

Towards an Evolutionarily Plausible Theory of Language: The Case Against Minimalism

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ABSTRACT

The Minimalist Program (henceforth MP) views language as a simple atomic system, devoid of much of the complexity associated with earlier generative theories. This position leads to difficulties from an evolutionary perspective; the minimalist language faculty can entail only a saltational account, in contrast to the gradual adaptationist explanation required by a complex modular biological endowment. This paper examines the methodology behind the MP, showing that this is the cause of incompatibility with evolutionary theory, and suggests an alternative route for constraining the theory of language based on evolutionary foundations.

1 INTRODUCTION

The job of the language evolutionist is to constrain the set of theories of language to those that are plausible evolutionarily. Theories which do not promote a version of the language faculty, for which a reasonable evolutionary account can be posited, must be rejected. This paper illustrates how the MP falls into this category. I will show how a methodological decision made early in the lifecycle of the MP has led to an incompatibility between the model of language it proposes and adaptationist theories of the evolution of the system.

Theorising in the Generative Enterprise in the last decade has led to a conception of language that is quite substantially altered from previous theories in this tradition. The MP, according to Chomsky, is a framework for considering language from a different viewpoint than that of previous incarnations of generative syntactic theorising, and that is to look at language as a system which is in some way perfect for the job it needs to do: “[T]he Minimalist Program...is...a research program concerned with...determining the answers to...the question ‘How ‘perfect’ is language?’” (Chomsky (1995))

The system's job, in Chomsky's view, is to create the mapping between signal and meaning. So, the term ‘language’, as used here, is meant to refer to some computational combinatorial system that achieves the mapping between signal and meaning; what is referred to in the recent paper by Hauser, Chomsky & Fitch (2002) as FLN - the faculty of language in the narrow sense; in other words, syntax. The question to be addressed here is how this conception of language fits (or does not fit) with accounts of the evolution of the system.

The job of the linguist is complicated by the fact that the theory is underdetermined by the data. So, the linguist needs to use more than just the data in order to proceed. In other words,

the linguist must posit a way of constraining the theory based on factors external to the empirical evidence. Without some such constraint on the theory, we can devise infinitely many theories to account for the finite amount of data, and linguistics will never progress.

Linguists working within the minimalist framework use one such constraint, and that is the constraint of perfection. The paper will discuss why using this particular constraint makes integrating minimalist theories with theories of language evolution very difficult, and will propose a different way to constrain the theory to overcome this evolutionary problem.

The paper will proceed as follows. Section 1 will provide a brief technical overview of the MP, highlighting the assumptions relevant to the problem under consideration here. Section 2 will then consider the question of the difference between the perfection that minimalists assume the language faculty to exhibit, and the notion of optimisation inherent in adaptationist evolutionary accounts. Section 3 will consider the question of methodology; specifically, the methodological choices underlying the MP, and how these lead to the incompatibility discussed in previous sections. Section 4 will examine ways the linguist can constrain the theory of language, and will suggest a way of doing this which overcomes the evolutionary difficulties that the MP faces. Section 5 will offer some further directions for pursuing this path. Finally, section 6 will conclude by pointing to a program for the future.

2 THE MINIMALIST PROGRAM - A TECHNICAL OVERVIEW

A brief technical overview of the MP is now in order. This overview will necessarily omit many details, but will give enough of a flavour to make the difficulties with the program clear. The MP is the latest incarnation of Chomskyan generative syntactic theory, and began just over a decade ago. The driving force which caused this development was the notion that economy conditions could play a larger role than previously assumed. The MP attempts to reduce both the derivational and the representational complexity of earlier versions of the theory, such as Government and Binding theory, in a number of ways.

Firstly, it posits fewer levels of representation. Levels such as Deep Structure and Surface Structure are removed, on the assumption that such levels were theory-internal in earlier frameworks; they were the levels at which constraints such as the Case Filter and the Theta Criterion were said to hold, and as minimalist theories eschew such constraints, the levels of representation which they required are no longer needed. The argument goes that the only ‘conceptually necessary’ levels (the only levels with independent motivation) are the levels at which the computational system interfaces with the phonological system (Phonological Form), and the conceptual or semantic system (Logical Form). Secondly, the framework posits only a few derivational rules, the main two being Merge - a process to connect elements in a hierarchical manner, and Move - a process to dislocate elements in the hierarchy to different positions.¹ Thirdly, the program posits fewer steps in a derivation, stating that steps should only be taken where strictly necessary. In other words, any step taken in the course of a derivation must be in some sense forced.

¹ Some variations (e.g. Adger (2003), Chomsky (2001)) posit a third rule, Agree. This will not be discussed here, suffice to say that its presence or absence does not affect the arguments made in the remainder of the paper.

In this framework, a sentence is built up by selecting lexical items from a numeration, or as Berwick (1998) puts it, a ‘bag of words’; some set of lexical resources which is a subset of the entire lexicon, and continuously applying Merge and Move until the derivation is complete, or in minimalist terminology, until the derivation converges. In other words, the derivation keeps going until all conditions on it have been satisfied.

The MP is a lexicalist theory of syntax. By this we mean that all items in the lexicon are specified as having a number of features before they enter the derivation. These features are either formal, phonological, or semantic. Phonological and semantic features can be interpreted by the phonological and semantic components respectively, but certain formal features cannot, and so must be removed during the course of the derivation. Formal features are either *interpretable* or *uninterpretable*, the latter being those that must be removed. Removal happens through a process of feature checking. We can describe this process in the following way: on being selected from the numeration, a lexical item with a formal feature must search the numeration for another item with a matching feature. Once it finds such an item, the two matching features can check. Checking is best understood as a procedure whereby matching features cancel each other out, or dissolve each other away.

One stipulation on checking features is that matching features can only check off if they are in a local relation. Thus, we have found the first of two things that regulate the application of the Move operation in this framework. Feature checking forces Move to apply so that items which need to check with each other can be in a local relation. The second thing to regulate movement is economy conditions. These ensure that the movements which take place are the simplest or most economical possible. For example, the Shortest Move Condition says that if there is more than one movement available to us at a certain point in a derivation, we must make the movement which is shortest. So, we can sum up this brief technical introduction by outlining the MP as simply a combination of feature checking and economy constraints.

3 PERFECTION VERSUS ADAPTATION

The preceding section has illustrated that the overriding theme of the MP is perfection, or optimality, in the design of language. At first blush, this might seem to fit quite well with an adaptationist account of the evolution of the system, in that adaptation by means of natural selection implies looking for the most optimal way to deal with a problem posed by the environment. As Gould & Lewontin (1979) have put it, natural selection is an optimising agent. In this section, however, I hope to show that the notions of perfection and adaptation contrast in fundamental respects.

For Chomsky, the notion of perfection is pivotal to the conception of language in the minimalist framework: “[l]anguage design may be optimal..., approaching a ‘perfect solution’ to minimal design specifications” (Chomsky (2002b)). The adaptive process of natural selection involves successive modifications over many generations, each constituting an improvement in a system, or an increase in its fitness. In contrast, the perfection of the MP is not assumed to have arisen in this manner.

Adaptation can be viewed as a hill-climbing process. In a search space containing a global optimum, and many local optima, natural selection will often stop when it reaches a local optimum. In other words, although this local optimum may not be the perfect solution to the

problem, it is a good enough solution. Adaptive evolutionary processes lead to organisms which are fit enough to deal with their environment, but not necessarily the most fit, or the most perfect that they could be. The reason for this, as Dawkins (1982) has discussed in *The Extended Phenotype*, is that there exist a number of constraints on attaining perfection through adaptive means. Some such constraints that Dawkins mentions are given in (1).

(1) *Dawkins' constraints on reaching perfection through adaptive means*

- (i) **Available genetic variation** - the fact that natural selection can only work with what is available to it. If the material available does not include that which is needed to reach the global optimum, then perfection will not be realised.
- (ii) **Historical constraints** - the fact that natural selection has no foresight, and hence a move towards today's optimum may hinder reaching tomorrow's optimum.
- (iii) **Time lags** - the fact that the environment may change in such a way as to make the optima of times past a disadvantage to the organism today.

Thus, there is clearly a difference between Chomsky's vision of 'perfection' in language and the optimising process of natural selection. While the former is an absolute, the latter involves points on a gradient scale reached only by overcoming certain limitations.

The MP posits a system of language which is minimal in both its computational and its representational complexity. In minimising the system in this way, language becomes less plausible from a gradual adaptationist evolutionary perspective. In fact, in reducing any system down further and further in this manner, all that is left available to us, in evolutionary terms, is a saltational story. Now, if language were to turn out to be as simple and economic as the MP predicts, then a small genetic change may have been enough to provide humans with the capacity. However, it is not at all clear that language is that simple.

In this section, I have shown that not only is the minimalist system of language incompatible with anything other than a saltational account, the predictions of an adaptationist account are incongruous with the tenets of minimalism. It is difficult to see how a system as perfect as language in minimalist terms could have evolved by natural selection. The birth of minimalism in the generative enterprise therefore constitutes the adoption of a set of postulates which rule out, from the get-go, gradual adaptationist evolutionary plausibility.

4 MINIMALIST METHODOLOGY

We have seen that the driving force of minimalist studies is to elucidate a system which shows perfection in its design. In assuming the fundamentals of minimalism, Chomsky made a methodological decision as to how to drive the theory: "[w]ith at least a general picture of what a genuine theory of language might be like, we can contemplate some more principled questions about its nature. In particular, we can ask how 'economical' is the design of language. How 'perfect' is language, to put it more picturesquely?" (Chomsky (1998)). In the early nineties, when the MP was born out of Principles and Parameters theory, Chomsky chose to drive the theory in a certain way. Choosing to formulate a model of the system which holds at its core the importance of economy and optimality is just one choice Chomsky could have made as to how he was going to constrain the theory of language.

This decision was not based on empirical facts, but was a decision of methodology; a decision as to how the body of practices, procedures, and rules to be used by minimalists would be motivated and delimited. As mentioned earlier, in linguistics, we must use something outside the empirical facts to constrain the theory. Therefore, it is not that making a methodological decision was the wrong thing to do. Such decisions need to be made in order to forge forward with a theory of language. The argument, however, is that it is the particular decision that Chomsky made that is inappropriate from an evolutionary perspective. The decision to follow guidelines of perfection, optimality, and economy immediately rule out from the very beginning a theory of the evolution of language from a gradual adaptationist perspective, by virtue of the fact that an optimal, economic, perfect system is too atomic and undecomposable to be able to follow such an evolutionary path.

The methodological decision that Chomsky takes is to formulate a theory that insists on a perfect, economic, optimal system. The methodological policy he follows in order to accomplish this is what he refers to as the Galilean style. The Galilean style refers to the approach of Galilean-Newtonian physics; that is, abstraction away from the world of sense perceptions to mathematical models of how the world works. Essentially the Galilean style says that we should set out the theory, and ignore any data which seem to refute the theory. As Chomsky puts it: "...the abstract systems that you are constructing...are really the truth; the array of phenomena is some distortion of the truth." (Chomsky (2002a))

The Galilean style is indeed a well-respected way to do science. Clearly we need to apply this practice to a certain degree no matter what discipline we are working in. As Newton (1704) put it: "[t]o explain all nature is too difficult a task for any one man or any one age. 'Tis much better to do a little with certainty and leave the rest for others that come after you.'" However, it is the particular data that Chomsky chooses to dismiss that cause concern. The data he dismisses are the facts of evolution, and in choosing these empirical facts to ignore, Chomsky has driven the system of language too far from being evolvable.

As a result of dismissing these empirical facts, language begins to resemble a system that looks more like something from the physical sciences than the biological sciences. Chomsky himself has noted that "[t]here is no strong reason to believe that a biological system should be well-designed in anything like this sense." (Chomsky (1998)) The assumption of the minimalist thesis of economy and perfection gives us a system which flies in the face of all the evidence from studies in evolutionary biology. Such studies point out that adaptations do not lead to perfect systems, in the same way that physical processes can. So, the minimalist views language as being a biological entity which has feasibly arisen by non-adaptive means due to its atomicity and perfection. If minimalism is indeed correct in its assumptions, then this possibility cannot be immediately ruled out. However, it is far from clear that the minimalist delineation of the language faculty is accurate. If it turns out to be the case that language is not so atomic, economic, simple and perfect, then it will be difficult to uphold the hypothesis that the system arose in our species by the type of non-adaptive means normally reserved for the physical sciences.

Language is a system that is grounded in biology. It is a biological endowment in our species, and hence must have evolved over a particular timescale, and in particular steps, as with our other biological endowments. The methodological decision that Chomsky has made does not

allow for this conception of language. Instead, it forces language to be a system quite divorced from other biological systems. The question that therefore needs to be asked is why Chomsky has made the methodological decision that he has - in other words, why would he opt for a methodology that is suitable for the physical sciences, but not for the biological sciences, when the object of study is a biological faculty?

Assuming the minimalist thesis forces us into a position where language is seen as an atypical system, a non-biological system, a system which cannot be explained by the normal adaptive evolutionary process of natural selection. However, if natural selection is the explanation par excellence in biology for complex adaptive systems, of which language is clearly an example, we need to be very careful about adopting the assumptions of the MP, or indeed any assumptions that prevent us from positing an evolutionary explanation involving natural selection.

In a sense, the minimalist argument is backwards. The MP is designed to provide us with a simple, economic system of language. Such a system must have evolved in one step due to its atomic nature. Consequently this must be how we got language. So, from the outset, this conception of language is only compatible with a saltational evolution. However, we should begin from the opposite end of the argument, and state upfront what an evolvable system would look like, and from there begin to figure out how the system arose.

5 CONSTRAINING THE THEORY

As has been noted earlier, we need some way to constrain our theories of language if we are to progress in the right directions. There are, in fact, numerous ways in which we can constrain theories of language, as shown in (2).

(2) *Ways to constrain the theory of language*

(i) **Considerations of Acquirability** - studies in language acquisition (Ritchie & Bhatia (1999), Bertolo (2001)) provide us with knowledge about how children acquire language. In that children acquire language quickly and easily, without adequate input, and in that they cannot acquire just any arbitrary language, a theory of language constrained by acquirability considerations says that the system must be learnable. Principles and Parameters theory, for example, was designed with these concerns in mind.

(ii) **Considerations of Neurological Plausibility** - studies in neurolinguistics (Obler & Gjerlow (1999), Pulvermüller (2003)), and of language disorders (Goodglass (1993), Papathanasioude & Bleser (2003)), provide us with knowledge about how our brains store and deal with language. A theory of language constrained by neurological considerations says that the system must be neurologically plausible; that the features of language can somehow be instantiated in the neural tissues of the brain.

(iii) **Considerations of Cross-Linguistic Variation** - studies in comparative synchronic syntax (Roberts (1997), Jensen (1999), Ouhalla (1999)) provide us with knowledge about the differences exhibited across languages in their form. A theory of language constrained by considerations of cross-linguistic variation says that the system must be able to have varying end states. Again, Principles and Parameters theory was designed with this in mind.

(iv) **Considerations of Diachronic Change** - studies in diachronic syntax (Kroch (2001)) provide us with knowledge about how languages change in their form over time. A theory of

language that is constrained in this way says that the system must be non-static. Further, actual instances of language change (such as the tendency of changes to happen gradually following an s-shaped curve) must be predicted by the theory.

(v) **Considerations of Parsability** - studies in psycholinguistics provide us with knowledge about how we assign a structure to a string that we encounter. They inform us about how we deal with such things as ambiguity and garden path sentences. A theory of language which is constrained by such factors says that the system must be parsable. That is, it should, for example, conform to parsing models which accord with psycholinguistic facts. The *Aspects* model of transformational grammar (Chomsky (1965)) was criticised by Peters & Ritchie (1973) for the very reason that it could generate grammars that are not parsable, and this may be one of the reasons that that model has been vastly revised over the past forty years.

(vi) **Considerations of Simplicity and Economy** - this is the way in which the theory of language posited in studies in the minimalist framework is constrained. The MP makes a distinction between the weak and the strong minimalist theses. The former says that the theory must be the most economic in an Occam's Razor sense (economy of statement); in essence this is the type of 'minimalism' that is pursued by all scientists. The latter is the crux of the MP, and says that the theory must elucidate a system which is itself the simplest and most economic way to do what it has to do (economy of process), which here, is to create the mapping between signal and meaning by satisfying some set of conditions imposed by other systems of the mind.

This list enumerates just some of the constraints we can impose on our theory of language. It is envisaged that additional constraints will become apparent in the next few years from work currently being undertaken in the field of genetics.² Considering the six constraints above alone, it becomes obvious that the final constraint seems to stand out. The constraint of simplicity and economy seems unmotivated in comparison to the others listed. These undeniably have independent motivation; the same cannot be said for the constraint of economy, it appears less reasonable.

What the language evolutionist is concerned with relates to a different way of constraining the theory of language. We should constrain the theory based on considerations of evolutionary plausibility. In other words, we need to use studies in evolution to provide us with knowledge about how biological endowments, such as language, evolve. We would need to consider a number of issues, such as those in (3).

(3) *Issues to consider in developing an evolvable theory of language*

(i) **Issues of timescales** - in other words, the order of events in the evolutionary development of our species that are relevant to language.³ Examples might include the development of social relations, or the emergence of particular neural substrates.

(ii) **Issues of plausible antecedents** - what our ancestors needed to possess in order that the language system we now have could have evolved. Examples here include social calculus (Calvin & Bickerton (2000)), or symbol usage (Jackendoff (2002)).

² See, for example Gopnik & Crago (1991), Lai *et al* (2001) and Enard *et al* (2002).

³ That is, of course, assuming that extant traces of these developments in the past are available now.

(iii) **Issues of plausible processes and outcomes** - in other words, we know that processes and outcomes including the following occur in evolution: selection (natural, sexual, kin etc.), random drift, exaptation, spandrels, etc. The question is which of these could have provided us with features of language, or indeed plausible evolutionary precursors of such features.

So, our theory must account for the fact that language is a biological capacity, and as such must have followed the same types of evolutionary paths which we posit for other biological capacities in our species. Essentially, a theory of language that is constrained by considerations of evolutionary plausibility says that the system must be *evolvable*.

A distinction can be drawn between two ways of approaching the problem of the evolutionary origins of language. The minimalist methodology states that we should search for the most minimal system we can find. Once minimalists have determined what this is, the evolutionary linguist can then investigate where the system can take us evolutionarily (which, as has been discussed above, can only be to a saltational account). A contrasting methodology is exhibited in the work of Ray Jackendoff (2002), who begins by searching instead for an evolvable system. The evolvable system, once reasoned out, can then be examined further in order that it might be minimised in some way.

Jackendoff approaches language from the question of how the human specialisation came to be coded in our genes. He states that this question is important not just to justify the hypothesis of Universal Grammar, but also “...in part as a way to further investigate and refine the architecture of the language faculty...” Jackendoff (2002). In other words, Jackendoff acknowledges the fact that evolutionary considerations must not simply constrain how and when the faculty of language evolved, but also what shape the faculty may take. The minimalist concentrates instead on what shape the faculty takes from a non-evolutionary perspective. Constraining the theory of language by assuming the faculty to follow guidelines of simplicity and economy may lead the minimalist to an evolutionary proposal - that of saltation - but this proposal is the result of a steadfast belief of what the faculty looks like; the faculty itself is not assumed to have in any way been shaped by its evolutionary path.

Jackendoff's position encompasses the essence of evolutionary theorising; that is, it embraces the evolutionary path that is taken by a feature or trait as a deciding factor in its ultimate form. His theory proposes a sequence of steps (some ordered, some parallel) required in order that the language faculty we now have might have developed. The argument is supported by the use of examples of ‘fossils’ at each stage; that is, linguistic elements drawn from child language acquisition, late second language acquisition, pidgins, aphasic language, and ape language experiments that mirror the earlier stages of the language faculty. So, the current state of the language faculty is shown to include the different stages reached in the course of its evolution, each of these stages in some way affecting its final arrangement.

However, it is not just the fact that evolutionary considerations must influence the language faculty that makes the Jackendovian approach superior to the line the minimalist pursues; it is also the fact that the constraint of evolvability necessarily entails many of the other constraints listed in (2), while the constraint of simplicity or economy does not. For example, an evolvable system must be neurologically plausible; an evolutionary explanation must necessarily make reference to the neurological developments in our species that allowed for,

and were necessary for, our linguistic developments. Similarly, an evolvable system will have to be parsable if it to be of any use to its possessors. If a system evolved which could generate unparsable strings, those who possessed the system would not have attained any advantage over those who didn't; in fact it would probably have been more of a disadvantage. However, the one constraint that is not immediately entailed by the evolutionary constraint is that of simplicity/economy. A gradual adaptationist evolutionary account involving natural selection will not automatically result in simplicity/economy. In fact, the result is often quite the opposite - redundancy and complexity.

6 AN EVOLUTIONARILY PLAUSIBLE THEORY OF LANGUAGE

In this section, I will consider what an evolutionarily plausible theory of language might look like. If we use considerations of evolvability to constrain our theory of language, what features would the theory be predicted to have?

In order to begin to answer this question, we need to understand what is meant by evolvability. Wagner & Altenberg (1996) define it as "...the genome's ability to produce adaptive variants when acted on by the genetic system." In other words, a system is evolvable if it produces variants that can be acted upon by natural selection; if it can reduce lethal mutations, while at the same time reducing the number of mutations required in order to produce novel phenotypic traits.

In the evolutionary biology literature a number of properties are associated with the capacity to evolve. The first of these properties is redundancy. If a system is redundant it has more chance of being able to cope with the difficulties and puzzles that the environment might throw at it by virtue of having more than one strategy to solve such a problem. This is selectively advantageous, and so the redundant system is likely to out-perform the non-redundant system in the evolutionary battle.

A second related property associated with evolvability is robustness. Robustness is linked to the property of redundancy in that a system is robust to environmental damage if it exhibits redundancy of function.

The third property I will mention here is modularity. Modularity is assumed to be related to the question of evolvability in that if a system is divided up into different modules, with certain genes responsible for certain modules⁴, a mutation in one part of the system will not interfere with the other parts of the systems. In other words, characters of the system may vary independently.

We can now return to the question posed at the beginning of this section. Some suggestions for features that an evolutionarily plausible theory of language might possess are given in (4).

⁴ Note that this scenario does not rule out pleiotropy; it suggests that pleiotropy may be intra-modular rather than inter-modular, or that inter-modular pleiotropy is kept to a minimum.

(4) Features of an evolutionarily plausible theory of language

(i) **Initiatory conditions** - the theory would have to posit one or more foundational aspects which emerged at the very beginning of linguistic evolution to get the whole process started. These conditions could equally have been conditions in the individuals at that particular developmental stage in their evolution, or indeed conditions in their environment.

(ii) **Modularity** - the theory would maintain that language is a modular system. In other words, the system consists of independent yet interacting components; it is a non-atomic system in contrast to that proposed in the MP. Modularity, as a property associated with evolvability, is important in the context of the question of language evolution for two reasons. Firstly, modularity is a principle of design which is especially well-suited to tinkering. It has often been argued that evolution is not an engineer but a tinkerer (see e.g. Jacob (1977)). Natural selection, as mentioned previously, can only work with what is available to it; unlike an engineer, it cannot start from a clean drawing board and design an entirely new system. Secondly, it has been argued that complex systems exhibit modularity to a greater extent than simple systems, due to their need to cut down on interference between different aspects of the system. Therefore, an evolutionarily plausible theory of language which assumes the language faculty to be complex and to have arisen gradually should naturally appeal to modularity as a central feature.

(iii) **Redundancy** - the theory would advance that the modules in the system exhibit a certain amount of redundancy, and hence the system as a whole would be robust. Redundancy in language is widespread; one well-known example is the fact that language can use more than one way of conveying the same type of information - certain languages use both inflectional morphology and word order to mark particular semantic facts.

(iv) **Hierarchical organisation** - the theory would assume the interacting modules of the system to be organised in a hierarchy. Here, 'hierarchical' is not meant in the sense that we normally associate with language - the hierarchical organisation of syntax - but it is meant in an evolutionary sense. In other words, the theory would posit that each module on the hierarchy emerged separately, and that the order of modules on the hierarchy indicates a plausible incremental sequence of emergence. Obviously, it would be naïve to assume a completely strict sequence as certain modules could have evolved in parallel, but equally, the hierarchy would reflect the fact that certain modules of the system would have to be in place before others could emerge.

(v) **Plausible variation** - the theory would have to posit variation in terms of both cognitive and communicative abilities at each stage in the evolutionary process. Natural selection requires variation, and in order for language to evolve, variation would be needed both in the cognitive systems of our ancestors, and in their communicative abilities.

(vi) **Selective advantages** - the theory would have to posit a selective advantage for each module of the system. If the emergence of a module implied no augmentation of fitness for our ancestors, then it would have had no reason to have emerged. So, moving along the evolutionary path of language by means of emergence of the modules on the hierarchy would equate to a trajectory through a fitness landscape.

We need a theory of language which holds these features at its core. Jackendoff's work is clearly consistent with most, if not all, of these requirements, and as such is a good example of the type of theory that needs to be advanced in order to progress with answering the many important questions posed here.

7 A PROGRAM FOR THE FUTURE

What work do we now need to set about doing in order to progress with characterising a theory of language that is evolutionarily plausible? As an initial step, two aspects need to be attended to. The first thing we need to do is to work out how to define 'evolvable'. This means we need to understand both in general terms, and in more specific terms with respect to our species and our language faculty, what can evolve, and how it can evolve. Secondly, we need to further refine and elaborate the features of a theory of language which is constrained by evolutionary plausibility. The features in section 6 constitute a first stab at some suggestions; further work is required to formalise the features.

In sum, we need to set the agenda for a new theory of language, and begin from there, rather than attempting to force a theory which has been designed to solve a different problem into our evolutionary mould. Some might argue that setting the agenda from an evolutionary perspective will mean that those who are interested in answering different questions will have to force our theories into their moulds, and this will not aid progress. However, it is important to remember that the ultimate goal is that we can devise a theory that will answer all the questions about language that we need to answer - evolutionary questions, acquirability questions, neurolinguistic questions, parsability questions etc. Clearly, this goal will not be reached for a long time yet, so in the meantime, we must accept the fact that there are different branches of enquiry in linguistics, and let our branch set its agenda in the same way that others do.

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