of plant terminology according to which the bare noun stem denotes the fruit of a plant, while a compound with the noun 'mother' as its head denotes the whole plant and with the noun 'child' the seeds of the plant, cf. (20).

- (20) Compounds with *ñaa* 'mother' and *jé* 'child' as heads of plant names in Koyra Chiini (Nilo-Saharan; Heath 1999a: 78).

Stem	Meaning	Stem + - <i>ñaa</i> 'mother'	Stem + - <i>ije</i> 'child'
baani	'pods of an acacia sp.'	'acacia sp. (tree)'	'acacia seed'
koo	'baobab fruits'	'baobab tree'	'baobab seeds'
dunguri	'beans'	'bean plant' (also: 'pregnant woman')	'seed (of bean)'

To conclude, there is yet another answer to the question of what may happen when two nouns are combined: There appears to be a crosslinguistically common process from noun-noun compounds to derivational structures. That this is a gradual process is suggested e.g. by the fact that there are usually combinations that can be described as transitional, in that they exhibit properties of both compounding and derivation. Note however that presence of a productive pattern of noun-noun compounding does not automatically lead to derivation; both English and German have such a pattern but have evolved hardly any derivational structures.

Inflection

The development from compounding to derivation is crosslinguistically widespread; but this is not normally the way in which inflectional morphology arises. Nevertheless, there are cases suggesting that in specific situations, compounding can also give rise to inflection. We saw above how modifying compounds of the form [noun + 'child'] gave rise to productive patterns of diminutive derivation in a number of languages. But the same combination can also lead to the emergence of inflectional categories. The !Xun examples looked at above illustrate one way in which this may happen.

In this Khoisan language, nouns are essentially transnumeral, that is, they are unspecified for number. Thus, the noun *!xō* can mean 'elephant' or 'elephants'. But there is a small number of exceptions: Some frequently used nouns, typically denoting human beings, follow a suppletive pattern, in that singular referents use a different lexeme than plural referents. We had one of these nouns above: *mà* 'child of, offspring' has the suppletive plural form *nìhè* 'children'. Accordingly, in noun combinations having this noun as their head there is an obligatory singular plural distinction. Thus, whereas *!xō* 'elephant(s)' is not number-sensitive, in combinations with *mà* as its head it is – hence *!xō-mà* 'young or small elephant' has an obligatory plural form *!xō-nìhè*, that is, whenever *mà* is a derivational suffix there is an obligatory number distinction. Now, with a number of nouns, *mà* has been lexicalized as part of a new noun, and with such nouns the erstwhile plural form of the noun has become an inflectional plural suffix, e.g., *xāmà*, plural *xāmìhè* 'old man', *tc'ámmà*, plural

tc'ámmihé 'bird'. In short, with the grammaticalization of the noun *mà* in modifying compounds, a lexical distinction has turned into an inflectional one.

Nominal plural is generally described as a phenomenon belonging to the inflectional domain of grammar. The development from noun to plural marker via noun-noun combining is in fact well documented, and in most cases it involves nouns for 'people' that serve as the input of grammaticalization. For example, the noun *tîu* 'people' of the South Khoisan language !Xóõ appears to have given rise to the suffix *-tû*, forming the plural of human nouns of noun class 4 (Tom Güldemann, p.c.), and in the French-based creole Seselwa of the Seychelles Islands in the Indian Ocean, the noun *ban* 'group (of people)', historically derived from the French noun *bande*, has been grammaticalized to a plural marker of definite nouns, e.g., *ban pirog* (PL canoe) 'the canoes' (Heine and Kuteva 2002a).

To conclude, compared to derivation, inflection is fairly rare as a grammaticalized output of noun combining; still, it may arise, as the preceding examples have shown.

5.5 Adpositions

Another way in which noun-noun combining may give rise to new functional categories can be seen in the development of adpositions, involving the reinterpretation of (21a) as (21b). Note that this is not the only way in which adpositions – both prepositions and postpositions – may evolve (see Heine and Kuteva 2007, chapter 2), but it is crosslinguistically presumably the most common one.

(21) The rise of adpositions

- | | | | |
|---|-----------------|---|-----------------|
| a | NP ₁ | - | NP ₂ |
| b | NP | - | Adposition |

The way this happens involves most frequently attributive possession, that is, modifying combining, i.e. "genitive constructions", where one noun (phrase) is the syntactic modifier (*N*₁) and the other its head (*N*₂). That the diachronic development is from attributing possession to adpositional construction, rather than the other way round, is suggested e.g. by the fact that the latter tends to retain morphosyntactic properties that still bear witness to their origin as constructions of attributive possession. For example, the English adpositions *in front of*, *because of* exhibit properties of attributive possession, such as the possessive marker *of* and the word order head – modifier, even though they are now unambiguously prepositions. Accordingly, the placement of adpositions

(at least of the type looked at here) is determined by syntactic principles, in that a head – modifier order will give rise to prepositions and modifier – head order to postpositions.

But the process leading from (21a) to (21b) is not restricted to attributive possession. It may as well be based on appositive combining, where N_2 is added to N_1 as an apposition serving to specify or further elaborate the meaning of N_1 , and having the same argument status as N_1 . This strategy is pragmatically rather syntactically determined, that is, the apposition almost invariably follows the other noun – irrespective of whether the language concerned has head – modifier or modifier – head word order. In some languages, the appositional noun takes a possessive modifier cross-referencing the preceding noun (e.g., 'the house, its top'). Appositive combining of this type gives rise most of all – though not necessarily – to locative constructions, where the apposition provides a locative specification of the other noun. It is in particular – but again, not always – body-part nouns that serve as appositions. Example (22) from the East Cushitic language Dhaasanac of southern Ethiopia illustrates this kind of combining, where the second noun delimits or specifies the location of the first noun. Of the ten nouns that have been grammaticalized to postpositions, eight denote body parts, as table 5.3 shows.

- (22) Dhaasanac (East Cushitic, Afroasiatic; Tosco 2001: 240-4)

kúo	bíl	?af	taalli?
2.SG.S	house	mouth	stand.PERF
'Were you (standing) in front of the house?'			

Table 5.3: The grammaticalization of body part nouns to adpositions in Dhaasanac (East Cushitic, Afroasiatic; Tosco 2001: 240-4)

Form	Meaning	Literal meaning
?afu	in front of	mouth
bál	next to	chest
mé	in front of	head
sugu	Behind	back
?él	behind, back	back
géere	Inside	belly
?innu	around, amidst, between	eyes
tóomo	between	waist

5.6 Classification

But the combination of two nouns where one acquires a modifying function for the other may also lead to other forms of linguistic constructions. One way in which it can affect the typological profile of a language concerns what is commonly described as systems of classifiers (CL). In the present section we will look at such systems with a view to determining some of the effects noun combining can have on the development of some classifier categories. To this end we will be restricted to two types of classification, namely noun classifier and numeral classifier systems. Many languages have either of the two systems, but some languages have both, and both may occur within the same utterance (Aikhenvald 2000: 90).

We are not able to do justice to the structure of nominal classifiers, for which see the rich literature on this subject (Aikhenvald 2000 and the references therein). Our interest is simply with what the conceptual process is when a noun assumes the role of a classifier of another noun. We will not be concerned with systems that are most commonly associated with noun classification, namely noun class systems of the type found e.g. in Niger-Congo, some Australian and Amazonian languages, or gender systems as they occur e.g. in Indo-European or Afroasiatic languages,¹⁰ for the following reason: These systems are usually grammaticalized to the extent that it is in most cases not possible to reconstruct their genesis and the motivations underlying them. Since we are concerned in this paper with nouns, we will also ignore classifiers derived from verbs, and will have little to say on verbal classifier systems.

Languages with noun classifiers are found in particular in Australia, Mesoamerica, Amazonia, and eastern and southeastern Asia. Classifier phrases consist of a classifier (CL) plus the classified noun, as in (23).

- (23) Yidiny (Pama-Nyungan; Aikhenvald 2000: 83)
- | | |
|--------------|---------|
| jarryu | durrguu |
| CL.BIRD | owl |
| 'mopoke owl' | |

The number of classifiers to be found in a given language varies from two (in the Australian language Emmi) to several hundred in some languages of East and Southeast Asia. In other languages again, almost any generic noun can be used as a classifier (Aikhenvald, 2000: 84-5). Classifiers are in the

¹⁰ See Aikhenvald (2000: 95) on typological differences between these and nominal classifier systems.

majority of cases derived from nouns, and in many cases they are still homonymous with their lexical sources; for example, the Yidiny classifier *jarryu* in (23) is homonymous with the noun *jarryu* 'bird'.

Noun classifiers are mostly free morphemes, but they may as well be affixes on nouns. They are either a subclass of nouns or form a morpheme class of their own. The extent to which the use of noun classifiers is obligatory differs from one language to another. They are not always restricted to nominal structures; at least some of them can be used as agreement or anaphoric markers, as in the following Yidiny example:

- (24) Yidiny (Pama-Nyungan; Aikhenvald 2000: 87)
- | | | | |
|--|-------------|--------------------------------------|---------------|
| ngayu | ganguul | bugaany nyundu minya | baga lnyunda. |
| I.NOM | wallaby.ABS | eat.PAST you.NOM CL.EDIBLE.FLESH.ABS | spear-SUB |
| 'I ate the wallaby, which animal you speared.' | | | |

Numerical classifiers are found in many parts of the world; they are particularly common in East and Southeast Asia and Mesoamerica, but extremely rare in Africa, Europe, and Australia. They occur contiguous to a numeral (or other quantifier) in quantifying noun phrases, cf. (25).

- (25) Tashkent Uzbek (Aikhenvald 2000: 102)
- | | | |
|-----------------------|----------------|---------|
| bir | bâs | karâm |
| one | CL.HEAD.SHAPED | cabbage |
| one (head of) cabbage | | |

They tend to be free forms, but they may as well be clitics or affixes on numerals or, very rarely, on nouns, and in some languages they are treated as a subclass of adjectives. In numerical classifier constructions, the noun (N) is generally the head, and the classifier (CL) usually forms one constituent with the numeral (NUM). Constituent order depends on the general syntactic rules of the language concerned; crosslinguistically the most common constructions are [NUM-CL]-N, e.g. in Chinese, and N-[NUM-CL], e.g. in Thai; what is common to all constructions to be found is that the numeral and the classifier always occur adjacent (Aikhenvald 2000: 104-5).

Numerical classifiers may form an open-class category, where virtually any noun can be used as a classifier, as in Thai and Lao, they may number several hundred, as in the Mayan language Tzeltal, but their number can as well be severely limited, as in the Tai language Nung, where there are only four classifiers. While noun classifiers are not always used obligatorily, numerical classifiers are normally obligatory whenever a numeral is used in a nominal construction. However, the higher the number value of the numeral is, the more likely it is that the classifier is omitted; note further that there are languages

where not every noun takes a numeral classifier. Finally, numeral classifiers (though not noun classifiers) can be "repeaters", that is, the classifier is the same as the classified noun, e.g.,

- (26) Mal (Mon-Khmer; Aikhenvald 2000: 104)

?ən	?ui	cianj	ba	cianj.
I	have	house	one	CL.house
'I have one house.'				

Finally, mention should also be made of noun incorporation, that is, of noun-verb compounds where the noun is grammaticalized to a part of the verb, thereby giving rise to verb classification. This is the case in what Mithun (1984) calls classificatory noun incorporation, where the incorporated noun having a general meaning narrows the scope of the verb. Thus, in the Siberian language Koryak, the noun *qoya-* 'reindeer' in combination with the verb *nm-* 'to kill' yields *qoyanm-* 'to reindeer-slaughter', and the noun *dulg* 'tree' of the Australian Gunwinggu language narrows the scope of the verb *-nag* 'to see' to produce *-dulg-nag* 'to tree-see'.

Grammaticalization

As far as the evidence available suggests, the rise and development of both types of classifiers is essentially the result of the grammaticalization of nouns as classifying categories. Concerning the choice of lexical sources of classifiers, Aikhenvald observes:

The choice of which set of nouns becomes classifiers is typically language-, family-, or area-specific [...]. Australian languages typically use generic nouns such as 'vegetable food', 'meat' (or 'edible animal'), and various human divisions (e.g. 'man', 'woman', 'person') as generic classifiers. Mayan languages typically have a number of classifiers which refer to the domain of social interaction, culture and beliefs (e.g. 'male kin', 'respected male', 'deity'). Classifiers can come from words for 'animal', 'dog', 'corn', 'rock', 'water' (Aikhenvald 2000: 353).

While there is little information on the nature of the process leading to the rise of classifiers, the evidence that exists points to a process whereby noun-noun combinations gradually develop into noun-classifier constructions in that one of the nouns assumes a more general, classifying function. The process involves all four parameters of grammaticalization. Extension means that the noun acquiring properties of a classifier comes to be increasingly used

with a wider range of nouns classified, with the effect that the meaning of the classifier is increasingly generalized on the one hand, and modified by the meaning of the nouns with which it co-occurs on the other.

Aikhenvald (2000: 82) observes that there is often a generic-specific relationship between the classifier and the noun classified. We argue that the generic nature of classifiers is due to desemanticization, that is, to the loss of specific semantic properties of their nominal sources. As we will see below, however, loss can – and frequently is – made up for by the emergence of new properties resulting from the extension of the item to new contexts.

Desemanticization is minimal, if not absent, in the case of repeaters (see above), where the classifier tends to express largely the same meaning as the noun classified. But there are also quite a number of cases of grammaticalization from noun to classifier without desemanticization, where a generic noun gives rise to a generic classifier having essentially the same range of referents. For example, in the Western Austronesian languages Minangkabau and Acehnese, *bungo* and *bungöng*, respectively, are generic words for 'flower', and both have given rise to generic classifiers for flowers – that is, there has been decategorialization from noun to classifier but no semantic change. Further common examples involve nouns for 'man' and 'woman' which have developed into noun classifiers, respectively, for male and female referents (Aikhenvald 2000: 402-3). There is also no desemanticization when a noun on the way to classifier acquires a more specific meaning. For example, the noun *xiinaq* 'man' of the Mayan language Mam appears to have provided the source for the noun classifier meaning 'old man, respectfully'.

Otherwise however there is a generalization of meaning on the way from noun to classifier. There appears to be a difference between noun classifiers and numeral classifiers in the nature of this process. The former tend to involve a development from specific to generic meaning relating to material makeup and function, while the latter tends to highlight specific properties of the object classified, such as shape. For example, in the Western Austronesian language Minangkabau, the noun *batang* 'tree' appears to have given rise on the one hand to a noun classifier meaning 'tree as a generic' and on the other hand to a numeral classifier meaning 'vertical long object, often made of wood' (Aikhenvald 2000: 302).

Once a noun assumes the function of a classifier, it undergoes decategorialization, losing many of the properties characterizing its use as a noun: It becomes restricted in its freedom of placement within the clause, and it loses the ability to take its own modifiers and determiners. In a number of cases, the process also involves erosion, in that the classifier may lose in phonetic substance. In the Mayan language Mam, the development from noun to noun classifier tends to lead to a shortening of vowels, e.g., *q'aa* 'young man' (noun) > *q'a* classifier, *txiin* 'young woman' (noun) > *txin* (classifier), while in

the Australian language Olgolo, the nouns *úyu-* 'fish' and *ínhá-* 'animal' appear to have been shortened, respectively, to *y-* and *nh-* in their development to generic classifiers (Aikhenvald 2000: 91; 357). In the Mayan language Akatek, the noun *winaj* 'man' appears to have been reduced to the noun classifier *naj* used for human beings, saints and mythological animals, e.g.,

- (27) Akatek (Mayan; Zavala 2000: 134-6)
- | | |
|-------------|-------|
| naj | me' |
| CL | sheep |
| 'the sheep' | |

The extent to which desemanticization takes place is a function of the extension parameter mentioned above, that is, of the number of nouns with which the classifier combines. An extreme example is provided by cases where a classifier combines only with one noun: In such cases, the meaning of the classifier is determined exclusively by the meaning of that noun. For example, in the Benue-Congo language Kana, the numeral classifier *nɛɛ*, derived from the noun for 'person', combines only with the noun for 'guest'; the meaning of this classifier is thus highly specific, being determined by one noun only. But classifiers tend to combine with larger paradigms of nouns, and the larger the paradigm of nouns is, the more desemanticized the classifier will be. Common semantic properties that tend to survive or to surface are in particular the following (see Aikhenvald 2000: 404-5 for references):

- (a) Function. For example, in the Australian language Ngan'gityemerri, the noun *syiri* 'weapon' became extended to all things involving striking, including lightning, and in the North Arawak language Tariana of Amazonia, the classifier for 'canoe' is used for any vehicle.
- (b) Material. In the languages of the Kanjobalan branch of Mayan, the word for 'corn' is also used as a classifier for corn and products made of corn.
- (c) Shape. In the Austroasiatic language Dioi, the noun for 'leaf' is used as a classifier for paper, fabric, and board, and in Indonesian, the noun *batang* 'tree, trunk' is used to classify vertical things fabricated from wood and other long inflexible things.

More generally, desemanticization tends to involve an extension to a larger class of referents, and thereby a loss in semantic specificity. For example, the noun *bana* 'fresh water' of the Pama-Nyungan language Yidiny is used to classify all drinkable liquids, and the noun *ix* or '*ix*' 'woman' of the Mayan language Akatek appears to have provided the source for the classificatory particle '*ix*' used for human beings, saints and mythological animals (Zavala 2000: 134), see also the discussion above about the development *winaj* 'man' > noun classifier *naj* used for human beings, saints and mythological

animals in Akatek. The Thai item *tua* was used in earlier documents exclusively as classifier for four-legged animals; later on it underwent dramatic extension, with the effect that it now combines with a wide range of referents, including mannequins, tables, ghosts, beds, numbers, or underwear – to the extent that it is hard to find any common semantic denominator¹¹ (Aikhenvald 2000: 314). The final stage of desemanticization would be reached when the classifier can combine with all nouns and thereby loses all its semantic content.

Conclusions

The evidence presented by Aikhenvald (2000) and others suggests that noun-noun combinations provide one of the main, if not the main source for the genesis of classifiers. However, in most of the cases discussed above there are no historical records on the directionality of change. That our reconstruction of a development from noun to classifier is nevertheless correct is suggested by the following pieces of evidence: First, there are some historically attested cases, and they are supportive of the unidirectionality hypothesis from noun to classifier and from less to more grammaticalized items. Classifiers were used sporadically in the classical period of Chinese (500-206 BC), and from about 100 AD their use increased. For example, the Chinese classifier *gè* goes back to an item with the meaning 'trunk of bamboo tree' in the Shang Dynasty (c. 1400 BC), it subsequently acquired the meaning 'trees' and then 'wooden objects', and in the Tang Dynasty (600-900 AD) it appears as a general classifier. In a similar fashion, *tiáo* meant 'small branch' in the Shang Dynasty and since the Song Dynasty (960-1117 AD) it serves as a general classifier for long things (see Aikhenvald, 2000: 410 for more details; see also Erbaugh 1986; Bisang 1996). Second, we are not aware of any examples of a reverse development from classifier to noun. While it may turn out that such examples exist, they are likely to be extremely rare and exceptional. And third, as we saw above, classifiers exhibit exactly the same characteristics of grammaticalization vis-à-vis their non-grammaticalized counterparts as other functional categories do.

To conclude, we seem to be dealing with yet another instance of a development where the combination of two independent nouns is put to new uses, in that one of the nouns assumes a classifying function for the other noun.

5.7 On creativity

Noun-noun combining can be described as a process leading to the "creation" of new meanings, constructions, and words by combining independent nouns by means of specific strategies such as attributive possession (modifying

¹¹ But see Carpenter (1987: 45-6) and Downing (1996: 101-2) for a prototype-extension approach.

combining), coordination (additive combining), or juxtaposition (appositive combining). The term creativity has been used in a wide variety of different ways; the way we define the term in the present work is as follows: Creativity is an activity leading to the design of a novel object or idea by modifying existing norms, where this modification comes to be accepted by those who are responsible for maintaining these norms. With reference to the subject matter of this book, the expression "novel object or idea" stands for a meaning or linguistic structure that previously did not exist in this form in the language concerned, while "those who are responsible" are the speakers of that language. "Modification" means that the resulting structure cannot immediately be derived from existing norms (or rules) or conventions; rather, it consists of some break of constraints on the pragmatics, the morphosyntactic structure, and/or the (compositional) semantics of the items concerned. Note that not all modifications of norms lead to new creations. In fact, the vast majority do not, ending up as instances of "deviant" language use. It is only when modifications come to be accepted by the speakers of the language that we speak of creativity. Creativity thus may mean that existing norms are re-defined – that is changed; it contrasts sharply with productivity, which consists simply in the regular application of existing rules or norms.

This definition, which is based on Csikszentmihályi (1990), is not entirely satisfactory since it both includes and excludes a number of phenomena that some would consider essential for an understanding of creativity; still, it takes care of most salient instances of what tends to be subsumed under "creativity" and of the kind of conceptual processes that we are concerned with here. We may illustrate the use of this definition with the English compound *egg head*: Those who designed this concept modified existing norms in that they proposed a meaning that cannot compositionally be derived from that of its parts; the meaning is novel in that there does not appear to be any other English word expressing exactly this meaning, and this compound and its meaning have come to be accepted by speakers of English.

Compounding is a productive mechanism which may but need not involve creativity. Obviously, alternative compounds are paradigm instances of creative activity but there are also other types of noun-noun compounds that can be called "creative" in accordance with our definition. In the following we will illustrate the creative use of modifying compounding by looking at the West African Niger-Congo language Ewe. In the contact situation between Ewe speakers and societies in Europe, speakers acquired a range of new concepts relating to western culture and technology. The primary strategy that Ewe speakers used in the 19th and early 20th century for creating terms for new concepts was modifying compounding, a highly productive mechanism of

the language. In the same way as in the inalienable possessive construction, the head follows the modifier in compounding. The following examples from Ewe, taken from Westermann (1905), are meant to illustrate the creativity that Ewe speakers used in forming new words for concepts that they were exposed to as a result of contact with the western world. Our examples are restricted to noun-noun compounds with the noun *ga* 'metal' as a modifier. The meaning of this noun was extended to also denote specific items made from metal, namely 'money' and 'watch, clock', although the latter concept was also expressed by the alternative compound *ga-o- òkuř* (metal-strikes-itself). In combination with color adjectives, the use of *ga* was extended to express specific kinds of metal, e.g., *ga dzé* (metal red) 'brass, copper', *ga yibɔɔ* (metal black) 'iron, iron-like metal'.

One domain of new concepts structured by modifying compounds was that of household goods, e.g., *ga-tí* (metal-stick) 'metal spoon', *ga-zé* (metal-pot) 'kettle, metal pot', *ga-nú* (metal-thing) 'tin'. Furthermore, there were a number of other artefacts that came to be expressed by means of the noun *ga* 'metal' as a modifying constituent, such as *ga-ykúí* (metal-eye.is.it) 'spectacles', *ga-kă* (metal-string) 'wire', *ga-kpɔ* (metal-fencing) 'wire fence'. A new institution associated with metal that Ewe speakers were confronted with was that of prison, giving rise to compounds such as *ga-xɔ* (metal-house) 'prison', or *ga-tɔ* (metal-owner) 'prisoner'. Another domain concerned means of modern transportation, e.g., *ga-sɔ* (metal-horse) 'bicycle', *ga-mɔ* (metal-way) 'railway', *ga-fɔkpa* (metal-shoe) 'horseshoe'. In yet another domain, namely that of commercial interaction, it was not the meaning 'metal' but rather that of 'money' that was exploited for expressing new concepts, e.g., *ga-sí.así* (money-hand.hand) 'cash (payment)', *ga-ví* (money-child) 'small change'.¹²

These examples show that the Ewe noun *ga* in combination with some head noun has provided a rich source for forming new concepts by means of modifying compounding. The question now is whether this process can be called creative in accordance with the definition we gave above. One of the two requirements of this definition is clearly fulfilled: The compounds have been accepted by the speakers of the language. The answer is more complex in the case of the second requirement of modification of existing norms. With regard to the syntax of the construction, the answer is clearly in the negative since we

¹² There are a number of further compounds that are derived from the 'money' meaning of *ga*. For example, we observed above that in its 'metal' meaning, *ga* has given rise to the compound *ga-tɔ* 'prisoner'. But this compound has a second meaning, 'rich person', which appears to be derived from the 'money' meaning.

are dealing with the productive application of an existing rule, whereby two nouns are combined, with the first assuming the function of a modifier and the second that of the head of the construction.

But what about the semantics of the compounds: Is it suggestive of a modification of existing norms? It would seem that in a number of these compounds the answer is also in the negative since the meaning of compounds can be derived compositionally from that of its constituent parts – e.g., when a kettle (*ga-zé*) is described as a 'metal pot'. Still, there are other cases where one might argue that there is a modification of norms – hence creativity, in that compounding led to a transfer from one domain of human experience to another, e.g., from metal to prison (*ga-xɔ*), or from animate to inanimate concepts, as in compounds such as *ga-sɔ* (metal-horse) 'bicycle' or *ga-mi* (metal-excrement) 'rust (of iron)'.

On the basis of this definition, noun-noun combining in general and compounding in particular do not necessarily entail creativity, and creativity is not an all-or-nothing matter; rather, there is a scale extending from non-creative productivity to full creativity. Our usage of creativity contrasts thus can be described in the following way:

- (a) Creativity is not a specifically linguistic phenomenon; rather, manifests itself in virtually all domains of human behavior – including domains of behavior where recursion is ostensibly absent.
- (b) It is unpredictable within limits.
- (c) Rather than being stable across space and time, it entails language change; with each new act of creativity, the language is no longer exactly what it used to be prior to this act.
- (d) It is one of the main driving forces of innovation, i.e., of language change, in that it constantly leads to the rise of new meanings and new constructions.

Perhaps the most controversial component of this description can be seen in (b). Take the Ewe example *ga-mi* (metal-excrement) 'rust (of iron)' that we just presented: "Unpredictability" consists in the fact that Ewe speakers recruited the concept 'excrement' to serve as a metaphorical vehicle to express the concept 'rust' – they could have chosen various other vehicles. At the same time there is also a limit as to what could serve as a vehicle in this case, in that it is only concepts that both the speaker and the hearer will accept to provide a possible cognitive link to 'rust' that could be recruited.

5.8 Conclusions

A question that we posed in the introduction to this paper was what one can do with two nouns, and what people in the past may have achieved by combining

two nouns. The answer we gave in this paper was bluntly: a lot. We saw in the preceding sections that combining free nouns can lead to noun modification, compounding, derivation, and even to inflection. It can also lead to the emergence of word categories such as adjectives and adpositions, and it may also give rise to classifying morphemes such as noun and numeral classifiers – in other words, noun-noun combining can be held responsible for a wide range of grammatical categories. And the process described in this paper is essentially unidirectional: We will not expect that any of these categories will develop diachronically into nouns and combinations of nouns.

Combining two nouns is on the one hand a non-creative activity as long as it simply consists of applying existing "rules" productively. However, to the extent that this involves combinations that were hitherto considered inappropriate and/or leads to the propagation of novel meanings that cannot be predicted from the sum total of the meanings of the nouns combined, and that come to be accepted by the community of speakers, this is a creative activity. Such creativity is not restricted to but is most obvious in alternative compounds, such as English *egg head*, *flatfoot*, *half-wit*, *highbrow*, *lowlife*, *redcoat*, *redhead*, *sabertooth*, *tenderfoot*, *whitecap*, *white-collar*, etc., or the examples we had above, like Mandarin *yún-yǔ* (cloud-rain) 'sexual intercourse' (= the sport of cloud and rain) and Vietnamese *giăng-hoa* (moon-flower) 'flirtation, ephemeral love'.

What accounts for the fact that certain kinds of nouns tend to be combined, giving rise to new structures such as compounding, nominal modification, derivation, noun classification, adpositions, etc.? Observations on grammaticalization suggest that there is a cluster of the following factors in particular: First, there is cognitive manipulation. By combining two words, A and B, in a novel way, a new concept may be expressed. In one type of combining – the one that we were centrally concerned with here, A assumes a modifying or specifying function for B. Second, there is the parameter of extension: Combining A and B is a necessary but not a sufficient requirement for grammaticalization to take place. What is required in addition is extension, whereby the use of A is extended to other members of the paradigm to which A belongs, i.e., A₁, A₂, etc. Third, there is desemanticization: The larger the paradigm of A-members becomes, the more will B lose in semantic specificity, that is, the more general its meaning will be. Fourth, in accordance with the parameter of decategorialization, the more productive the pattern becomes, the more are A and/or B likely to lose in properties characteristic of their erstwhile categories, and they may adopt other properties characteristic of new contexts.

Extension entails an increase in frequency of use, or what Bybee (2002) also refers to as repetition:

[...] repetition is the glue that binds constituents together. Thus, I hypothesize that hierarchies of constituent structure are derivable from frequent sequential co-occurrence. In this view, the more often particular elements occur together, the tighter the constituent structure. Thus, low-level constituents such as a determiner, *the*, and a noun, such as *puppy*, frequently co-occur, while higher-level constituents, such as an NP, *the puppy*, and verbs such as *ran*, *licked*, or *slept* occur together less often (Bybee 2002: 111).

Frequency of use plays an important role in the rise of new functional categories out of noun-noun and other word combinations. At the same time we maintain, as is also acknowledged by Bybee, that the primary motivation for the process is semantic (or conceptual), and that frequency is derivative of this motivation.

In a number of works on language genesis, e.g., in studies on complex adaptive (self-organizing) systems, it is assumed that the rise of grammar is contingent on the presence of a sufficiently large lexicon (e.g., Li 2002: 90). While this may be so, this does not appear to be a crucial factor: As we saw in this paper, the presence of one word category with only two instances is – in principle – enough to produce a wide range of different grammatical structures. This suggests that quantity is not necessarily a decisive issue for grammatical categories or relations to arise.

Following Heine and Kuteva (2007) we hypothesize that the processes described in this paper can in some way be traced back to the earliest forms of human language. In their reconstruction of grammatical evolution, these authors do not deal with noun-noun combining, and the question arises at what stage it may have emerged in early language. Speaking about compounding – which, as we showed above, comes at a stage later than combining – Jackendoff (1999; 2002: 249-50) suggests that compounding is a possible "protolinguistic fossil" and "a plausible step between raw concatenation and full syntax" on account of the relations obtaining between the words of a compound. In support of this suggestion he presents in particular two kinds of evidence: First, he draws attention to observations according to which in the Basic Variety of late second language learners as proposed by Klein and Perdue (1997: 332) the formation of new words is limited to noun-noun compounds. And second, he argues that children improvise compounds very early.

Neither of these arguments is entirely convincing. Compounding is not clearly productive in all instances of the Basic Variety (Sandra Benazzo, p.c.). In the acquisition process of English-speaking children, compounding has been found to be important. The first stage in the acquisition of compounds leads children to create a structure instantiated by combinations such as *wash-man*,

open-man for which there is no equivalent in the adult languages which they are exposed to. The strategy tends to be described in the relevant literature as "overextension", where children extend the use of their words to refer to things that would not be covered by the adult word. Overextensions appear most commonly in children's speech from about age 1;6 to 2;6 and may affect as many as 40% of children's early words (Clark 2003: 88). And compounding is not confined to English-speaking children; children acquiring German, Swedish, and Icelandic also construct new root compounds from as young as age two (Clark 2003: 297). But all these are languages having a highly productive mechanism of compounding, while many other languages, such as the Romance or Bantu languages, have not. It would seem in fact that in such languages, compounding does not nearly play the role it does in the acquisition of English: Children tend to wait until age three or four before they make much active use of novel word-formation, relying on mechanisms other than compounding, such as derivational means or possessive constructions, using prepositional phrases, as introduced, e.g., by *à* or *de* in French (see Clark 2003: 298).

Notice that, for the present purposes, it is important to recognize the distinction between *combining* and *compounding*. On the basis of the scenario proposed in table 5.1, nouns must have been the first category to emerge in early language (layer I), and it is reasonable to assume that, once there was such a category, it was possible to combine different instances of this category. But there are also reasons to argue that compounding was not among the earliest mechanisms of word combining. The first reason relates to the typological distribution of compounding just alluded to: While being widespread crosslinguistically, noun-noun compounding is not found everywhere in the world; it seems to be common in languages having a pronounced modifier-head word order and distinctly less so in head-modifier languages. More research is therefore required on whether it is in fact a situation like the one found in English, as Jackendoff (2002) argues, or else a situation as found in French that reflects an earlier structural pattern. If early language was characterized by modifier-head ordering then it would in fact be plausible to hypothesize that compounding arose early (Fritz Newmeyer, p.c.).

Other reasons concern grammaticalization theory. According to table 5.1, adjectives must have arisen fairly early in the evolution of language, namely at layer III. Now, a common – though not the only – diachronic source for adjectives is provided by nouns assuming the role of modifiers in noun-noun combinations (see section 5.2). This means that the presence of such combinations must have preceded that of adjectives in time; in other words, noun-noun combining must have been present at least at layer III, if not earlier. Another common process that we discussed above (section 5.4) concerns the development from compounding to derivation (and occasionally to inflection).

In our scenario of grammaticalization of table 5.1, categories that may be suggestive of a derivational behavior did not arise in the early layers of evolution – certainly not within the first four layers. While this observation does not provide any clues as to when compounding emerged, it suggests at least that there is no evidence for an early emergence of it.

But there is another reason why we are hesitant to accept the claim that compounding is a possible "fossil" of language evolution. A common source, if not the main source, of (modifying) compounds is provided by attributive possessive ("genitive") constructions. This observation is in accordance with the parameter of decategorialization, in that modifying nouns in possessive constructions generally show a lower degree of decategorialization than modifying nouns in compounds; for example, whereas the former usually dispose of the whole range of nominal properties (such as the ability to take modifiers or to be inflected) this is not normally the case with the latter. This suggests that there must have been attributive possessive constructions before noun-noun compounds arose – in other words, it is unlikely that compounding belonged to the earliest forms of word combining in human language.

Acknowledgements

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Abbreviations

ABS = absolute	CL = classifier	DIM = diminutive
GEN = genitive	NOM = nominative	N = noun
NP = noun phrase	NUM = numeral	PAST = past tense
PERF = perfect	PL = plural	S = subject
SG = singular	SUB = clause subordinator 1,2,3=first,second,third person.	

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6. Functional categories: an evolutionary perspective

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Abstract

In this chapter I will focus on the status and origin of functional categories in the languages of the world, and explore various ideas, with reference to proposals by researchers such Bickerton and Jackendoff, concerning three possibilities: (a) that in the course of language evolution, language developed from a functional category-free to a functional category-rich state; (b) that language started out as a system consisting mostly of syntactic patterns and functional categories (albeit of a different nature), and only then acquired a content lexicon. Ultimately, I tentatively propose that neither scenario is the most likely one, but that we need to consider the possibility of co-evolution of the syntactic and the lexical subsystems or modules in language, with functional categories at the interface between the two.

6.1 Functional categories

Functional categories can take various shapes. Consider for instance, the Andean language Cuzco Quechua. In this Quechua variety, the original language of the Inka Empire, sentences generally have the form given in (1):

- (1) *Tusu-yu-spa taki-ya-spa-n asa-ru-n-ku kargo-yoq-kuna-qa.*
 dance-AUG-SS sing-AUG-SS-AF pass-EXH-3-PL charge-POS-PL-TO
 'The charge holders [patrons of the feast] pass dancing and singing.'
 (Cusihuamán, 1976: 223)

In this example we find two kinds of elements: lexical roots (two of which, *kargo* and *pasa-*, are loans from Spanish) and affixes (in bold in (1)).

These two classes of elements differ on a number of dimensions:

Phonology and morphology

- (a) Roots often consist of two syllables, while affixes are generally mono-syllabic;
- (b) In roots we sometimes find aspirated and glottalized consonants; these are absent in affixes.

Semantics and pragmatics

- (c) The meaning of the affixes is very often much more abstract than that of the roots;
- (d) Some of the affixes play a role in organizing the information structure of the clause, such as affirmative marker *-n* and the topic *-qa*.

Syntax

- (e) Many of the affixes play a role in the syntactic organization of the clause; thus *-spa* marks temporal subordination (here simultaneity) with identical subjects; *-n-ku* marks the subject-verb agreement relation.

Then there are a few affixes in (1), often occurring closer to the root, which have properties intermediate between those of affixes and roots. The elements –*yu-* (full form *-yku-*) and –*ru-* (full form *-rqu-*), glossed here as 'augmentative' and 'exhortative', but with much more complex meanings, as well as the possession marker *-yoq*, have somewhat more concrete meanings, are often lexicalized, and play a less central role in the organization of the clause. Their shape is also slightly more complex than that of other suffixes.

Thus we find a rather sharp division in Quechua between roots and affixes, with some of the affixes having root-like characteristics. These types of distinctions do not exist only in languages with a complex morphology, such as Cuzco Quechua, but also in languages with more simple morphologies, often termed "isolating".

Consider now an example from the Surinam creole Saramaccan, the language of one of the Maroon societies in the tropical inland forest:

- (2) *a bi túe wan sitónu gó a mi báka*
 3s PST throw one stone go LOC 1s back
 'He threw a stone at me (from behind)' (De Groot, 1981: 118).

Here all elements are separate words (although there is some morphology in Saramaccan as well). Again, considering the different dimensions, the elements in Saramaccan can be split up into more lexical and more functional ones.

Phonology and morphology

- (a) Functional elements in Saramaccan generally consist of only one syllable, while lexical elements often are longer;
- (b) The functional elements in this Saramaccan example do not carry specified high tone (marked with a '), but there are some elements that do (Norval Smith, p.c.).

Semantics and pragmatics

- (c) Again, we find more concrete meanings such as *sitónu* 'stone' and *tíe* 'throw (away)', and more abstract meanings, such as *a* 'third singular pronoun', *bi* 'past tense', and *a* 'locative'.

Syntax

- (d) The functional elements, such as the person clitic *a* and the tense marker *bi*, play a role in organizing the clause syntactically.
- (e) In contrast with Cuzco Quechua, there is no overt marking of agreement.

We also find a few elements with intermediate status, such as the serial directional verb *gó* and location specifier *báka*. These may carry a high tone, have a somewhat concrete meaning, and in phrase structure have a status similar, although not identical, to that of lexical heads.

Not surprisingly, other languages, such as Dutch, may have a set of distinctions similar to the ones made in Cuzco Quechua and Saramaccan. Consider an example such as (3):

- (3) *Vergeef-0 me toch mijn ont-nuchter-end-e*
 forgive-IM 1s.AC though 1s.GE dis-illusion-ing-AG
en scept-isch-e toon.
 and scept-ical-AG tone.
 'Please forgive me my disillusioning and sceptical tone.'

In this sentence again we find some functional elements (in bold), as well as lexical elements. In addition, there are some elements intermediate between the two, and heavily lexicalized, which in this case are affixal (prefix *ont-* 'dis-' and adjectivizing *-isch* '-ical').

Phonology and morphology

- (a) Many functional elements in Dutch are pronounced with a schwa (even though sometimes written differently, as in the case of *mijn* 'my');
- (b) Some morpho-syntactic categories in Dutch receive a null expression, such as imperative;
- (c) Some morpho-syntactic distinctions are suppletive, e.g. the *me* 'me'/*mijn* 'my' distinction;
- (d) Some functional categories appear to be separate words, and others appear as affixes.

Semantics and pragmatics

- (e) Some affixes have a purely formal function, such as adjective agreement –*e*, without a clear meaning;
- (f) There are elements with a purely discourse organizing functions, such as *toch* 'though'.

Syntax

- (g) Various elements play a role in signalling the grammatical organization of the clause, such as the agreement marker and the case forms of the first person pronouns.

Thus the lexical/functional distinction is valid for various languages, but with different morpho-lexical manifestations.

While Cuzco Quechua, Saramaccan, and Dutch all have reasonably large inventories of functional elements, in some languages there may be many fewer. This has been claimed for Riau Indonesian by David Gil (e.g. 2001). Consider his often cited sentence (4):

- (4) *ayam makan*
chicken eat

This may mean 'the chicken eats', but also 'the chicken is making somebody eat', or 'somebody is eating where the chicken is', and a host of other things. In Riau Indonesian many aspects of sentence meaning are not expressed through formal markers or rigid structural patterns, but through general interpretive conventions, heavily relying on the context.

Still, Riau Indonesian has functional elements, such as the relator *yang* and tense markers such as past proximate *tadi*, but there are fewer of them than in, say, Cuzco Quechua, and they are relied on less frequently in actual language use. Parkvall (2005), using data from the World Atlas of Linguistics Structures (Haspelmath et al., 2005), has tried to calculate the number of

morpho-syntactic distinctions that different languages make, and concludes that there are large differences in these numbers. There have been claims that there are some languages (e.g. Old Chinese as it appears in poetic texts) without functional categories, but no such language appears in Parkvall's sample.

From this brief survey we can perhaps draw the tentative conclusion in (5):

- (5) a. All languages are characterized by a lexical-functional distinction in their inventory of elements;
- b. In most languages there are some elements intermediate in status on the lexical functional/dimension;
- c. There are various ways that the functional categories of a language may be realized: as affixes, as separate words, as null forms, etc.
- d. Languages may differ in the richness of the inventories of functional elements.

It should be noted that sign languages also have developed functional categories (cf. Muysken, in press), similar to those of spoken languages. This supports the idea that these categories are universal.

The question addressed in this paper is what could be the evolutionary basis for the lexical/functional distinction? Botha (2003: 11) puts the justified demand of 'ontological transparency' on work in this area: if we are discussing the paths of evolution of a certain element or property of language, we should know what that element or property is. This is not simple in the case of functional categories. So how can we define functional categories, given their different manifestations? I propose the following definition (borrowing from Anderson's definition of inflection in his paper *Where's morphology?* (1982)):

- (6) A functional category is an element in the inventory of items in a language that plays a clear role in the grammatical rules of the language.

This definition clearly locates functional categories at the interface of the lexicon and the grammar. What is the reason that human languages have developed this interface category? Before turning to this question, I will turn to further discussion of the question of whether the lexical / functional is sharp or gradual.

6.2 A gradualist perspective: category models and semantic maps

There is fairly widespread recognition, as mentioned in section 1, that among the functional categories not all elements are equal. Some adpositions are more

clearly 'functional' than others (compare French *de* 'of' to *dessus* 'on top', clitic pronouns show special behaviour when compared with strong pronouns (compare *le* '3SG.MS.OB' to *lui* 'him'), copulas (*be*) are more restricted than aspectual auxiliaries (*finish*), etc. Roughly, we get a number of chains converging, from more lexical categories, roughly as in figure 6.1, where four points of reference are taken. Departing from locational and directional adverbs, verbs marking boundaries, discourse markers, and descriptive nouns, several chains can be construed that converge on a class of definiteness and finiteness markers, the most grammaticalized categories perhaps in the nominal and clausal domains:

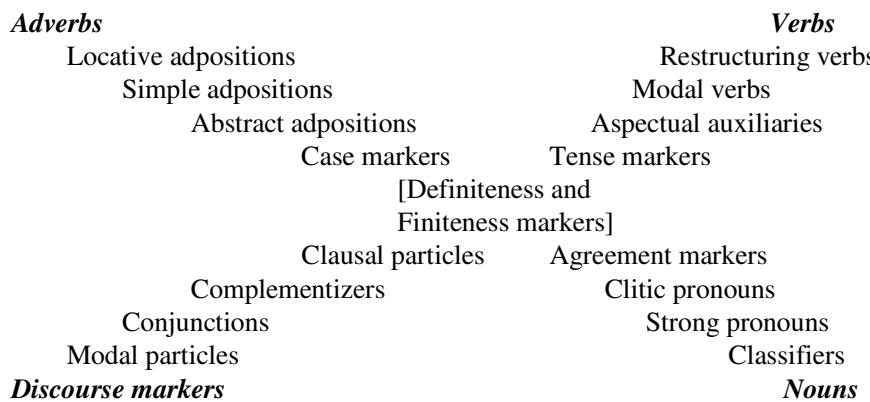


Figure 6.1: Chains of related categories, arranged from lexical to functional from the outside inwards

In order to properly deal with this array of notions expressed in categories, several models can be envisaged, which correspond to different approaches to grammatical categories. Currently there are at least four main models for categorisation (some of which, to be sure, have not been given very precise definitions yet, and may be better labelled 'views' or 'perspectives'):

- Prototype models
- Scale and Hierarchy models
- Mono-dimensional models
- Multi-dimensional models, including Multi-level and Chain models.

The **Prototype** model (e.g. Croft, 1991) assumes that each category has a typical meaning or use (e.g. nouns are typically used to refer), expressed by core members of the category, while other words may belong to a category without expressing this core meaning. A typical noun would be *table*, a less typical one *size*. Thus, one could envisage a proto-typical functional category such as 'the' at the centre of the definition (highly specific morpho-lexical properties, specialised syntax, reduced phonological shape, abstract meaning) and other elements more or less distant from this prototype. The prototype model does not seem to help us much in accounting for lexical/functional differentiation.

The **Scale** model (Ross, 1972; Sasse, 1981) likewise assumes that the boundaries of a category may be fuzzy, but makes the additional assumption that categories can be arranged on a linear scale. There is a large literature on gradience in grammatical categories (cf. the summary in Sasse, 2001), e.g. the adverb ... preposition cline or the noun ... verb cline. The **Hierarchy** model (cf. e.g. Comrie, 2001: 34, who makes this relevant distinction) is a scale model which has a high/low dimension. This asymmetry could be due to historical change, as postulated in grammaticalisation theory, to cognitive development (from simple to complex), to language evolution, etc. Thus adpositions could be on a scale with adverbs on the lexical end and case markers on the functional end. Modals could be on a scale with auxiliaries on the functional end and full verbs on the lexical end, etc. Clearly, figure 6.1 is an instance of this type of scale model.

The **Mono-dimensional** model (e.g. Baker, 2003) assumes that categories are not squishy and that they consist of one-to-one pairings of forms and meanings. Possible disparities between form and meaning are solved through special adjustment rules at either the syntax/phonology or the syntax/semantics interfaces. With respect to the issue at hand this model would assume that there is a true set of functional categories, and a number of other elements which might share features of functional categories but are really lexical in nature. The discussion then would be whether a certain class is 'truly' functional or not. This type of model would require an absolute boundary somewhere in the scales introduced in figure 6.1.

The **Multi-dimensional** model (Plank, 1984; Sadock, 1991; Jackendoff, 2002) assumes that categories lie at the interface of different representations – morpho-lexical, syntactic, phonological, and semantic. The **Multi-level** model as one instance (Cann, 2000: 58) would assume that functional categories can be distinguished, in absolute terms, at one level of analysis, in this case E-language, but not at another level, I-language. The **Chain** model assumes that various categories may be part of a chain of some kind, as in the T-chain

proposal (Guéron and Hoekstra, 1988), where the Verb, Tense, the Inflection, and the Complementizer nodes may be part of a syntactically coherent subsystem. Conceptually, it can be seen as a type of multi-dimensional model, since the chain represents only one dimension.

Independently of where one draws the line exactly in figure 6.1, it appears that there are at least a number of elements that fall under the loose definition of 'functional category', a class of elements which is relatively limited in size and does not readily admit new members. The elements typically have a fairly abstract meaning and serve to link different expressed notions, such as predicates and arguments. In (7) seven sets are distinguished, arranged in terms of their degree of integration into the clause.

(7) *Rough classification of functional categories*

- a. Interjections are not at all integrated into syntactic structure, and often have deviant morpho-phonological shapes;
- b. Discourse markers and adverbs, are only loosely integrated into the clause;
- c. Evidential markers, conjunctions and adpositions;
- d. Classifiers generally fit into more or less closed classes, but these are often not paradigmatically structured;
- e. Pronouns are generally tightly organised in paradigms, but often play a relatively independent role, and often do not have special morphology;
- f. Modals and auxiliaries are often closely linked to tense markers, but vary somewhat in their morpho-phonological features;
- g. Tense and agreement markers, case markers and determiners tend to have reduced phonological shapes and are tightly linked to the syntactic skeleton of the clause.

The classification in (7) could be made more or less fine-grained, following the chains in figure 6.1, to be sure. However, it is clear that we are not dealing with a unified phenomenon here. Rather, it seems that lexical elements are 'recruited', to a greater or lesser extent, into syntactic processing.

This syntactic processing is linked to some kind of semantic map, involving major syntactic categories and the various functional notions linked to these. An approximation of such a map is given in figure 6.2.

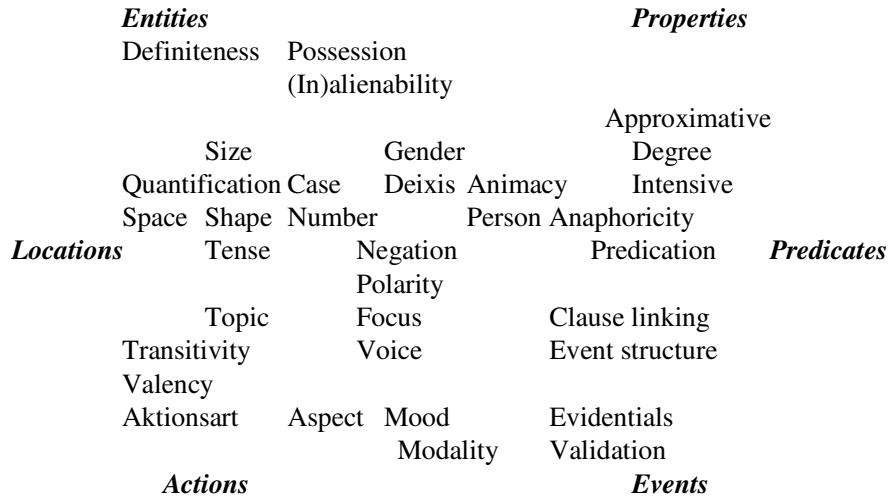


Figure 6.2: Rough semantic map of a number of notions likely to be expressed by functional categories

The map sketched in figure 6.2 involves six 'anchor points': Entities, Properties, Locations, Predicates, Actions, and Events, and is indicative of the richness of the concepts expressed in the functional domain.

The seemingly gradual nature of the classification of functional categories is the result of their being an interface category, and hence we must adopt a modular perspective to deal with this classification, taken up in the next section.

6.3 A modular perspective

Linguists can contribute to the study of language origins by considering the very nature of language itself. What is it about language that might inform us about its possible genesis? The most serious problem with most structural approaches to language, particularly those within the generative tradition (but already immanent in the Saussurean dictum that language is a system *où tout se tient*), is that they have tended to view the language capacity as a single monolithic whole. This monolithic view stands in the way of the gradualist perspective of language evolution that is required if we bring the origin of language in line with the genesis of other human capacities, both cognitive and more generally neurological, adopting a Darwinian perspective.

A more promising approach takes the modular organization of the language capacity as its starting point. In human language, (at least) four essentially different modules intersect: (a) the structure-building and -processing capacity (*syntax*), (b) the sign forming and using capacity (*semiotics*), (c) the capacity to engage in sustained exchange of information (*interaction*), and (d) the capacity to form complex representations of information (*cognition*) in our mind. This claim of four different interacting modules remains empty unless we manage to isolate the formal properties of these modules. I will briefly sketch those of the two of the modules involved that relate most directly the concerns of this paper: syntax and semiotics.

Two crucial features of language are part of the module of *syntax*. These are not found outside of language: *endocentricity* plays a role in sentence grammar (through X-bar theory), in word formation (headedness), and in phonology (e.g. in syllable structure). The property sometimes confusingly labeled displacement by Chomsky (e.g. 2000), I will term '*movement*' here (without any of the derivational claims often associated with this term): the fact that in language elements do not always appear in the place in the sequence where they are interpreted ([where] do you live < you live [what place]).

Berwick (1998) assumes that the following five properties are characteristic of the syntactic capacity: digital infinity (including recursion), displacement (see above), structure dependence, core grammatical relations (subject, object), locality constraints (e.g. subjacency). Ultimately, he assumes the property of Merge (Chomsky, 1995) to account for these properties, interfacing with pronounceability and interpretability requirements. However, it is not clear to me how endocentricity follows directly from Merge.

The module of *semiotics* contributes a number of properties to language; these principles or properties are however also found in non-linguistic semiotic systems (such as traffic signs). The first principle is that of *distinctiveness*: lexical elements must be sufficiently distinctive to contrast with other elements. A second principle is *transparency*: new lexical elements ideally are transparently derived from existing elements. A third principle, *elementarity*, refers to the requirement that a lexical element ideally functions as a coherent whole, as an atom which can be combined with other elements. This principle is often referred to as the lexical integrity principle in the case of language. Fourth, the principle of *analogy*, which causes new forms to be built parallel to already extant forms.

The organization of the lexicon as a semiotic system has several effects. A well-known semiotic effect is that of *blocking* in morphology: the availability of one form (e.g. *thief*), no matter how it arose, will block the acceptance of a possibly more productive other form (e.g. *steal-er*). A second

well-known effect is that of *suppletion*: within a tightly organized paradigm, a non-transparently derived or etymologically unrelated form may still be lexically related (e.g. *bad / worse*). Third, the principle of analogy produces lexical subsystems characterized by paradigmaticity.

Bearing distinctions such as the above in mind, I argue for a multi-dimensional, modular approach to the human language faculty, and subsequently, to grammatical categories, as the examples given in section 6.1 show. This approach implies that syntactic computation, interactive communication, sign building (semiotics), cognition, and perception/production are assumed to cooperate conjointly in what appears to be a single phenomenon: the human language capacity. These capacities include, as stated, syntactic computation, interactive communication, sign building (semiotics), cognition, and perception/production. The modular perspective implies that functional elements can and should be viewed as multi-dimensional. Not only do they have a form and a meaning (the traditional Saussurean notion of sign), but they may or may not play a separate role in syntactic computation (through their feature content); in addition, they may have an interactive function. This multi-dimensional, interface, character is also responsible for the fact that categories are perceived as gradient. Thus, we can perceive the distinction between lexical and functional as gradient due to the interactive character of the different modules. In these modules, the functional categories have different definitions.

1. Syntactically, functional categories are those elements that define the skeleton of the clause and its constituents.
2. Semantically, functional categories are those elements that have an abstract, non-ontologically defined meaning.
3. Phonologically, functional categories are those elements that do not form the nucleus of a phonological word.
4. Morpho-lexically, functional categories are closed class, paradigmatically structured elements.

Different dimensions of functional categories overlap but do not coincide: typically the semantic set of functional categories is a proper superset of the syntactic one, and typically the phonological set is a proper subset of the syntactic one. The morpho-lexical set and the syntactic set overlap only partially; etc. A modular view of functional categories opens the way for a gradualist view on language evolution, I will argue.

6.4 Functional categories from an evolutionary perspective

How can we explain the emergence of functional categories from an evolutionary perspective? We need to ask ourselves what the specific advantage of functional categories would be in human language. I will explore various ideas in this respect, with reference, of course, to proposals by researchers such Bickerton (1990) and Jackendoff (2002). These proposals depart from the assumption that in the course of language evolution, language went from a functional category-free to a category-rich system, feeding upon the expressive possibilities of a rich lexicon. This I will term the *syntactic enrichment option*. It is also the option explored, albeit with a twist, in work on grammaticalization by Heine and Kuteva (2007).

An alternative would be that language started out as a system consisting mostly of structural patterns and functional categories (albeit of a different nature), and only then acquired a rich content lexicon. It is true that its extremely rich vocabulary is as much a feature setting human language apart from possibly antecedent animal communication systems as its rich syntax and inventory of functional categories. This could be termed the *lexical enrichment option*. However, if we take functional categories to be the original set of elements, it is unlikely that these are the continuation of the limited set of fairly concrete and generic alarm calls etc. of animal communication systems, given the highly abstract and category-bound nature of functional categories.

A third possibility would be to assume that the lexical and the syntactic possibilities of human language co-evolved: a rich lexicon allowed further development of functional categories, and a rich syntactic system allowed further possibilities for lexical enrichment. I will term this the *co-evolution option*.

Since the syntactic enrichment option has dominated the (admittedly syntactic-centric) theoretical literature this will occupy most of the following discussion. I will begin by sketching the preliminary assumptions in this direction of Bickerton (1990), and then those Jackendoff (2002: 236-7), building on Bickerton: in Jackendoff's view, language evolution involved a number of steps of syntactic enrichment towards a more adequate communicative system, and involved the evolution of language-specific cognitive abilities.

6.4.1 From a functional element-free to a functional element-rich system

The primary original proponent of the syntactic enrichment or 'functional expansion' scenario is Bickerton (1990), who proposed an early protolanguage, with little syntax, followed by a qualitatively very different stage with Full Language. Bickerton assumes that with *Homo erectus*, about one million years ago, protolanguage emerged, a system with a lexicon, but without syntax. Clausal organization would be in term of pragmatic principles first, then semantic principles, and finally syntactic principles. There would be flat structure rather than layered structure, and no agreement markers in stead of the complex agreement characterising some natural languages. Finally, there would be no recursion.

As to the lexicon, there would be only lexical categories, rather than lexical and functional categories as in full languages. There would not be the complex morphology of full languages. Also, protolanguage would show little diversity in categories, rather than the high diversity in categories of at least some full languages, and vocabulary would be poor.

As far as the pragmatics of information processing is concerned, interpretation would be context dependent rather than context independent, and processing would not yet be fully automatic, as with full languages.

As regards the phonology, protolanguage would have purely syllabic articulation, rather than the articulation based on more complex phoneme combinations. Phoneme inventories would be simple rather than the complex inventories of some contemporary languages, and likewise syllables would be simple. There would be no lento/allegro styles, presumably, rather than the complex lento/allegro and sanddhi rules of contemporary languages.

Bickerton adduces evidence (p. 180) that whatever vocabularies primates manage to acquire in human captivity only involve content words. However, Bickerton (1990: 181-5) assumes that certain functional pre-syntactic categories developed during the protolanguage period, since certain abstract notions are central to any basic communicative system. These would include:

(8) Negation

Wh-words

Possibly pronouns

Modal operators such as *can* and *must*

Aspectual operators to indicate completed or earlier actions, or later actions

Direction and location markers

Quantifiers such as *many* and *few*

For Bickerton, following his work on pidgin and creole genesis in Bickerton (1981), it is crucial to adopt a non-gradualist position: the transition between protolanguage and full language was radical and did not involve any intermediary stages. However, the evidence from pidgin / creole genesis for this position is weak, and in other domains, such as child language and aphasia adduced by Bickerton (1990: 105-129), the evidence for a sharp break is not very strong either, if existent at all.

Jackendoff (2002), building on Bickerton's work, assumes a much more complicated pattern of incremental development, involving a number of logically independent and yet in part logically subsequent separate steps. There is generally no independent evidence for these steps, but certainly they correspond to mostly separate phenomena. I will first present them and then turn to the question how these interact with the possible emergence of functional categories. The steps are (2002: 238-260):

- (9) a. Pre-existing primate conceptual structure
- b. Use of symbols in non-situation-specific fashion
- c. Use of an open, unlimited class of symbols
- d. Development of a phonological combinatorial system
- e. Concatenation of symbols
- f. Use of symbol position to convey basic semantic notions
- g. Hierarchical phrase structure
- h. Symbols that explicitly encode abstract semantic relations
- i. Grammatical categories
- j. System of inflections to convey semantic relations
- k. System of grammatical functions to convey semantic relations

After phase (f) [Use of symbol position to convey basic semantic notions], something like Bickerton's protolanguage may have been arrived at, and after the final phase, (k), we can speak of modern language. The sequence of different developmental steps can be portrayed as in figure 6.3.

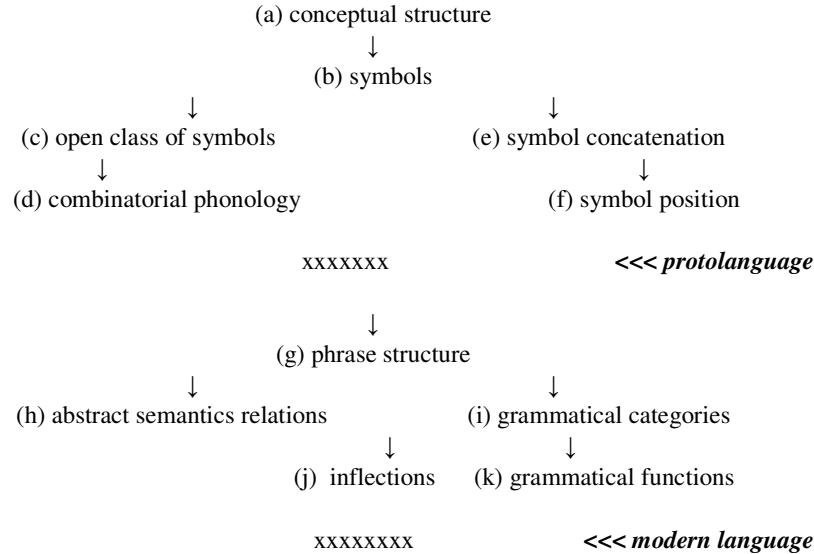


Figure 6.3: Jackendoff's (2002) scenario for the development of grammar

One type of functional categories is introduced in step (h), [Symbols that explicitly encode abstract semantic relations]. Here Jackendoff mentions notions similar to those suggested by Bickerton in (8), enumerating the following types of elements (pp. 253-254):

- (10) a. Spatial relation terms: *up, toward, behind*
- b. Time terms: *now, yesterday, before*
- c. Markers of illocutionary force or modality: *if, may, can*
- d. Markers of discourse status: definite and indefinite determiners
- e. Quantification: *some, all, always*
- f. Purposes, reasons, intermediate causes: *for ... to, with, because*
- g. Discourse connectors: *but, however, and so forth*

A second type of functional category is introduced in step (j), [System of inflections to convey semantic relations], referring to case markers, agreement markers, etc., elements whose interpretation is strictly grammatical rather than notional.

Thus Jackendoff splits the functional categories into two sets: elements with more semantic content, often realized as separate words, and more purely formal elements, often realised as inflections. This distinction between two sets

would also correspond to different stages in the process of evolution: content-full elements would evolve before more formal elements.

Pursuing a similar line of argumentation as Jackendoff, Johansson (2006) argues that four different grammatical properties can be distinguished in the syntax of human languages, which to some extent are implicationaly ordered:

- (11) a. Language is **structured**: the ordering and relations of the items in a clause has implications for the system;
- b. Language is **hierarchical**: within the structure there are several layers of ordering;
- c. Language is **recursive**: sometimes categories on one hierarchical layer in the structure re-appear on another one;
- d. Language is **flexible**: sometimes the order and arrangement of elements may alternate in different utterances.

The basic sine qua non property is structure: all other properties imply structure, but not vice-versa. Furthermore, recursivity implies both structure and hierarchy, but not vice-versa. Similarly, flexibility implies structure (and possibly also hierarchy), but not vice-versa. Flexibility and recursivity are logically independent of one another. On the basis of the distinct properties in (11), Johansson arrives at a scenario with the following possible stages in grammatical development:

- (12) one word sentences
- two word sentences (+ 11a)
- sentences with hierarchical structure (+11b)
- sentences with recursion (+11c)
- sentences with full modern syntax (+11d)

6.4.2 Evolutionary advantages of functional categories

Assume that there was an earlier stage in the evolution of language, something like Bickerton's or Jackendoff's protolanguage, in which there were no functional categories. Rather, this language only would have the equivalent of content words. What would be the advantage that the emergence of functional categories would confer upon a type of language system, which had them?

Surprisingly perhaps, this question was first posed, as far as I am aware, in an article by Labov written in 1971 and published in 1990: 'The adequacy of natural language I: The development of tense'. Here Labov contrasted the tense marking of the English-lexicon pidgin of Hawaii with the later creole. In the

pidgin temporal reference was indicated with adverbs like 'yesterday' and 'later', in the creole with particles like 'been' and 'go'. Claiming that there is no inherent semantic reason for 'been' rather than 'yesterday', Labov argues that a system with tense particles allows greater stylistic possibilities. Citing the English example of the huge range of variability accompanying the pronunciation of 'I am going to go', which can be reduced to [angnego], but with many intermediary forms. Labov argues that there are at least 27 ways of pronouncing this sequence, and this variability makes a language with a future marker of the 'be going to'-type more attractive than one only with adverbs like 'later'. The problem is of course that theoretically, adverbs might also show the same possibility of being shortened, yielding stylistic options. This is precisely what has happened with the Tok Pisin tense marker 'bye and bye', which is ultimately pronounced like [baə] (Sankoff and Laberge, 1973). However, the reduction of 'bye and bye' went in parallel with its shift to the preverbal position and its incorporation into the emerging Tense/Mood/Aspect particle system.

While Labov's answer focuses on the stylistic dimension, Bickerton (1990: 55) assumes that functional categories provide a cognitive advantage: 'They constitute, as it were, the coordinates of the linguistic map, a kind of topological grid whereby the positions of objects and events can be plotted relative to the observer and to one another.' Bickerton bases himself on work by Leonard Talmy in this respect, who contrasts (2001: 32-33) the open class system, which is engaged in conveying conceptual content, with the closed class system, which conveys conceptual structure. Thus we can think of the emergence of functional categories as the result of the emerging need to provide conceptual structure to messages as they became more complex. Even though the same meaning can be expressed with adverbs as with tense markers, there may be semantic advantages as well to more abstract meaning carrying elements. It may not always be relevant to indicate that something happened 'yesterday' or 'last week', and in such a case a more generic marker like 'before' would be preferable.

Other researchers have sought answers in the domain of formal syntactic patterning. One syntactic possibility, following the work by Hauser, Chomsky and Fitch (2002), was that functional elements emerged because of the development of recursion in the syntax: these elements would help making the links between the constituents visible in structures that were growing to be progressively more complex. The types of elements that could fulfil this task would primarily be complementizers, as in (13a), and adpositions or case markers, as in (13b):

- (13) a. I told you already **that** I had seen **that** Mary had left.
 b. my cousin's neighbour's cat

A second possibility was that functional categories emerged to facilitate efficient marking of head/complement dependencies. As syntactic structures became more complex, there was an increasing need to clearly delineate the relation between the predicate and its arguments, as well as that between a head noun and its dependents. Consider a sentence such as (14) from Cuzco Quechua:

- (14) Mariya-**man** Pedru-**q** wasi-**n-ta** riku-**chi-rqa-ni**
 Mary-DA Peter-GE house-3-AC see-CAU-PST-1
 'I showed Peter's house to Mary.'

In (14) there are agreement markers indicating subject (*-ni* '1st singular') and possessor (*-n* '3rd singular'), and case markers indicating indirect object (*-man* 'dative'), possessor (*-q* 'genitive'), and direct object (*-ta* 'accusative'). These elements generally allow unambiguous identification of the various interactants.

A third possibility is that the functional categories actually define the categorical status of the content words. Consider the words from Quechua in (15a):

- | | | | |
|---------|-------------------|----|---|
| (15) a. | wasi 'house' | b. | wasi- yki 'your house' |
| | rumi 'stone' | | rumi- yki 'your stone' |
| | riku- 'see' | | riku- nki 'you see' |
| | puri- 'walk' | | puri- nki 'you walk' |
| | puka 'red' | | puka- yki '*you(r) red/your red one' |
| | yana 'black' | | yana- yki '*you(r) black/your black one' |

While the lexical forms of Quechua nouns, verbs, and adjectives are non-distinct or very similar, the endings make clear what kind of element is used, as in (15b). Verbs receive forms like *-nki* for the second person, and nouns forms like *-yki*. Adjectives can only be marked with *-yki* when they denote a noun. Thus it is the functional categories that give the lexical ones their clear categorical status.

Thus various syntactic explanations may be given for why functional categories are useful in a slightly more complex grammatical system. However, these various explanations, and other imaginable ones, suffer from two deficiencies, at least.

(A) They each only cover certain sets of cases, not all functional categories. Roughly the following relations hold between these three functions and specific sets of categories:

- (16) a. *recursion marking* complementisers, adpositions, case markers
 b. *head/complement marking* agreement markers, adpositions, case markers
 c. *categorical distinctions* determiners, inflections, case markers

(B) Languages differ considerably in the extent to which these different syntactic functions are realised by functional categories. Everett (2005) claims that the Brazilian language Pirahã has only very limited sentential recursion, if any. Similarly, in some languages head/complement is indicated by strict word order, rather than with agreement and case marking. Finally, some languages show clear lexical distinctions between e.g. nouns and verbs, rather than marking these distinctions with functional categories.

Thus, the syntactic processing advantages of functional categories can not easily be stated in terms of a single aspect of syntax. Rather, it is syntactic processing overall that is facilitated by functional categories. Levelt (1999: 86) writes: 'Syntax develops as "the poor man's semantics" for the child to systematize the expression of semantic roles, just as phonology is "the poor man's phonetics", a lean system for keeping track of the subtle infinitude of articulatory patterns.' In the same vein, we may suggest functional categories are the poor man's lexicon – that part of the lexicon involved in morpho-syntactic patterning. Automaticity of processing is what is involved in the use of highly frequent markers, and automaticity of retrieval of functional elements from the mental lexicon.

6.4.3 *Claims of the linguistic fossil analysis*

Above, particularly in the work of Bickerton (1990), two or more parallel processing systems were postulated, available for language use: a more recently developed syntactic system A, and a fossil paratactic system B (reminiscent or a remnant of the protolanguage). The syntactic processing system A is assumed to use functional categories as part of the functional skeleton, is highly automatised, and has recursion. The primary syntactic structure building takes place through the selection of a specific complement by a specific head, like NP by D(eterminer), or VP by I(nflection).

The paratactic processing system B uses various principles for ordering such as iconicity and information structure, is only partially automatised, and has no recursion. There are no functional categories, and there is no functional

skeleton. The primary syntactic structure building takes place through adjunction.

Evidence for processing system A includes the lexical/functional asymmetries in insertional code-mixing, borrowing, Creole genesis, and mixed languages that I argued for in Muysken (2008). We may also refer to patterns of L1 development versus L2 development, and the results from speech error research.

Possible evidence for system B, cited by Jackendoff and Bickerton, includes the possibility for paratactic speech in Foreigner Talk and other restricted registers, the emergence of early pidgins, the Basic Variety that emerges in early L2 learning (Klein and Perdue, 1997), and the possibility of agrammatic speech by patients with aphasia. In Muysken (2000) I discuss the capacities of bilinguals to create structures in alternational code mixing and the acquisition of complex structures in early L1 through adjunction, as examples of this paratactic processing capacity.

While system B is assumed to be available as a fall-back system in the background, system A is dominant in actual language production for acquired languages, because it is more efficient, rapid, etc. It is tempting to assume that system B is anterior, in evolutionary terms, to system A, making pidgins etc. special windows on biologically earlier stages of human language.

However, the route by which B developed into A is not clear. A first scenario would be that automatisation of frequently used forms would lead to internal restructuring and internally generated structural development, while a second scenario would be that another system (phonology, motor control) was co-opted to provide the functional skeleton.

Also the evidence for a functional-category poor system is mainly indirect and of dubious value. Second language learners may fall back on non-grammatical routines, but where they can transfer functional categories from their L1 they will do so. The data on the second language development of Dutch possessives presented by Van de Craats (2000), concerning both Turkish and Moroccan Arabic learners, are a case in point. To be sure, Klein and Perdue (1997) do not claim that the Basic Variety has no structure or functional categories, but rather that the settings for the values of the functional categories are unmarked. Similarly, pidgins may show many more features of the original native languages of their speakers than is sometimes assumed, and hence contain evidence for the functional categories of these languages. Likewise, the evidence from agrammatic aphasia shows that speakers have to rely on non-syntactic strategies if their syntactic system has been impaired, rather than that such a system is necessarily anterior to the other system.

Thus the actual evidence for the syntactic enrichment model is not as strong as sometimes made out to be.

6.4.4 Lexical enrichment models

The co-optation scenario, by which a non-linguistic system, e.g. the one involved in motor control, is co-opted to serve as the basis of a grammatical subsystem, could also be the basis for a lexical enrichment model. In this model there would be an essential discontinuity between the non-syntactic sign manipulation capacity of primates and human language, assumed to be a control system in its initial stages. However, it would be hard to imagine for such a system to work without a basic lexicon in place. It is also not clear that this lexicon would grow by itself, without the concomitant expansion of the syntactic system, which could become progressively more complex.

6.5 Discussion: towards a co-evolution model

The model proposed by Heine and Kuteva (2007) assumes gradual enfolding of the lexical system, with the emergence of more and more different categories. Thus the syntax and the lexicon would evolve together. A rich lexical system relies on a rich syntactic system as much as the other way around.

Lexical systems, as they become richer, start showing evidence of more and internal structure. This structure is of a different nature, however, from that of syntax. Paradigmatic relationships between items (e.g. analogy and contrastive pairing) start playing an important role, but so do syntagmatic patterns, as words get longer and more complex. Carstairs-McCarthy (2005: 183) reflects upon the evolutionary origin of morphology, following up on his earlier work in Carstairs-McCarthy (2000), and suggests that it involves 'a shift from a domain of grammar in which the syntagmatic dimension is dominant to one in which the paradigmatic dimension has at least equal importance.' In fact, some functional elements (e.g. the series *anybody*, *anyone*, *anywhere*, *anyway*) show complex internal structure, and some combinations of auxiliary elements may also be partly fixed (cf. the combination *ain't* or *didn't* (*you*)).

Functional categories emerged at the interface of the syntax and the lexicon, as these systems became more complex, and helped structure the interaction between these modules. As lexical forms become part of the syntactic processing system, they tend to become reduced and eventually end up as null, but then new forms come in to take their place. Like pebbles in a mountain stream, the lexical elements get polished, and eventually reduce to sand.

The differences between languages with respect to the extent that the morpho-syntactic categories receive lexical expression reflect their histories and typological make up (see also Kusters, 2003), in that more isolated languages tend to develop more complex morpho-syntactic systems.

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7. Do mouths sign? Do hands speak?: Echo phonology as a window on language genesis

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Abstract

Although the sign languages in use today are full human languages, certain of the features they share with gestures have been suggested to provide information about possible origins of human language. These features include sharing common articulators with gestures, and exhibiting substantial iconicity in comparison to spoken languages. If human protolanguage was gestural, the question remains of how a highly iconic manual communication system might have led to the creation of a vocal communication system in which the links between symbol and referent are for the most part arbitrary. Posing the question in this way, and regarding sign languages as 'manual' ignores the rich and complex role played by other articulators: body, face, and, in particular, the mouth.

As well as manual actions, sign languages include several types of mouth actions. The research reported here focuses on one subgroup: 'echo phonology', a repertoire of mouth actions which are characterised by 'echoing' on the mouth certain of the articulatory actions of the hands.

Three different types of data (narratives in 3 European sign languages, code mixing in hearing British Sign Language/English bilinguals, and functional imaging studies) provide examples of a possible mechanism in the evolution of language by which the units of an iconic manual communication system could convert into a largely arbitrary vocal communication system.

7.1 Introduction

Since gesture systems (home sign) can appear in the absence of linguistic input (Goldin-Meadow, 2003), the sign languages of Deaf¹ communities have sometimes been regarded as primitive communication systems and, the reasoning follows, as a precursor to spoken languages. Linguistic research over the past 40 years has shown that sign languages are not primitive and are in fact

¹ 'Deaf' with an upper-case 'D' is used to refer to membership of a sign language-using community and includes both hearing and (audiologically) deaf individuals.

full natural languages with complex grammars (Stokoe, 1960; Klima and Bellugi, 1979; Sutton-Spence and Woll, 1999). Nevertheless it is possible that sign languages, being in a visual-gestural modality, have features in common with evolutionary precursors of spoken language.

Although the sign languages in use today are full human languages, and are used by modern humans with 'language-ready' brains, certain of the features they share with gestures have been suggested to provide information about possible origins of human language. These features include sharing common articulators with gestures, and exhibiting substantial iconicity in comparison to spoken languages. This iconicity is present both in signs that represent concrete objects and actions, and those which represent abstract concepts. For example, signs in British Sign Language (BSL) referring to cognitive activities (THINK, UNDERSTAND, KNOW, LEARN, etc.) are generally located at the forehead, while signs relating to emotional activities (FEEL, INTERESTED, EXCITED, ANGRY) are located on the chest and abdomen.

If human proto-language was gestural, the question remains of how a highly iconic manual communication system might have led to the creation of a vocal communication system in which the links between symbol and referent are for the most part arbitrary. Posing the question in this way, and regarding sign languages as 'manual' ignores the rich and complex role played by other articulators: body, face, and, in particular, the mouth.

As well as manual actions, sign languages include several types of mouth actions. The research reported here focuses on one subgroup of these mouth actions: 'echo phonology', a repertoire of mouth actions which are not derived from spoken language, which form an obligatory accompaniment to some manual signs in a range of sign languages, and which are characterised by 'echoing' on the mouth certain of the articulatory actions of the hands.

Three very different types of data (narratives in 3 different European sign languages, anecdotal observations of hearing individuals bilingual in BSL and English, and functional imaging studies with deaf signers) will be presented. These provide examples of a possible mechanism in the evolution of language by which the units of an iconic manual communication system could convert into a largely arbitrary vocal communication system.

7.2 Historical perspectives

Many writers have suggested that human vocal language may have evolved from manual gestures. What is required to sustain such a claim is a plausible mechanism by which primarily manual actions could have transformed themselves into vocal actions. One mechanism (not even requiring

communicative gesturing as an intermediate stage) was suggested by Darwin in his study *The Expression of Emotions in Man and Animals* (1872):

'there are other actions [of the mouth] which are commonly performed under certain circumstances ... and which seem to be due to imitation or some sort of sympathy. Thus, persons cutting anything may be seen to move their jaws simultaneously with the blades of the scissors. Children learning to write often twist about their tongues as their fingers move, in a ridiculous fashion' (p. 34).

Henry Sweet (1888) extended this notion to encompass a transition from manual gesture to 'lingual gesture':

'Gesture ... helped to develop the power of forming sounds while at the same time helping to lay the foundation of language proper. When men first expressed the idea of 'teeth', 'eat', 'bite', it was by pointing to their teeth. If the interlocutor's back was turned, a cry for attention was necessary which would naturally assume the form of the clearest and most open vowel. A sympathetic lingual gesture would then accompany the hand gesture which later would be dropped as superfluous so that ADA or more emphatically ATA would mean 'teeth' or 'tooth' and 'bite' or 'eat', these different meanings being only gradually differentiated' (pp. 50-52).

To Sweet, therefore, should go the credit for hypothesising as a key link between gesture and spoken language, the 'sympathetic lingual gesture accompanying a natural hand gesture'. Richard Paget (1930) attempted to find evidence for such a theory. Like Sweet, Paget claimed that the earliest human language was a language of gestures, in which actions originally made by hand were unconsciously copied by movements or positions of the mouth, tongue or lips.

'Originally man expressed his ideas by gesture, but as he gesticulated with his hands, his tongue, lips and jaw unconsciously followed suit ... The consequence was that when, owing to pressure of other business, the principal actors (the hands) retired from the stage ... their understudies – the tongue, lips and jaw – were already proficient in the pantomimic art' (p. 133).

He supplies a number of examples of this process:

'Another ... example may be given, namely, in connection with the beckoning gesture – commonly made by extending the hand, palm up, drawing it inwards towards the face and at the same time bending the fingers inwards towards the palm. This gesture may be imitated with the tongue, by protruding, withdrawing, and bending up its tip as it re-enters the mouth.

If this 'gesture' be blown or voiced, we get a resultant whispered or phonated word, like **edə**, **edə**, or **edra** ... suggestive of ... our English word 'hither' (p. 138).

Paget's theory (known as the 'ta-ta' theory from the example above) was developed further by Swadesh (1971). He quotes another example of its application:

'... a word like the Latin *capio*, I take, or English *capture*, whose root begins with a *k* sound and ends in the sound *p*, made by closing the lips. It has been suggested that the formation of the *k* sound at the back of the mouth, while the lips are open, is comparable to the open hand. The closing of the lips, then, is analogous to the fingers closing with the thumb as one takes hold of an object. Thus the pronunciation of the root *capio* is like the action of taking. Of course not all words are to be explained in this way; in fact, only a few. And yet the possibility that some words developed in this way is not denied by other qualities also evident in language' (p. 4).

Paget's theory can only be validated if there is evidence for a historical process by which overt gestures were reflected, reproduced in miniature, in gestures, particularly of the tongue and lips, which were then associated with the production of speech-sounds.

In the absence of any plausible mechanism for the shift from hand to mouth, or any historical evidence, the notion of a hand-mouth link remains as speculative as any other theory of language origins. One weakness of the approach of Paget and the others is that they all suggest that the mouth actions themselves share underlying imagery with the iconic manual gesture, leaving open the question of how a hypothesised highly iconic manual communication system could have led to the creation of a vocal communication system in which the links between symbol and referent are for the most part arbitrary.

7.3 Contemporary evidence

7.3.1 Neurobiological perspectives

Studies of neurons in the monkey brain by Rizzolatti and colleagues since 1996 (Rizzolatti, Fadiga, Gallese and Fogassi, 1996; Rizzolatti and Craighero, 2004) have identified 'mirror neurons', which fire when the animal observes another individual making specific movements (primarily for reaching and grasping). The mirror system, in temporal, parietal and frontal regions, is part of a system specialised for perceiving and understanding biological motion. Although research has not shown a mapping of vocalisation production onto perception of vocalisations, this mapping is implicit in Liberman and Mattingly's (1985) motor theory of speech perception, which proposes that speech is understood in terms of its articulation, rather than its perception. It should also be noted that the anatomical closeness of hand and mouth related neurons in the premotor cortex may relate evolutionarily to the involvement of both in common goals. The relationship between mouth actions related to eating, and those found in spoken language, have been discussed in detail by MacNeilage (1998).

Gentilucci (2003) has shown in a series of studies that when humans were asked to open their mouths while grasping objects, the size of the mouth opening increased with the size of the grasped object. Grasping larger objects and bringing them to the mouth induces increases in the size of mouth opening and voice spectra of syllables pronounced simultaneously. Observing another individual grasping or bringing different sizes of objects to the mouth also affects the articulation of syllables.

7.3.2 Gesture and speech

A number of theorists have postulated that gesture (on its own) is the origin of language. McNeill (2008) provides a strong set of arguments against this position.

His basic claim is that a primitive phase in which communication was by gesture or sign alone, could not have evolved into the kind of speech-gesture combinations that can be observed in modern human communication, suggesting that if such a phase existed, it was not a proto-language, but a precursor of mimicry and pantomime. He argues that a 'gesture-first' theory:

'incorrectly predicts that speech would have supplanted gesture, and fails to predict that speech and gesture became a single system. It is thus a hypothesis about the origin of language that almost uniquely meets Popper's requirement of falsifiability – and is falsified, doubly so in fact' (McNeill, 2008:12).

As with the earlier writers on the subjects, Rizzolatti and Arbib (1998) also see gesture as fading once speech has emerged:

'Manual gestures progressively lost their importance, whereas, by contrast, vocalization acquired autonomy, until the relation between gestural and vocal communication inverted and gesture became purely an accessory factor to sound communication' (p. 193).

In such models, gesture is seen as unintegrated with speech – both in modern human communication and in human evolution.

Another thread in the 'supplantation of gesture by speech' argument relates to the advantages of speech over gesture (Corballis, 2003). McNeill, Duncan, Cole, Gallagher and Bertenthal (in press) have argued that speech is the default form of human communication because it has fewer dimensions, is more linear, is non-imagistic (and hence more arbitrary (with the potential for a larger lexicon), etc. Given this asymmetry, McNeill argues that even though speech and gesture were selected jointly, it would still work out that speech is the medium of linguistic segmentation:

'Sign languages – their existence as full linguistic systems – impresses many as a reason for gesture-first, but in fact, historically and over the world, manual languages are found only when speech is unavailable; the discrete semiotic then transferring to the hands. As we shall see later, this transfer takes place automatically. So it is not that gesture is incapable of carrying a linguistic semiotic, it is that speech (to visually disposed creatures) does not carry the imagery semiotic' (p. 13).

7.4 Hands and mouth in sign language

7.4.1 Mouth actions and other non-manual articulators

As mentioned above, sign languages of the deaf offer a unique perspective on language, since they embody the structural and communicative properties of spoken language, while existing entirely within a wholly visual-gestural medium. Among other insights, they enable investigators to clarify the core components of language in distinction to those that reflect input or action characteristics of the language system. This difference is reflected in the articulators on which languages in the two modes rely. Sign languages make use of non-manual articulators, including actions of the head, face and trunk (e.g., Liddell, 1978; Sutton-Spence and Woll, 1999). Within the face, eye actions such as eye narrowing, changes in direction of gaze and eyebrow

actions (raise/lower) play important roles in sign language communication (Crasborn, 2006). In addition, although sign languages are unrelated to the spoken languages used in the surrounding hearing community, sign languages do borrow elements from spoken language (Sutton-Spence and Woll, 1999). Other mouth actions (*mouth gestures*) are unrelated to spoken languages (see figure 7.1 below).

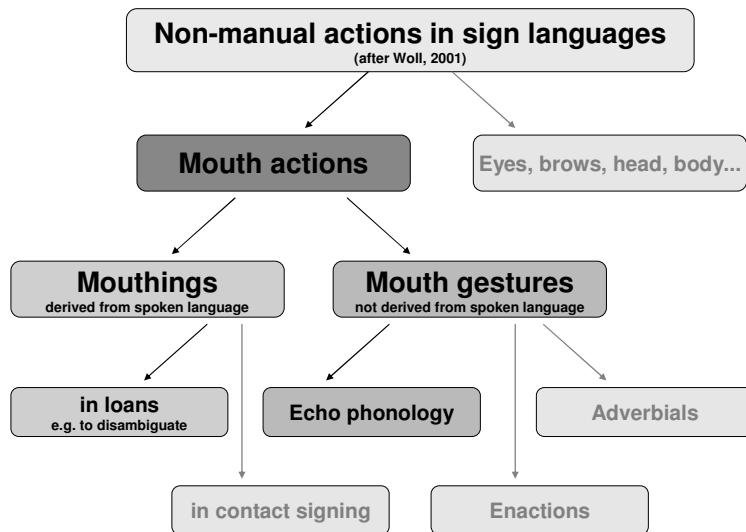


Figure 7.1: Mouth actions in sign language

7.4.1.1 **Mouthings.** Sign languages can borrow mouth actions from spoken words – speech-like actions accompanying manual signs than can disambiguate manually homonymous forms. These are considered to be borrowings, rather than contact forms reflecting bilingualism in a spoken and signed language, since there is evidence that signers can learn these without knowing the source spoken language. These can disambiguate signs with similar or identical manual forms. For example, the BSL signs, ASIAN and BLUE, are manually identical (see figure 5.7c). To distinguish which meaning is meant, mouthings are incorporated, derived from the mouth actions used when speaking the words 'Asian' or 'blue'.

7.4.1.2 Adverbials are arrangements of the mouth which are used to signal manner and degree (e.g. to indicate that an action is performed with difficulty or with ease; to indicate if an object is very small or very large, etc.).

7.4.1.3 In Enaction (sometimes called mouth-for-mouth), the action performed by the mouth represents that action directly (e.g. in CHEW, the mouth performs a 'chewing' action, while the sign is articulated on the hands).

7.4.2 *Echo Phonology*

The term **Echo Phonology** (Woll and Sieratzki, 1998) is used for a class of mouth actions that are obligatory in the citation forms of lexical signs. In the BSL sign TRUE (see figure 7.5d below), the upper hand moves downwards to contact the lower hand, and this action is accompanied by mouth closure, synchronised with the hand contact. This type of non-speech-like mouth gesture has been termed 'echo phonology' (EP), since the mouth action is considered secondary to that of the hands (Woll and Sieratzki, 1996; Woll, 2001). That is, the mouth gesture 'follows' the hand actions in terms of onset and offset, dynamic characteristics (speed and acceleration) and direction and type of movement (opening, closing, or internal movement). Thus, these gestures illustrate a condition where 'the hands are the head of the mouth' (Boyes-Braem and Sutton-Spence, 2001). EP mouth gestures are not derived from or influenced by the forms of spoken words borrowed into sign; rather, they are an obligatory, intrinsic component of this subgroup of signs, their patterning presumably constrained by common motor control mechanisms for hands and mouth (Woll, 2001). The signs in which they are found require the presence of the mouth gesture to be well-formed, and mouth action includes some movement: either the exhalation or inhalation of breath, or a change in mouth configuration during the articulation of the sign: for example, EXIST (wiggling of fingers, no path movement, accompanied by [ʃʃ]); TRUE (active hand makes abrupt contact with palm of passive hand, accompanied by [am] – see figure 7.5d below); DISAPPEAR (spread hands close to 'flat O' shape, accompanied by [θp]).

The essential dependence of the mouthing on the articulatory features of the manual movement can be seen in three BSL signs all meaning 'succeed' or 'win'. Three different oral patterns of mouthing co-occur with these signs, and one cannot be substituted for the other.

In SUCCEED, the thumbs are initially in contact, but move apart abruptly as the mouth articulates [pa]. In WIN, the hand rotates at the wrist repeatedly as the mouth articulates [hy]; and in WON, the hand closes to a flat O, while the mouth articulates [ʌp]. Most importantly, the action of the mouth in signs with echo phonology, while echoing that of the hands, is not in itself

iconic. Sweet, Paget and the other early writers cited above postulated that iconicity in the mouth gesture itself was the source of spoken words. However, it is difficult to see how a mouth gesture on its own could iconically express the semantic notion of 'succeed' or 'true'. Echo phonology illustrates a mechanism by which abstract concepts, which can be represented by iconic manual gestures, can be attached to abstract mouth gestures.

7.5 Echo Phonology in different sign languages

In a study comparing narratives in three sign languages (<http://www.let.ru.nl/sign-lang/echo/index.html>), the occurrence of echo phonology was compared with other types of mouth action. The chart below shows the percentage of signs accompanied by mouth actions other than mouthings, in narratives of Aesop's fables. Although there is variability across the data for two signers of each of the three sign languages (Swedish, British, Netherlands) echo phonology is found in all three (figure 7.2) (van der Kooij, Crasborn, Waters, Woll, Mesch, in press).

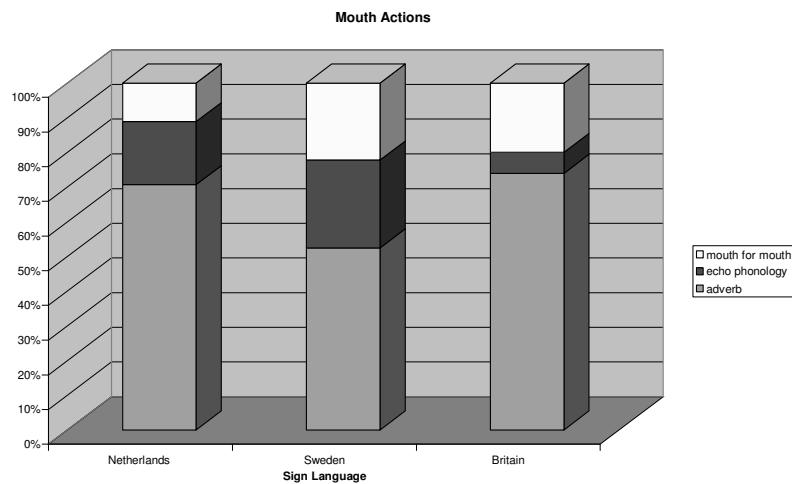


Figure 7.2: Echo phonology in 3 sign languages

7.6 Evidence from bilinguals

Sign and speech are frequently mixed in bilingual signers (both deaf and hearing). Because these languages occur in different modalities (bimodal bilingualism), a unique type of mixing can take place: code blending, where elements from a spoken language appear simultaneously with elements of a

sign language. Either language can serve as the base language, and the elements can either be overlapping or identical. Van den Bogaerde provides many examples in the language of deaf mothers to their children. In the first example below, Dutch is the base language, and one of the spoken words is accompanied by a sign with the same meaning. In the second example, Dutch Sign Language is the base language, and one of the signs is accompanied by a word with the same meaning:

- | | | |
|----------------------|---|--------|
| 1. Signed | | VALLEN |
| Spoken | die gaat vallen | |
| English gloss | that goes fall | |
| Translation | <i>That [doll] is going to fall</i> | |
| | | |
| 2. Signed | INDEX _{hij} JAS BLAUW | |
| Spoken | blauw | |
| English gloss | INDEX _{he} COAT BLUE | |
| Translation | <i>He has a blue coat</i> | |

However, in mixed code blending, each language contributes complementary information in simultaneous constructions. In Example 3, the signed and spoken elements (POP + geel) combine to form a single phrase:

- | | | |
|----------------------|--|--------|
| 3. Signed | POP SPELEN | |
| Spoken | geel | |
| English gloss | DOLL PLAY | yellow |
| Translation | <i>(I want) to play with the yellow doll</i> | |

Strikingly, there are no examples in van den Bogaerde's corpus study of any sequential code switching or mixing, although this is the norm for unimodal bilinguals. However, anecdotal observations from conversations between hearing people with deaf parents (bilinguals native in both BSL and English) indicate that some of the mouth gestures found in signs with echo phonology can appear (with voicing) as code mixing with English in the absence of production of any manual signs.

Examples include:

1. A: 'Have you done that poster?'
B: '[ʃʃʃ]' (NOT-YET), I'll do it tomorrow'
2. A: 'It was terrible. It was like '[amp]' (END/absolutely over)

3. 'I couldn't get a straight answer from anyone. It was completely [pipipip]' (VARIED/inconsistent)

These examples are suggestive of a possible leap from mouth gestures accompanying signs to a situation where mouth gestures appear to have independent existence as lexical items. Further research is necessary to explore whether these forms are more similar to vocal gestures or to words. In either case they demonstrate that echo phonological elements can occur within speech.

7.7 Functional imaging study

Despite the differences in the modality of the perceived signal, the neural organisation of language processing is remarkably similar for sign and for speech. Studies of patients with brain lesions reliably show that sign language processing is supported by perisylvian regions of the left hemisphere (e.g., Atkinson, Marshall, Woll and Thacker, 2005). Neuroimaging studies show similar patterns of activation for processing sign language and spoken language when acquired as native languages by deaf people and hearing people, respectively. In particular, sign language processing elicits activation in the superior temporal plane and posterior portions of the superior temporal gyrus and left inferior frontal cortex including Broca's area (BA 44/45) (MacSweeney et al., 2002; Neville et al., 1998; Petitto et al., 2000), just as for spoken language (Capek, Bavelier, Corina, Newman, Jeppard et al., 2004; MacSweeney et al., 2002).

Speech and sign, however, do not appear to rely on identical brain networks. In a study directly contrasting BSL (deaf native signers) and audio-visual English (hearing monolingual speakers), MacSweeney and colleagues (2002) did not find any laterality differences between the languages. However, MacSweeney and colleagues (2002) did find differences between sign language and audio-visual speech, which they attributed to the modality of the input rather than to linguistic processes. Regions which showed more activation for sign than audiovisual speech included the middle occipital gyri, bilaterally, and the left inferior parietal lobule (BA 40). In contrast, audio-visual English sentences elicited greater activation in superior temporal regions than signed sentences.

With these considerations in mind, a study (Capek et al., 2008) explored the following conditions in which lists of single items were presented to deaf native signers in the fMRI scanner: (1) silent speechreading of English (SS); (2) BSL signs with no mouth action (hands only – HO); (3) BSL signs with

mouthing (disambiguating mouth – DM) and (4) BSL signs with mouth gestures (echo phonology – EP).

The stimuli were designed to vary on the dimensions of presence or absence of mouth opening/closing; presence or absence of hand and arm movements; and presence or absence of English-based mouth actions (figure 7.3).

	mouth opening and closing	hand- arm movements (BSL)	English- derived mouth
No mouth (HO)	-	+	-
Phonology (EP)	+	+	-
Disambiguating mouth (DM)	+	+	+
Silent speech (SS)	+	-	+

Figure 7.3: Characteristics of stimuli

Stimuli consisted of single words/signs, examples of which are given in figure 7.4. The list of silently spoken words was based on English translations of the signs below (figure 7.4).

EP	DM	HO
EXIST [u]	FINLAND/METAL	TABLE
WIN [hy]	BATTERY/AUNT	CHERRY
NONE [pu]	WOOD/PROBLEM	BUTTER
SUCCESS [pa]	RUSSIA/BOY	KNOW
END [pəm]	ITALY/WIN	FAX

Figure 7.4: Examples of stimuli

Figure 7.5 shows examples of each of the stimuli types:

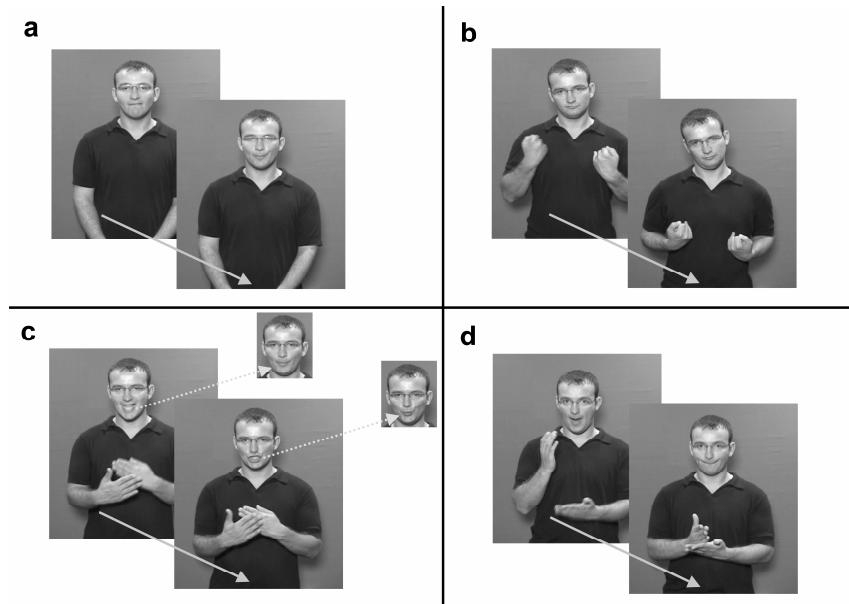


Figure 7.5: Illustrations of stimuli

- 7.5a. SS. Silent articulation of the English word “football”. The fricative (/f/)(‘foot...’), and the semi-open vowel /ɔ:/ (‘..ball’) are clearly visible
- 7.5b. HO. The BSL sign ILL
- 7.5c. DM. The BSL sign ASIAN shows the mouthing of /eɪ/ and /|/. The face insets show the corresponding parts of the mounings for the manual homonym BLUE, where /b/ and /u:/ can be seen
- 7.5d. EP. The manual sequence for [TRUE] requires abrupt movement from an open to a closed contact gesture. As this occurs, the mouth closes abruptly.

This experiment was designed to address a number of specific questions: to what extent does the pattern of activation between speech perception and sign language perception differ?; does the processing of mounings (DM) differ compared to signs without mouth action (HO)?; does echo phonology (EP) generate distinctive activation compared with mounings (DM)?; How do non-signers differ from signers?

Thirteen (6 female; mean age 27.4; age range: 18-49) right handed participants were tested. Volunteers were congenitally, severely or profoundly deaf native signers, having acquired BSL from their deaf parents. Stimuli were presented in alternating blocks of each of the experimental and a baseline condition. Participants were instructed to understand the signs and words and they performed a target-detection task in all conditions, to encourage lexical processing. During the experimental conditions, participants were directed to make a push-button response whenever the stimulus item contained the meaning 'yes'. This 'yes' target was presented in an appropriate form across all 4 conditions, specifically: as an English word with no manual component in the SS condition, as a BSL sign with no mouth action (but BSL-appropriate facial affect) in the HO condition, as a BSL sign with an English mouth pattern in the DM condition and as a BSL sign with a motoric mouth echo in the EP condition. Full details of the experimental protocol and analysis may be found in Capek et al. (2008).

7.7.1 To what extent does the pattern of activation for speech perception and sign language perception differ?

7.7.1.1 Speechreading (SS)

The major area of activation was perisylvian (superior temporal and inferior frontal), with somewhat more extensive activation on the left than the right. These findings conform with other recent studies. They confirm that silent speech can activate regions in deaf people's brains that have been identified as auditory speech processing regions in hearing people.

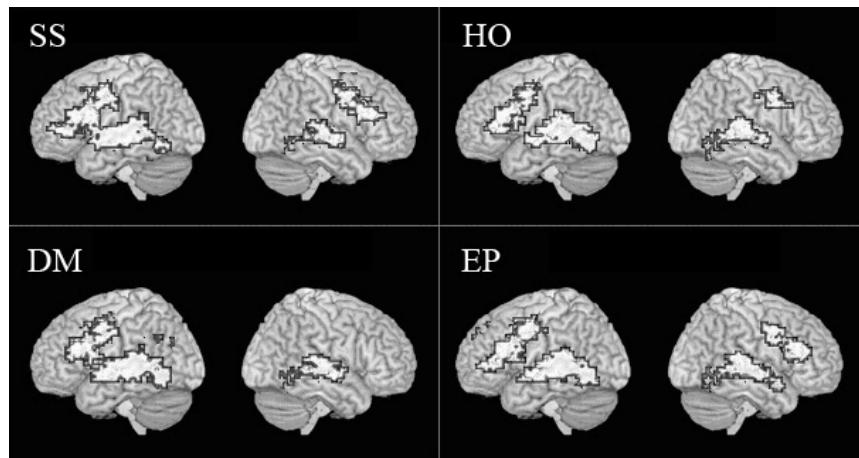


Figure 7.6: Brain activation

7.6a (top left) activation during silent speechreading (SS)

7.6b (top right) activation during processing of signs without any mouth actions (HO)

7.6c (bottom left) activation during processing of signs with disambiguating mouth actions (DM)

7.6d (bottom right) activation during processing of signs with echo phonology (EP)

7.7.1.2 Sign language (HO, DM, EP)

In all three sign language conditions, there is also activation in perisylvian regions. It affirms that sign language in Deaf native signers activates core language regions that are typically found when hearing people listen to speech. Although both sign language and speech involve perisylvian regions, sign language perception activated more posterior and inferior regions. For this analysis, silent speechreading is compared with the 3 sign conditions (figure 7.7)

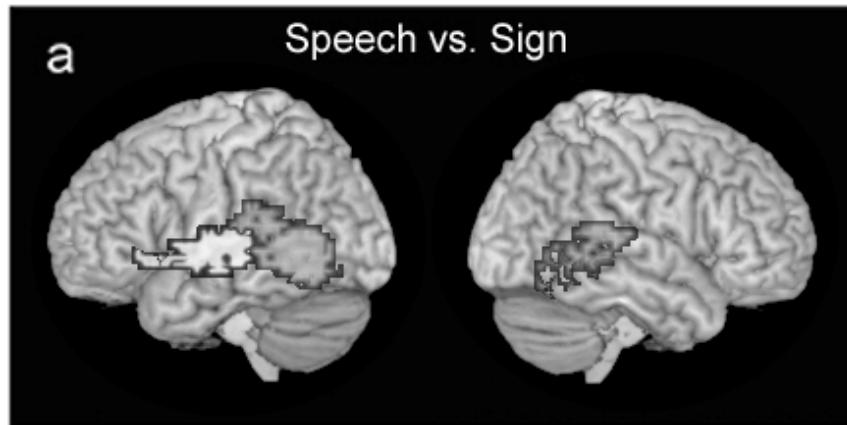


Figure 7.7: Silent speech (light grey) vs. Signs (EP, DM & HO) (dark grey)

7.7.2 *Does the perception of signs with mouthings (DM) differ from signs with no mouth (HO)?*

If language (speech vs. sign) is the crucial reason for the more posterior activation found in BSL perception, then signs with disambiguating mouth and signs without mouth should be processed identically. On the other hand, if the articulators used determine the areas of activation, then DM and HO signs should differ, with more posterior activation for the NM signs. The data support the first alternative: anterior activation characterised DM and posterior activation HO (figure 7.8). There was greater activation for signs with mouth actions in superior temporal sulci of both hemispheres; additional activation in the left inferior frontal gyrus; and HO signs activated more right posterior temporo-occipital regions. These may be particularly important for the perception of hand actions. These findings are very similar to those exploring distinctive patterns of activation consequent on observation of hand and mouth gestures that are unrelated to sign language.

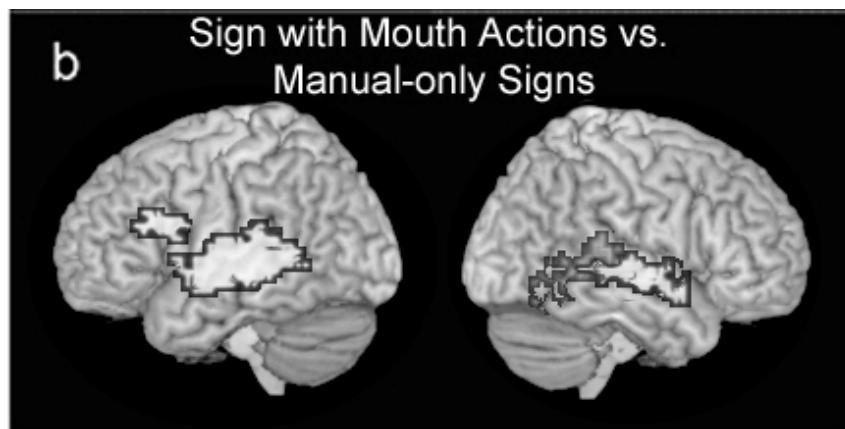


Figure 7.8: Signs with mouth actions (DM & EP) (light grey) vs. HO signs (dark grey)

7.7.3 *Does echo phonology (EP) generate distinctive activation compared with other mouthing (DM)?*

The contrast between the condition that used DM and the one that used EP provides further insight into the cortical correlates associated with observing specific articulators within sign language. Here the pattern differed. DM generated relatively greater activation in a circumscribed region of the left middle and posterior portions of the superior temporal gyrus, while EP produced relatively greater posterior activation. This can be considered to reflect the fact that DM is more 'speech-like' than EP. Thus EP appears to occupy an intermediate position between signs without mouth and signs with mouth actions derived from spoken language (figure 7.9).

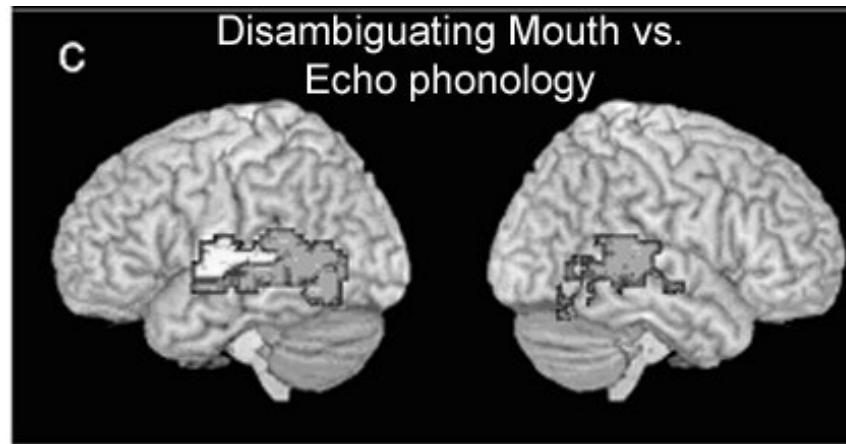


Figure 7.9: DM (light grey) vs. EP signs (dark grey)

These findings suggest a strong conclusion concerning brain organisation for the perception of sign language. The task required participants to process material linguistically. In order to achieve lexical processing, BSL users must integrate perceptual processing hands and of face/head, and this needs to be achieved fluently and automatically. If the cortical circuitry for sign language processing were driven by a mechanism that is 'articulation-blind', we would expect there to be no systematic differential activation between, for example, signs with mouthings (where the mouth information is non-redundant), signs without mouthing (where there is no mouth information or signs with echo phonology, where the information on the mouth is redundant. Yet the contrasts analysed here suggest this is not the case. It appears that mouth actions, when they are a required component of the sign, differentially activate a circumscribed region within the middle and posterior portions of the superior temporal gyrus. More generally, there is a strong similarity between the patterns of distinctive activation for mouth actions and for hand actions. This suggests that when the language processor is engaged, it requires ongoing access to visual information about the articulators that deliver information to it, and that this information can be distinguished in terms of relative cortical location. The core language processes themselves, appear to be similarly constituted for sign language and for speechreading in Deaf native signers.

7.8 Conclusion

One issue for those concerned with suggesting a link between gesture and word has always been how the largely visually-motivated gestures could have been transformed into the largely arbitrary words of spoken language. Echo phonology provides evidence for a possible mechanism. Firstly, the phenomenon appears to be fairly common across different sign languages (although the occurrence of echo phonology needs to be researched in non-European sign languages). Secondly, the oral activities in echo phonology are themselves non-visually motivated. It is impossible to reconstruct from a syllable such as [ʃ] the meaning 'exist', although the manual activities can be interpreted as visually representing the marking of an area in space. Thirdly, the actual inventory of elements in echo phonology looks very much like a system of maximal contrasts in a spoken language phonology (although there are some limitations because of the absence of sound contrasts). Fourthly, functional imaging research on the representation of signs and words in the brain suggests that echo phonology occupies an interesting intermediate position.

This paper represents only a very preliminary exploration of echo phonology. However, the data lead us to a number of conclusions. They support the arguments of those who argue against the notion that a unimodal manual protolanguage preceded the evolution of spoken language, since they demonstrate the extent to which signs are combined with mouth actions. The data also provide a window onto a mechanism by which the arbitrary pairing of a referent with a symbol (Saussure's defining feature of spoken language) could have occurred. Further research is needed to explore the presence of echo phonology in other sign languages (including those with a more recent point of creation than BSL) and whether echo phonology is subject to change (for example, added or transformed in a process of sign conventionalization). These studies may provide more insights into the origins of phonological/lexical structure in spoken language, and from that to the evolution of human language.

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