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

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[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

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[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 'Hmmmmm' (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

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[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.

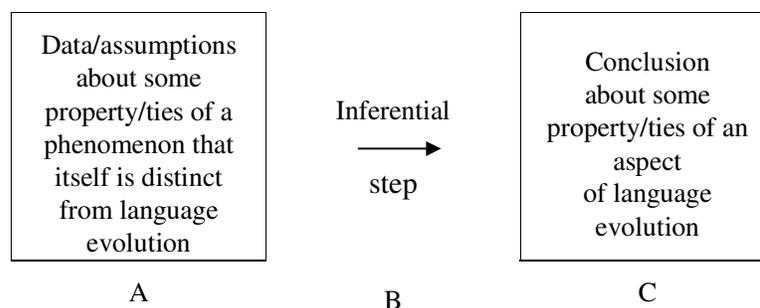| Data/assumptions about some property/ties of a phenomenon that itself is distinct from language evolution	Inferential ⟶ step	Conclusion about some property/ties of an aspect of language evolution
A	B	C

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.

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[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.

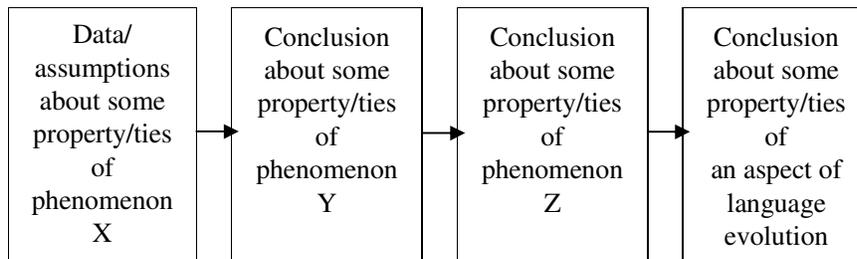| Data/ assumptions about some property/ties of phenomenon X	Conclusion about some property/ties of phenomenon Y	Conclusion about some property/ties of phenomenon Z	Conclusion about some property/ties of an aspect of language evolution

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

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[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

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[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

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[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.

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

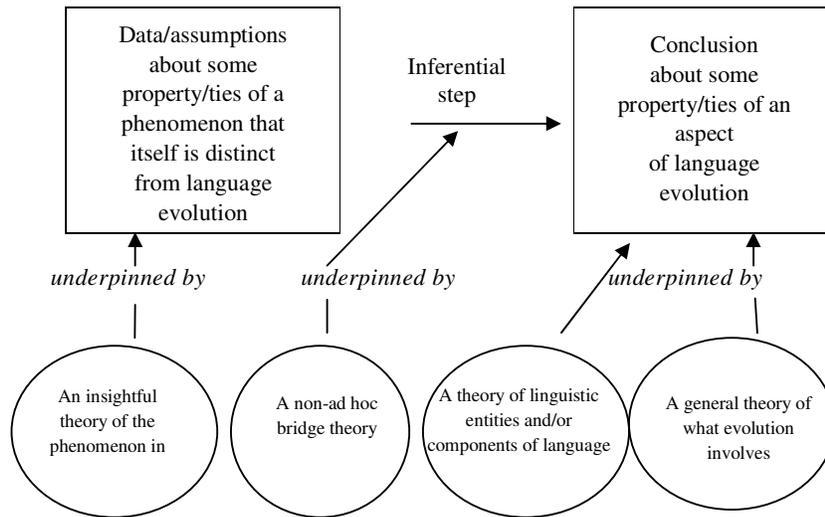[16] For elaboration on these points, see Botha (2006b: 12, 2008a, 2008c).

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]

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[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 care-givers 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

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[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-

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[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

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[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]

Acknowledgements

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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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