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2000

The Adaptive Significance of Human Language

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Abstract

Many experts have argued that human language is fundamentally incompatible with the principles of traditional Darwinian evolutionary theory. According to conventional Darwinian explanations, specific traits evolved among species according to gradual and incremental genetic changes, each of which that were in some way so favorable to the survival and reproduction of ancestral generations that they were ultimately preserved within successive generations of those species. Human language, it has been said, is simply to complex to be explained as a result of Darwinian explanations, since each successive step in the evolution of language would confer no obvious survival benefits to its recipients. According to this idea, language is such an "all-or-none system," that it could not possibly have existed in any immediately beneficial intermediate forms and thus could not have evolved according to conventional Darwinian modes of explanation.

In this paper, I will argue that much of this apparent controversy and skepticism is due in large part to (1) unfortunate misunderstandings of key theoretical issues in linguistics, psychology, and evolutionary biology (2) dogmatic and unnecessary attention to natural selection as the principle and solitary selective force in evolution (3) hasty dismissal of the role of sexual selection as having a key role in the evolution of complex traits such as language and (4) the absence in linguistics, psychology, and evolutionary biology of an adequate and satisfying evolutionary mechanism capable of explaining such apparent complexity. In this paper, I review those positions that argue against the selective advantage of language and come to a much different conclusion. I then continue to review a few of the most recent empirical findings and theoretical proposals of selective mechanisms capable of accounting for some of the most unique, particular, and peculiar species-specific characteristics typical of human language.

I. Introduction

Human language is among the most complex of all human behaviors. Its structure is rivaled in complexity only by the intricate precision of the vertebrate eye or by the powerful and masterful design of an eagle's wing. It has been said to be the one 'uniquely human' trait that separates us from all other forms of life within the animal kingdom.

While most modern theorists of language origins are in agreement that at least some aspects of language are due to in part to innately determined laws governed by our biology, it is surprising that many of these same theorists are skeptical toward the idea that our ability to use spoken language can be explained as a direct consequence of conventional Darwinian processes. Moreover, it seems that a great deal of this apparent confusion could be firmly put to rest if it

were not for an unfortunate historical focus on natural selection as the primary or even solitary selective force in evolutionary biology capable of explaining the evolution of complex traits, especially within the human species. It should be duly noted that this is an extremely important point, and one that I will focus much attention to later.

II. Arguments Contra Language as an Adaptation

Many theorists have argued variously against the adaptive significance of human language. Most noteworthy among those falling into this camp have been have been world-renowned Harvard paleontologist Stephen Jay Gould and MIT linguist Noam Chomsky. Faced with the apparent inadequacy of natural selection as the only mechanism capable of explaining the undisputed complexity of human language, a common suggestion by both is that language is not the outcome of the process of natural selection, but instead a mere side effect or accidental by-product of other evolutionary forces such as an overall increase in brain size that was itself adaptive for our ancestors. Both Gould and Chomsky have argued variously that human language is simply too complex to have arisen by the gradual and incremental process of Darwinian natural selection. For example, Gould has stated:

The Darwinist model would say that language, like other complex organic systems, evolved step by step, each step being an adaptive solution. Yet language is such an integrated "all or none" system, it is hard to imagine it evolving that way. Perhaps the brain grew in size and became capable of all kinds of things which were not part of the original properties (Gould, 1994).

Noam Chomsky, along similar lines, has stated:

It could be that when the brain reached a certain level of complexity it simply automatically had certain properties because that's what happens when you pack 10^{10} neurons into something the size of a basketball (Chomsky, 1994).

Another adherent of the Gould-Chomskyan approach has been the psychologist David Premack. According to Premack:

Human language is an embarrassment for evolutionary theory because it is vastly more powerful than one can account for in terms of selective fitness. A semantic language with simple mapping rules, of a kind one might suppose that the chimpanzee would have, appears to confer all the advantages one normally associates with discussions of mastodon hunting or the like....syntactic classes, structure-dependent rules, recursion and the rest, are overly powerful devices, absurdly so (Premack, 1985: 281-282).

Gould has further argued that language, as well as many more of our species-specific behaviors, presumably having come about as a consequence of our over-sized brains, are mere exaptations (Gould and Lewontin, 1979; Piatelli-Palmarini, 1989). An exaptation or 'spandrel' is, according to Gould, the adaptation or re-use of an existing structure for a new purpose. Gould describes a kind of water bird that uses its wings to block reflections on the surface of the water while looking for fish (Gould, 1987). Clearly, the bird's wings, ordinarily used for flying, are not the result of an adaptation for a sunshade. Instead, it is more likely that they are the re-use of an existing structure, namely, the wings, for shielding the sun's rays from the bird's eyes when it is convenient to do so.

III. Arguments For Language as an Adaptation

The arguments presented here are compelling, yet all seem to be centered around the general complaint that language is simply too intricate and complex to be explained by the gradualistic process characteristic of natural selection. The MIT linguist Steven Pinker has been foremost among those who argue in favor of language as an adaptation, as heralded in his now classic paper *Natural Language and Natural Selection*, co-authored with psychologist Paul Bloom, and in his popular work entitled *The Language Instinct*. Pinker's forceful response to his detractors, ironically enough, is that it is *because* language is such a complex system, that we are given no other choice but to account for this complexity by way of natural selection. Says Pinker:

Evolutionary theory offers clear criteria for when a trait should be attributed to natural selection: complex design for some function, and the absence of alternative processes capable of explaining such complexity (Pinker and Bloom, 1990).

Here Pinker makes a simple assertion; faced with the enormous complexity of language and with no other process which can adequately account for this complexity, we are destined almost by default to argue for natural selection as the cause of the intricate design features of language. Indeed, it is perhaps more difficult, if not downright impossible, to envision a sort of grand-size macro-mutation instantly befitting all members of the human species with the near flawless ability to understand, comprehend, and utilize spoken language.

But of course this couldn't be the case. While aside from violating every tenant of what we know of Darwinian evolution, it also contradicts virtually every principle of what we know and

understand as the scientific method. A jump from a "bare nothing" to a "great and complex something" virtually dictates that we default to more mystical or magical explanations, not scientific ones. Yet, this is exactly what both Chomsky and Gould, two of the perhaps most distinguished authorities on evolution and linguistics, would have us realize. No. There must be a more reasonable, scientific, and perhaps even Darwinian explanation that can account for the complexity of spoken language. Given that we have no other mechanism currently at our disposal to use in helping to explain the evolution of complex traits, it behooves us to reconsider, reassess and reevaluate a possible Darwinian explanation for this complex human ability. And since the theory of natural selection operates by definition from the differential reproductive success of traits that confer a definitive selective advantage, it must also be true that language, being a complex trait, must have provided a unique selective advantage for our ancestors during the course of human evolution.

Further problems have been suggested, of which some have already been presented above, so let us now refer to each of these once again in turn. Gould's greatest caveat, it will be remembered, was in his contention that language is an exaptation or accidental by-product that perhaps evolved for reasons unrelated to communication or the ability to convey information. Paraphrasing Gould, "The wading bird that uses its wing to shield its eyes from the sun did not evolve its wing specifically for this purpose." Pinker responds unflinchingly to this rather naïve assertion. Says Pinker:

A wing used as a visor is a case where a structure designed for a complex engineering task that most arrangements of matter do not fulfill, such as controlled flight, is exapted to a simple engineering task that many arrangements of matter do fulfill, such as screening out

reflections....You can use a television as a paperweight, but you cannot use a paperweight as a television (Pinker and Bloom, 1990).

What Pinker is getting at here is that while some structures may be exapted for another purpose that is less complex than the original function, the reverse cannot also be true. A hypothetical structure designed specifically for shielding one's eyes from the sun could not in turn be used as an effective and reliable wing capable of flight. Gould's analogy just does not work. Language is simply too complex to be dismissed as a mere "handy accident" of the human mind in the same way a bird's visor can be dismissed as being crafted solely for the purpose of shading its eyes from the sun. The Oxford linguist Jean Aitchison aptly summarizes this argument in her seminal work entitled *The Seeds of Speech*. Says Aitchison:

The complexity of language and the interwoven adaptations of the mouth, larynx, and brain make it unlikely that language could have developed as an accidental by-product (Aitchison, 1998).

The psychologist David Premack offers another compelling argument that draws noteworthy attention to the staggering complexity of language. His objection, mentioned briefly above, is that language is an "embarrassment" for evolutionary theory since its complexity seems almost to over-exceed its utility as an adaptive behavior. Our hunter-gathering ancestors may have had use for an occasional grunt or off-handed gesture to a fellow comrade while collecting berries or hunting large game, so the argument goes, but why the need for the "absurdly powerful devices" of "syntactic classes, structure-dependent rules and recursion" characteristic of most languages? Again, linguist Steven Pinker has been quick to dismiss these quasi-dilemmas. Says Pinker:

The objection is a bit like saying that the cheetah is much faster than it has to be, or that the eagle does not need such good vision, or that the elephant's trunk is an overly powerful device, absurdly so (Pinker, 1994:367).

Furthermore, many anthropologists, cognitive scientists, and evolutionary psychologists now believe it likely that human brain evolution, including our faculty for language, was propelled more by a cognitive arms race among conspecifics and social competitors rather than by an evolutionary need of mastery of technology and the physical environment (Pinker, 1994; Alexander, 1989). All the same, Premack's objection is an important one and worth coming back to later.

Finally, let us return to Gould's complaint that language could only have existed as "all-or-none system." According to Gould, language could not have come about by natural selection because it would not have been immediately useful in any intermediate forms.
If a hypothetical intermediate form of language conferred no obvious survival benefits to our ancestors, so the argument goes, it could not possibly have evolved.

The argument is surprisingly similar to that voiced by linguist and evolutionary skeptic Elizabeth Bates. Says Bates:

What protoform can we possibly envision that could have given birth to constraints on the extraction of noun phrases from an embedded clause? What could it conceivably mean for an organism to possess half a symbol, or three quarters of a rule?....monadic symbols, absolute

rules and modular systems must be acquired as a whole, on a yes-or-no basis-- a process that cries out for a Creationist explanation (Bates, Thal and Marchman, 1991:31).

What both Gould and Bates do not realize is that an intermediate language could have existed in a number of useful forms. It is obvious, moreover, as Bates contends, that "half a rule" or "three quarters of a symbol" would not have been useful as a primitive form of language. But then this approach apparently misses a very fundamental ideal behind the gradual step-by-step process of natural selection. Pinker clears up the problem persuasively. Says Pinker:

[Bates] assumes that Darwin literally meant that organs must evolve in successively larger fractions (half, three quarters, and so on). Bates' rhetorical question is like asking what it could conceivably mean for an organism to possess half a head or three quarters of an elbow. Darwin's real claim, of course, is that organs evolve in successively more complex forms. Grammars of intermediate *complexity* are easy to imagine; they could have symbols with a narrower range, rules that are less reliably applied, modules with fewer rules and so on....The languages of children, pidgin speakers, immigrants, tourists, aphasics, telegrams, and headlines show that there is a vast continuum of viable language systems varying in efficiency and expressive power, exactly what the theory of natural selection requires (Pinker, 1994:366).

IV. The Selective Advantage of Human Language

So how did language first arise? Whence did it arise? Who were the first of our now- extinct ancestors to speak? If language is the result of the process of natural selection, what sort of intermediate steps did it progress through to eventually produce the language we use today? Why is language so apparently complex? What do we mean when we use the word "complex?"

What adaptive advantage did language possibly confer, over and above picking berries, slaughtering game, and mastering the physical environment, to our now extinct ancestors? Why has the notion that language has evolved caused so much apparent skepticism and controversy coupled with a blatant and dogmatic dismissal of conventional Darwinian explanations of complex structure and form? Can a trait like language be explained by conventional Darwinism?

My position in this paper is that I believe that it can, but for many reasons that will eventually become clearer, the answer is not altogether intuitively obvious. These and similar questions, while easily among the most important with respect to the history of human evolution, are likewise among the most difficult. Indeed, during the 19th century the study of language origins was outlawed by the *Societe de Linguistique de Paris* as a safeguard against prolonged futile speculation (Kendon, 1991). Fortunately better theories and more reliable data, including analysis of extinct hominid cranial endocasts, past archeological records, and modern comparative ethological methods, have reopened the debate and have made possible today more honest inquiries into the true nature and origin of human language.

Unfortunately, most if not all of the arguments considered prior were based not on genuine problems with data analysis or theory construction, but instead on patent misunderstandings of evolutionary biology, psychology, linguistics, or all three. The primary goal in reviewing these positions was to draw attention to them while highlighting some of the most common key misunderstandings of issues directly related to the evolution of language. It is hoped that by bringing these issues to light, the reader will not only be able to recognize and identify these common yet important misconceptions of issues surrounding the evolution of language, but at the same time be able to grasp and acknowledge their largely hollow and barren content.

The greatest caveat most skeptics have had with the evolution of language has been in their relative incredulity of how to reconcile the now near-universally accepted doctrine that language has an innate basis with the alleged apparent "inadequacy" of natural selection as the primary or even sole mechanism capable of explaining this complex trait. Natural selection, it has been argued, is best often thought of as a "tinkerer" typically designing traits that were just advantageous enough to the survival and reproduction of a particular species to be preserved in successive generations of that species. Evolution does not start from scratch and does not follow some rigidly conceived plan or well-ordered blueprint purposefully intended to design organisms of exquisite and flawless perfection. Evolution designs organisms according to specific traits because those traits were, relative to its environment and other organisms against which it was struggling to survive and compete, just as good or perhaps a bit better than those of ancestral generations. Evolution typically works often just in order to "get by" and is consequently rarely wasteful with regard to the design of specific adaptations to particular species.

For these and other similar reasons then it is not altogether entirely surprising that when we are dealing with the topic of language evolution that natural selection often strikes many as seeming grossly inadequate as a mechanism of explaining this amazingly complex trait. The psychologist David Premack already mentioned has perhaps been most forceful among those falling into this camp as he has stated on numerous occasions that language is nothing less than an "embarrassment" for evolutionary theory since its complexity seems to almost contradict the tempo and mode of evolution that operates on a "just a bit better" mechanism of design. Indeed, the task itself of explaining the evolution of language has appeared so formidable to many in fact that almost no serious attention had been given to the area until just the past few recent decades.

Most noteworthy among those to have taken up this challenge has been University of Hawaii linguist Derek Bickerton. In his 1990 work entitled *Language and Species*, Bickerton gave the first real honest attempt at explaining how language may have arisen according to traditional Darwinian processes. Bickerton, like many evolutionary theorists, is skeptical about the proposed utility or usefulness of intermediate forms of language, and apparently, as Gould and others do, fails to see how it may have been immediately useful and hence adaptive in any in between forms. Bickerton further proposes that the most important features of language may well have arose as the result of a single crucial mutation. Yet, it seems difficult if not impossible to take Bickerton's ideas too seriously. In his apparent attempt to "reconcile" natural selection with Chomsky's "innateness theory" of language, Bickerton seems as if he requires the chance equivalent of natural selection's ability to assemble jetliners out of hurricanes. A single crucial mutation that endowed the human species with the ability to speak a fluent and in Bickerton's own words "language with incredibly complex syntax" seems grossly implausible at best. Many have agreed on this point including University of Michigan anthropologist Robbins Burling. Says Burling:

To the extent that language is highly complex, it is implausible to suppose that it derives from just one mutation; if it arose from a single mutation, it is implausible to insist that it is as complex as everyone wants it to be. I think Bickerton is trapped in a fundamental contradiction here. He struggles to try to resolve the contradiction, and he has done us a great service by presenting the arguments in detail. In the end, I think, he fails, but his attempt deserves to be carefully considered (Burling, 1992).

Bickerton however has written a great deal in regards to language origins, so it is sometimes a bit difficult to assess just where he stands in respect to many issues. His most recent venture, likely also representing his most recent position with regards to the language origins debate, has been in tandem with theoretical neurophysiologist William Calvin of the University of Washington. In their 2000 work entitled *Lingua ex Machina: Reconciling Darwin and Chomsky with the Human Brain*, Calvin and Bickerton take on the mightily ambitious project of finally laying to rest most if not all questions of the origins of human language. In the book, Bickerton once again voices his support for the notion that some intermediate form must clearly have preceded full-blown language. He continues furthermore to consider, in apparent disregard of many of his earlier ideas on the subject, that there may very well have been a great variety of various elementary languages, all of widely different novelty and complexity. This compromise seems more comfortable to Bickerton as it reduces the seemingly insurmountable evolutionary gulf between the hoots, clicks, and screeches we typically associate with our primate cousins and full-blown language. After all, an evolutionary leap from no language, to proto-language, to language is not much better than a leap from no language to a complete language system. In fact, it is exactly *half* as likely!

What Bickerton seems unwilling to confront in the end however is that natural selection must have been able to improve upon a vast and wide continuum of gradually more and more complex manifestations of structure and form in relation to the production of speech. After all, natural selection, by its very definition, *requires* this and any genuine attempt to "reconcile" Darwin with the evolution of a complex trait like language must be willing to accept this as given. The University of Oxford biologist Richard Dawkins has pointed out that this and other similar such arguments can be summarized as stemming from what he calls the "argument from personal

incredulity." According to Dawkins, the "argument from personal incredulity," also known as the "argument from complexity," or the "argument from ignorance," is where one attempts to make a case against a proposition on the basis of our inability to fathom or to explain a certain phenomenon or set of phenomena. It has the form:

I don't understand how this could arise naturally.
Therefore it couldn't have.

It is a very weak form of argument, regardless of context. Basically, it says that if I don't know something, then no one else knows, and no one ever will. In short, it is not actually a logical argument. It is simply an affirmation of bafflement or wonder. Suppose I leave a saucer of milk outside overnight. In the morning, the milk is gone. I can't think of anything but fairies that might have visited my yard. So, the missing milk is proof of fairies. Right?
In addition, it is also an affirmation of pessimism. Scientific breakthroughs occur regularly, but the arguer is confident that there will never ever be one about this subject.

Says Dawkins:

The general lesson we should learn is never to use human judgment in assessing such matters. Never say, and never take seriously anybody who says, "I cannot believe that so-and-so could have evolved by natural selection." I have dubbed this kind of fallacy the Argument from Personal Incredulity (Dawkins, 1995:70).

Dawkins continues with his own example:

I am a bishop, well-educated in classical literature and theology.

I have never been to the arctic, or seen a wild polar bear.

But off the top of my head, I can't see why polar bears are white.

So evolution can't explain it.

I told the story as an answer to the natural skepticism -- the Argument from Personal Incredulity -- that arises in people when they are faced with a really ingenious or complicated natural phenomenon. The skeptic says, "I cannot imagine a plausible series of intermediates, therefore there were none, and the phenomenon arose by a spontaneous miracle (Dawkins, 1995:91)."

In summary then if we are to give honest and serious consideration to the likelihood of natural selection's ability to explain language evolution, we must likewise be willing to consider that language went through a vast continuum of intermediate forms before giving rise to what we know today. Despite numerous attempts however by Pinker and others to dispel Bickerton's contention that language simply could not have existed in such a large variety of distinct and intermediate forms, Bickerton seems almost dogmatic in his assertion that certain aspects of language, especially syntax, are simply too complex to have arisen by any way other than through a great macromutation from ancestral proto-language to full-blown language. Here, Bickerton sees syntax itself as the key crucial mutation endowing our ancestors to speak with much of the same fluency and ease that all humans in every part of the globe do today.

Despite the details of *how* precisely language may have evolved, the point still remains that language *did* in fact evolve else we would not be here with our capacity to use it as we do today. For all of the attention Bickerton has given to explaining, as he sees it, how this process may

have occurred, it is both equally surprising and unfortunate that he devotes so little attention to *why* language may have occurred. Clearly, this is an important point very much worth addressing, for if we are ever to have a complete and through understanding of the origins of human language, an adequate *why* must be at least as important, if not more so, as an adequate *how*. Answering the question of *how* language evolved is only part of the puzzle.

To be fair, Bickerton does speculate briefly, if however momentarily, on a likely candidate that may have driven selection for the ability to use progressively more and more efficient means of communication. According to Bickerton and Calvin, both see the emergence of the first rudimentary proto-language as stemming from the intense selective pressure brought about by extractive foraging. Says Bickerton:

In the real world, food comes first, socializing second…the only animals other than ourselves to have anything that can transmit variable factual information, as language can, are bees, and bees, like our ancestors, are extractive foragers and use their language to help in their extractive foraging. The requisite variability, in the earliest stage of proto-language, would have involved the capacity to recruit one's fellows, by whatever combination of gesture and sound, to make particular foraging choices (led to a relatively unguarded carcass only a few hours old rather than to some decaying remains ringed by aggressive scavengers, for example). Thus not merely the power to communicate but some skill in handling the act would have been selected for at the same time, leading to increments in social intelligence as well as communicative ability (Calvin and Bickerton, 2000:199-200).

Bickerton's argument is compelling. Indeed, one aspect of the study of language origins that has most stymied attempts to legitimize the field is a plausible explanation of how and in what context language first arose. Since language is a largely social phenomenon, generally involving at least two or more parties, it has been difficult for many experts to imagine how speech may have been immediately useful to the first hominid to use it, presumably using a rudimentary proto-language. Bickerton's position has added credibility in that it helps to explain what may have been at the root of the selective drive to acquire an extremely useful, if somewhat limited in its primitive form, form of speech that could have conveyed the very barest facts necessary for exchanging information about variable food sources. This in conjunction with a very rudimentary system of gestures, such as pointing and the like, may have constituted that initial lauchpad which led later to more efficient and complex systems of communication such as language.

It is likewise interesting to note Bickerton's emphasis on the unique foraging capabilities of bees. Honeybees have a quite unique social system in that their entire way of life is structured around collecting nectar to be brought back to the hive to be made later into honey. Bees have evolved a similarly complex system of communication capable of conveying information to other bees about the direction, distance, height above the ground, and even type of nectar according to the kind of blossom from which it came.

Bees, like many other social insects, including wasps, ants, and termites, have an extensive division of labor system typically centered around extractive foraging practices. While early hominids may not have had such inflexibly defined jobs as those of bees, ants, or termites, whose roles are rigidly assigned by birth, it is hard to imagine how our early ancestors would not have

similarly benefited in many ways from a division of labor within their societies. For example, imagine trying to construct a scenario in which hunting big game would have been possible without the aid of one's comrades to assist in the conquest. Early hominids were simply not as well equipped as were the large felines and wild canines of the same period. A single carnivorous feline during that time, with the aid of its sharp claws, speedy gait, and peculiar ability to "stalk" its prey nearly undetected, all greatly contributed to this animal's success at hunting meat in the wild. Early hominids, however had none of these handy and miraculous tools to aid in predation, and thus had to rely on more than "just me" if they were to have a reasonable chance at including mastodons or other very large game into their diet.

In order to get such challenging tasks completed with any reasonable degree of success, it seems reasonable to assume there must have been a way of facilitating more efficient teamwork through cooperation and a division of the tasks necessary to accomplish this goal. A system in which individuals were able to find and locate meat, relay that information back to their comrades, were clear about their respective jobs, including when, where, and how to strike, and how to interpret important cues from both their comrades and the animal being stalked would have had an enormous advantage over groups that could not. "Two heads are better than one," as the saying goes, and in relation to hunting during the period of our early ancestors, group cooperation, mediated by the ability to plan ahead and divide up specific tasks was apparently indispensable. Such a system, of course, as we have already seen with honeybees, calls for a more effective means of communication able to deal with such demanding tasks. The first proto-language to emerge among early hominids was natural selection's answer to this demand.

Bickerton's argument however, while persuasive in it's logic, leaves unanswered the question of how a rudimentary "language" would have spread to other ancestral hominids if presumably it arose as the result of a random mutation within a single individual ancestral human. After all, a rudimentary proto-language would have quickly outlived its utility as a viable system of communication if only one member of a group were able to communicate with any degree of competence and proficiency while all others looked on in bewilderment. Pinker has attempted to resolve this apparent paradox by positing that perhaps the mutation or evolutionary sequence that led to the first elementary language was perhaps shared among individuals who were genetically related (Pinker and Bloom, 1990). Says Pinker:

Since much communication is among kin, a linguistic mutant would likely have been understood by some of his or her relatives, and the resulting enhancements in information sharing would possibly have benefited each one of them relative to others who were not related (Pinker and Bloom, 1990).

Once language had achieved its unique foothold in this respect, it is easier to imagine how language would have conferred a unique selective advantage among smaller genetically-related populations relative to other non-linguistically endowed populations. According to University of Cincinnati anthropologist Lynne Schepartz, once a rudimentary language had become further developed, the selective advantages it would have accrued to modern *Homo sapiens* would have been enormous. Says Schepartz:

New language-based social systems with enhanced cooperation and leadership capacities, self-identification and naming, and strategic planning and the division of labor would have enabled

modern Homo sapiens to outcompete linguistically limited archaic populations (Schepartz, 1993).

The Stanford geneticist Luigi Luca Cavalli-Sforza has argued similar implications while even suggesting the emergence of more advanced forms of language as a possible explanation for the mysterious unexplained disappearance of Neanderthal man. Says Cavalli-Sforza:

The average modern human genotype would largely supplant earlier ones if it had individual and group selective advantage conferred by higher communication skills (Cavalli-Sforza, 1989:411).

It also makes it easier to understand the rapid disappearance of Neanderthals, if they were biologically provided with speech of a more modest quality than modern humans (Cavalli-Sforza et al., 1988:6006).

But can scenarios such as these, all by themselves, be enough to explain the intricate complexity, subtlety and power we see in human language? Is this really all that is needed to account for the presence of language today among modern *Homo sapiens?* This of course may be one possibility, but what seems more likely for many reasons is that many of the more complex and intricate design features of language have still yet to be explained. Schepartz and Cavalli-Sforza have provided us with a credible launching pad for the beginnings of a rudimentary proto-language, but it remains uncertain as to whether such a process would have by itself been enough to result in a language as complex as our own. Judging by the skepticism of more than a few linguists, evolutionists, and psychologists, it would appear that most of them would agree. Moreover, the Cavalli-Sforza-Schepartz hypothesis fails to present a unique causal mechanism,

aside from the already mentioned pressure of group selection by means of natural selection, to account for this rapid and highly complex evolutionary development.

V. The Role of Sexual Selection in the Evolution of Human Language

Thus far I have reviewed a number of the most common problems scientists have consistently encountered when trying to understand the origin of our unique ability to use human language. Surprisingly enough, a rather large and significant degree of these problems have revolved not around acceptance of the idea that language has an innate species-specific basis, but around the idea that something as complex as language could ever be reconciled with a mechanism as characteristically so gradual as natural selection. Many of these issues, I have argued, can thankfully be put to rest however through an honest and more educated approach to understanding basic ideas in psychology, linguistics, and evolutionary biology. A significant majority of these skeptical claims include issues that will eventually be resolved not through more rigorous empirical testing or better theory construction, but through better educating people over often very basic misunderstandings of evolution.

Yet, aside from these issues, there are still a great number of questions over the evolution of language that remained unanswered. For example, why has there been so much apparently heated debate and skepticism revolving around the notion that language is simply "too complex" to be explained by evolution? Moreover, what do we really mean when we and others say that language is simply "too complex?" Finally, is there a way to ultimately "reconcile" Darwin and Chomsky with the human brain?

Most people, when confronted with the idea that language has somehow "evolved," find it difficult to understand the adaptive advantage that language could have possibly conferred to our ancestors if our main concerns during early hominid evolution were picking berries, slaughtering game, and mastering the physical environment. Language is "too complex," according to this argument, since it would have been used for little else above assigning division of labor within the community and referring to likely sources of food. After all, even honeybees, the only other species to have a communication system able to even approximate our own, do not have words, syntax, sentences, or any of the other unique design features of human language. Natural selection, a mechanism that typically operates based on an organism's interaction with its physical environment, seems grossly inadequate as a mechanism capable of explaining this change.

University of Michigan anthropologist Robbins Burling has voiced similar concerns. According to Burling, it is more likely that several selective forces were in play during hominid evolution that led up to the current complexity we now see in all modern human languages. Like many Darwinian anthropologists, Burling suggests that most of the selective advantages accrued by language were probably social since it would appear that most of the linguistic abilities necessary for carrying out technological or environmental tasks were probably minimal, at best. Part of the appeal of Burling's proposal is that it focuses primarily on heritable individual differences in linguistic abilities among individuals. The reason the point is so intuitively appealing is because this is exactly what is required by natural selection in order to give rise to evolutionary change. Says Burling:

Selection can occur only when the trait under selection is variable and when some, at least, of its variation is the result of genetic variability. This has to mean that, during the period when the ability to use increasingly complex language was evolving, individuals varied from one another in their inherited capacity for language. To attribute individual differences in language ability to genetic differences violates the egalitarian ideology that most linguists hold dear. Nevertheless, the capacity for language surely did evolve, and it could not have done so without a variable genetic base upon which selection could work. The genetically based differences in linguistic ability, moreover, must have contributed to differential reproductive success (Burling, 1986:4). Burling further continues to propose a mechanism that would have selected in favor of those individuals who were capable of handling a language more complex than most of their contemporaries. Says Burling:

When we look beyond subsistence activities, and consider interpersonal relationships as the primary arena for complex and modulated language, new and different selective mechanisms offer themselves as plausible. In particular, there are two relationships that may have been found quite generally in preurban societies and that, taken together, would give a selective advantage to high language ability. First, leaders are often acknowledged within their community to possess special and admirable linguistic abilities. Second, there is a widespread tendency for high-ranking men to father a larger than average number of children or to raise a larger proportion of their children to maturity. If better speakers become leaders and if leaders raise more children, we have a mechanism that would drive the selection for better linguistic skills (Burling, 1986:8).

The suggestion that the mind and many of its attributes grew during human evolution due to some sort of socially selected pressure is not new. In recent decades, the common consensus

among many primate researchers has been that the transition from monkey brains to ape brains was driven by selection for "Machiavellian intelligence" in order to outsmart, deceive, and manipulate one's social competitors. The anthropologist Robin Dunbar has speculated that large primate brains evolved to cope with large numbers of primate social relationships. He views human language, especially gossip, as an extension of primate grooming behavior that was used to facilitate more effective social relationships.

The proposal that human intelligence evolved largely in response to social rather than ecological or technological challenges eventually reached a consensus among evolutionary psychologists. The idea was immediately appealing to scientists for several reasons, most noteworthy among them being that a so-called "arms-race" for social intelligence looked to be a very promising way to explain the human brain's rapid expansion and evolution. However, the idea that human language arose as a direct result of such an "arms-race" is probably incorrect for several reasons.

First, according to the "Machiavellian intelligence" hypothesis for the origin of human language, humans and other primate species should be predisposed to lie without end, cheat and deceive others with impunity, and rarely if ever convey useful or factual information to any of their competing "rivals." But, we know that this is simply not always the case. Language is at is most useful when it is used at giving us factual and honest information about the natural world. While we are all prone to occasional lies, deceit, mistrust, or just bad information, it is hardly the case that we turn on our heels and scatter anytime anyone has anything potentially useful to say to us. We use language because it is an efficient means of conveying and extracting information, not because it is a good way of fooling our rivals. What seems more likely that while language may have at times been used for occasional treachery or deceit, this is not why we evolved to become

linguistic savants. Second, as has been pointed out by linguist Derek Bickerton among others, is that language of any kind, however primitive, would have made social life enormously more complicated. Says Bickerton:

The people who believe a complicated social life caused language have the right steps in the wrong order. Once lying and tale-bearing became possible, you had a lot more information to store and you had to be able to figure out how accurate it was if you weren't going to be perpetual palsy in your buddies' intrigues (Calvin and Bickerton, 2000:201).

Third, the "Machiavellian intelligence" hypothesis for language origins tells us much about what we share in common with other primate species, but very little about how we are different. No other primate species on the planet has ever developed anything even remotely similar to what we call human language, and indeed, we have been moved to compare our linguistic virtuosity with other species far distant from our own such as ants, bees, and termites. Steven Pinker has remarked, "Language is obviously as different from other animals' communication systems as the elephant's trunk is different from other animals' nostrils (Pinker, 1994:334)." If we are ever to discover how and why the first ancestral hominid ever spoke, we must first determine what makes humans unique and special from all other species in the animal kingdom.

Burling's proposal is unique among those already discussed in that it brings the focus away from natural selection as the sole driving force behind language evolution and suggests that sexual selection may have been just as important a mechanism during the evolution of human language. This is in many ways an important breakthrough as it relieves the burden at least in part from natural selection as the answer that explains all of the unique design features we know about

human language. Moreover, it specifies a unique kind of social selection to arise out of the "Machiavellian intelligence" cognitive arms-race, namely, the most direct form of social selection, sexual selection. As we will see later on, the power and importance of sexual selection I believe has been grossly misrepresented and underestimated as a mechanism in helping us to understand how language evolved.

Burling continues in his discussion to further ask whether there are sufficient grounds for taking these proposed relationships seriously. In turning to his second proposition, Burling cites as evidence the Yanamamo tribe studied specifically by anthropologist Napoleon Chagnon. According to Chagnon, "Headmen, in particular, continue to acquire wives in their later life and tend to produce significantly larger numbers of offspring than other males" (Chagnon and Irons, 1979: 384). Burling further argues that there is a very general tendency in human populations, as indeed in animal populations (see, e.g., Clutton-Brock, Guinness, and Albon 1982), that males vary far more widely than females in the number of offspring they produce. A few [high-status] human males father large numbers of children, while others are excluded from reproduction (Burling, 1986:9).

With regards to Burling's first proposition, there is also a great deal of evidence in support of this claim. The relationship between language ability and leadership or status has been thoroughly documented in a number of widely diverse cultures (Bloch, 1975; Abrahams, 1970; Hart, 1987). Says Harvard ethologist Marc Hauser, "it is clear that one's standing in a group is influenced by verbal loquacity, whether on inner city streets or corporate and governmental organizations" (Hauser, 1999). This relationship is further emphasized in an account given by anthropologist David Turton in describing the people of Mursi of pastoral East Africa. Says Turton:

One does not have to attend many meetings in a particular locality before coming to recognize the more influential men of the area. They are the speakers who are listened to without interruption and whose speeches tend to come toward the end of a debate, not because there is any set order of speakers, but because the very nature of their contributions reduces the need for further discussion (Turton, 1973:173).

Hauser has further shown that this generalization often holds true in primate species other than humans. In his studies of free-ranging vervet monkeys, Hauser has demonstrated that high-ranking individuals are generally more vocal than mid- to low- ranking individuals (Hauser, 1999).

The Harvard neuroanatomist Terrence Deacon has made similar arguments in coming from a comparative ethological analysis of other species. According to Deacon, before we can begin to understand the selective pressures that gave way to human language, we first "need to understand more generally what circumstances tend to produce significant evolutionary changes in communication in other species" (Deacon, 1997). Deacon argues that in many other species, the elaboration of communicative behaviors often occurs within the context of intense sexual selection. This can especially be the case in pair-bonding species such as primates and humans. Says Deacon:

When caring for offspring demands a contribution from both sexes, competing for access to many mates or finding mates with the best physical traits has less of an impact on reproductive output than does direct care of one's mate and offspring. The need to exchange information about parenting ability in similar in each sex, whereas obtaining information about desirable

physical traits is not crucial. Even in species where only one sex is necessary to care for the offspring (typically, but not always, the female), as is the case in the majority of mammals, the opposite sex (typically males) is not freed from the need for maturity and experience (Deacon, 1997: 380).

Deacon's discussion continues further to explain the far-reaching and intricate complexity of many other elaborate forms of animal communication including among them birdsong and human speech. Says Deacon:

Very different constraints and forces of sexual selection influence the evolution of communicative behaviors in species where both males and females must care for and defend their offspring. Because of their common reproductive interests, dual-parenting species tend to form cooperative pairs with strong exclusive (emotional) attachments to one another--pair bonding. Nevertheless, the underlying dynamic of the evolution of communication is the same: where the potential for inaccurate assessment of the other is high, and the potential costs of misjudgment or the advantages of deception are also high (in reproductive terms), communication will tend to be more elaborate and more complex. Pair-bonding species are under pressure to assess the other's physical condition, resource defense capabilities, care-giving abilities, and likely fidelity (Deacon, 1997:383).

Deacon holds that such a situation inevitably gives way to a kind of short-term "runaway" selection process that is eventually stopped once the costs associated with continued elaboration of communication begin to diminish any value of doing a little better than one's competitors. Take, for instance, the elaborate yet cumbersome plumage of a male peacock's tail. After a

point, the reproductive benefits associated with attracting fertile peahens are outweighed by having such a cumbersome and unwieldy rear appendage.

VI. The Evolution of Human Language through Human Sexual Mate Choice

As has already been mentioned, the anthropologist Robbins Burling has not been alone in her contention that many of the most important features of human language were brought about through sexual selection of the evolving human mind. In recent years, a host of prominent linguists, anthropologists, evolutionary psychologists, and language researchers have begun to take this idea more seriously than have the majority of evolutionary scientists in the past. Most noteworthy among them has been the Cambridge linguist John Locke, language researcher Jean-Louis Dessalles, and evolutionary psychologist Geoffrey Miller. Each have taken their own unique vantage points upon the language origins debate and have surprisingly come to find a great deal of common ground with respect to a number of important issues. Their suggestions are additionally provocative and intriguing in the fact that they in many ways compliment and expand upon Burling's ideas first put forth almost two decades prior.

Locke has extended Burling's social status model with additional linguistic evidence, paying attention to the role of what he describes as "verbal plumage" in human sexual relations and mate choice. Locke quotes from a study in which a young African-American man from Los Angeles explains the sexual-competitive functions of language to a visiting linguist:

Yo' rap is your thing…like your personality. Like you kin style on some dude by rappin' better 'n he do. Show 'im up. Outdo him conversation-wise. Or you can rap to a young lady, you

tryin' to impress her, catch her action—you know—get wid her sex-wise." Here we see in just a few concise phrases the boy's allusion to male competition for status and female choice for male displays (Locke, 1998).

Along the similar lines, prominent language researcher Jean-Louis Dessalles has noted that listeners of typically award higher social status to speakers who make relevant, interesting points in conversation. Language may have evolved, according to Dessalles, through social selection driven by these "relevance" displays. Dessalles also notes, in turn, that this may be one of the reasons why people compete to be heard and to offer good ideas and insights when talking or debating in groups. While both Burling and Locke have focused on dramatic public displays of oratorical prowess, Dessalles has focused on the importance of social competition to say interesting things during ordinary smaller-group conversation.

It is likewise intriguing to note linguist Derek Bickerton, who's main views have already been discussed, has remarkably fallen into agreement with many of the arguments presented by the before mentioned linguists. Bickerton, being perhaps one of the staunchest recent advocates in favor natural selection's ability to explain most, if not all, aspects of human language evolution, surprisingly concedes in his book *Lingua ex Machina* that, "Above all it was the attraction of having as a mate someone who got words out (however few) quickly, clearly, and appropriately – as opposed to someone who coughed, hesitated, and said duh-duh-duh." This is quite a confession, especially coming from so prominent an evolutionary language researcher and linguist, when the survivalist theory of evolution -- i.e. that natural selection is the primary shaper and mover -- has for over a century seemed the only scientifically respectable possibility.

Burling, Locke, and Dessalles have all identified important selection pressures that have been neglected in previous theorizing about language evolution. They have shown how language's hidden status and sexual benefits could have driven its evolution. In each of their respective theories, sexual attractiveness depends on social status, which in turn depends on the verbal fluency displayed during interactions with large groups or the intelligent and witty remarks usually demonstrated during small one-to-one conversation.

The importance of linguistic social status coupled with the ordinary use of one-to-one conversation or so-called "verbal courtship" of human mate choice has recently been taken up by senior research fellow Geoffrey Miller at University College in London. According to Miller, as lucidly outlined in his book entitled *The Mating Mind: How Sexual Choice Shaped the Evolution of Human Nature,* the human mind evolved as a kind of software peacock's tail advertising our prospective fitness to potential mates. In the book, Miller cites his contention that sexual selection likely shaped human language both directly through mate choice and indirectly through social status. Miller's primary focus in the book however is in his self-described "verbal courtship" theory of language evolution, largely because it has previously received so little attention.

Evolutionary psychologists have long known that both men and women favor long-term and short-term mating strategies and that they are typically much less discriminating about those partners in which they would like to have a one-night stand. A potential life-long mate, however, in most cases, needs to possess certain qualities before a partner is willing to commit themselves to that person and to their children for the rest of their natural-born lives. It is simply not in our best genetic interest to spend an inordinate amount of time and resources taking an

"experimental" approach to courtship, mating, a life-long commitment, and marriage. In most cases, the most reliable way to "size-up" a person or to find out whether a prospective mate has those qualities that would make them the most promising find, such as good genes, intelligence, resourcefulness, and an ability to care for future offspring, is not through casual observation, but direct interaction and conversation.

Furthermore, says Miller, verbal courtship can be quantified. Says Miller:

Conception of a baby is the evolutionary relevant threshold for success in courtship. [During] the early stages of a sexual relationship…each member of a couple would have uttered about a million words before they conceived any offspring. Each would have talked enough to fill six books the length of this one. From the first meeting to the millionth word, much can go wrong. Personalities clash. Arguments go unresolved. Incompatibilities arise. Both individuals must clear the million-word hurdle before they contribute to the next generation (Miller, 2000:356).

Miller suggests that such a selection pressure may have even already been in place during the very first utterances spoken by our first linguistically endowed hominid ancestors. Says Miller:

When language first evolved, it may have been a ten-word hurdle, or a thousand-word hurdle. But at each step, both individuals were trying to extract, by using the language available to them, as much information as they could. The more talking they did, the more of their minds they revealed. The more verbal courtship revealed, the greater effect sexual selection could have (Miller, 2000:356).

Verbal courtship does not have to be limited to the face-to-face flirtation we experience when trying to charm or entice a prospective mate. According to Miller, verbal courtship can extend its grasp into "anything we say in public that might increase our social status or personal attractiveness in the eyes of potential mates." Says Miller:

Verbal courtship in the broader sense explains why we compete to say interesting, relevant things in groups. Sexual choice permeates human social life, because anything that raises social status tends to improve mating prospects. If a man gains a reputation as an incisive thinker who consistently clarifies group decision-making and mediates social conflicts, his social status and sexual attractiveness increase. If a woman gains a reputation as a great wit and an inventive storyteller, her status and attractiveness increase as well. Public speaking and debate allow individuals to advertise their knowledge, clear thinking, social tact, good judgment, wit, experience, morality, imagination, and self-confidence. Language puts minds on public display, where sexual choice could see them clearly for the first time in evolutionary history (Miller, 2000:357).

In turning to the animal kingdom for a comparative ethological perspective, Miller notes that the only other species, aside from honeybees, to have evolved such elaborate, sophisticated, and detailed forms of communication are animals in which it was especially advantageous to somehow charm or elicit attention from prospective mates. Frogs, birds, and some primate species, such as rhesus monkeys, all at one time or another make use of various solicitation calls in order to attract the attention of potential mates. However, in the case of our early ancestors, the formal structure of language, according to Miller, apparently "evolved in the service of the sexually selected content, rather than as a sexual display in its own right, as bird song did."

Says Miller:

The formal structure of language evolved principally as a medium for conveying ideas and feelings, which tend to attract sexual partners by revealing our personalities and minds. Sexual selection shapes language's content more than its form. Sexual selection need not favor the superficial chatterbox over the Zen master who utters an enlightening and memorable 17-syllable haiku once a day. If it had, we would all resemble people with Williams syndrome, who tend to produce fluent, grammatical, large-vocabulary streams of relatively trite speech.

Miller's point here suggests that for the first time in evolutionary history, at least in the case of our early ancestors, sexual selection shifted focus not so much on animal calls as a sexual display in their own right, but on the specific form and content of those displays. The animal calls of song birds and tree frogs may be just as every bit elaborate and well-nuanced as those sounds produced by human language, but are different in that there can be an almost infinite variety of distinctive *meanings* that are also attached to those sounds. Miller reminds us of this distinction between animal calls and human speech when he repeats that, for us, "What we say is generally more important than how we say it." This is not to say, of course, that some animals do not have their mating calls, their alarm calls, and their other calls for reasons directly related to their immediate survival and reproduction. But only humans, seemingly, have that unique ability and desire to use sounds produced by their mouths and vocal cords whenever they just feeling like "talking."

Miller's detailed account of his "verbal courtship" theory is perhaps most intuitively appealing for the number of ways in which it describes so much about human nature. Approaching language evolution from the standpoint that it was often used to entice and attract our future

partners reveals much as to why, for example, we have the word "azure" in our vocabularies when "blue" seems to work perfectly well. The two words are nearly identical in meaning, and yet, there it is in Roget's Thesaurus. If we approach the evolution of language from the idea that it was used first and foremost as a medium of transferring useful information, it makes it difficult to explain the existence of little anomalies such as "azure" and "blue." Why is there so much apparent redundancy in the human language? If we mean to say that the sky is "blue," why, on occasion, do we use the word "azure?" Why don't we just say, clearly and precisely, exactly what we mean to say in the simplest, most straightforward way possible?

Miller believes that this phenomenon is just another extension of our desire to appear attractive in the eyes of prospective mates. Miller notes that while some of the largest bird repertoires have been estimated at around a thousand distinct calls and that most average primates know up to 5 to 20 distinct calls, the average adult human English-speaker knows some 60,000 words. According to this view, human language is, in many respects, costly, excessive, and luxuriant beyond the demands of ordinary conversation. But how many words do we really need to know getting by with our ordinary, every-day conversation? According to Miller, the most frequent 100 words account for about 60 percent of all conversation. The most frequent 4,000 words account for about 98 percent of conversation. Most pidgin languages, arising when people speaking mutually unintelligible languages are thrown together for the purposes of working and living together, have small vocabularies and minimal grammar, yet suffice for trade, cooperation, and ordinary survival functions. So why, asks Miller, do all mature, natural human languages have at least a hundred times as many words or more? If having a large vocabulary size was important enough for pragmatic considerations, we might not require a more satisfactory answer. Studies of pidgin languages and ordinary day-to-day conversation however have shown this not

to be the case. Many studies have found additionally that vocabulary size has about and 80 percent correlation with general intelligence. Evidence has also found vocabulary size to be one of the most heritable basic personality traits, thought by many researchers to be at least 60 percent genetically heritable. To the extent that intelligence, wittiness, and articulacy, coupled with general overall health and physical attractiveness, resourcefulness, and maybe even having a great sense of humor are all inter-correlated, having a large vocabulary size could indirectly advertise fitness.

This brings us to our final quandary of human language evolution that attempts to explain the differences in verbal ability between the sexes. Miller asks, "If language was sexually selected, why do women have a [generally] higher verbal ability than do men?" According to most models of sexual selection in other species, selection normally predicts that males evolve larger ornaments. If language evolved as a sexual ornament, it seems as if males should have much higher average verbal abilities than women. Most tests of human verbal abilities however, are tests of language comprehension, not tests of language production. "Given a strict male-display, female-choice mating system," says Miller, "we should expect female superiority in language comprehension and male superiority in language production." What this really means, in simpleton terms, is that according to Miller's verbal courtship model, men should be much more inclined to "shoot their mouths off" in many circumstances and to extend their verbal displays often well beyond the boundaries of their understanding. Says Miller:

The fact that men often do not know what they are talking about only shows that the reach of their displays often exceeds their grasp…females should recognize more words, but males should use a larger proportion of their vocabulary in courtship, biasing their speech towards

rarer, more exotic words. In this simple picture, more women might understand what "azure" really means (so they can accurately judge male word use), but more men might actually speak the word "azure" in conversation (even if they think it means "vermilion") (Miller, 2000:376-377).

Most women perform better on standard written vocabulary tests because these tests are biased in favor of language comprehension rather than on creative writing or language expression. Both are apparently two quite distinctive skills and are, according to Miller, biased according to sex. Men are more inclined to showy, ostentatious displays of intelligence and verbosity while women tend more toward discrimating this speech and, as best they can, reading between the lines. Miller further draws attention to the fact that while most books are written by men, women are faster readers and tend to buy more books. Men also give more lectures, ask more questions after lectures, dominate mixed-sex committee discussions, post more e-mail to Internet discussion groups, and sometimes bully women into silence often to make room for their own verbal displays. Says Miller:

To say this is due to patriarchy is to beg the question of the behavior's origin. If men control society, why don't they just shut up and enjoy their supposed prerogatives [and privileged status]? The answer is obvious when you consider sexual competition: men can't be quiet because that would give other men a chance to show off verbally. The ocean of male language that confronts modern women in bookstores, television, newspapers, classrooms, parliaments, and businesses does not necessarily come from a male conspiracy to deny women their voice. It may come from an evolutionary history of sexual selection in which the male motivation to talk was vital to their reproduction (Miller, 2000:376-377).

Considering all of the attention Miller gives toward his thesis that the human mind, language included, evolved as a sort of peacock's tail, it may be somewhat surprising that Miller does, at least in places, discuss the possible role that natural selection may have played during the evolution of language. For example, in pointing to the obvious benefits human language clearly has, not just as a way of attracting partners, but as an important medium of information exchange, Miller takes an obvious step backwards in asserting that most if not all of the mind's attributes can be accounted for by sexual selection. Derek Bickerton, on the other hand, while exalting the power of natural selection to account for human language ability, also concedes that sexual selection clearly must have had just as an equally important role to play. Both scientists, while committed to their own perspectives, seem equally as committed to discovering the facts about how language truly evolved, uncovering palpable leads and evidence, and keeping their minds open to fresh and new ideas.

It is worth pointing out however, that Miller's approach is perhaps most unique and noteworthy in this regard, if for no other reason than it simultaneously tumbles long-cherished dogmas as it opens the door to radically new ways of thinking about the evolution of the human mind. In all likelihood, there is something to be said for both approaches, taking in mind the already established fact that language is perhaps one of the most complex and highly refined skills ever possessed by human beings. Such a trait, it would seem, would undeniably benefit from a more detailed analysis from both perspectives, each paradigm hopefully adding something new, constructive, and worthwhile to this century-old mystery.

VII. Conclusion

While experts will no doubt continue in their debate and skepticism over the proposed origin, evolution, and adaptive importance of human language, it is my hope that more will attempt to review the many ideas and steadily increasing evidence themselves in trying to gain a more informed and educated approach to these difficult problems. It is my hope that in this paper I have persuasively argued that language shows signs of complex design that can only be accounted for by conventional Darwinian processes. In addition, I have argued for a variety of credible selective mechanisms capable of accounting for this design by way of the selective advantage accrued by increasing linguistic ability and competence. It is hoped that many of the ideas presented in this paper will prompt and stir those committed to discovering more about the evolution of language toward a more vigorous empirical research approach, provided of course that they are willing to abandon previous dogmas and discover these ideas on their own.

The debate over the origin and evolution of language continues to be one of the most currently contentious and heated issues within anthropology, linguistics, cognitive science, and evolutionary psychology. More research is clearly needed in the attempt to resolve these questions. Judging by the current state of affairs, it is unlikely to be completely resolved anytime soon. Indeed, it is perhaps more likely that many questions will never be satisfactorily answered being forever shrouded in mystery by the sands of time. We must continue to pursue knowledge of this question, however, as far as it can take us, being that understanding language is such an integral part to that eventual goal of a more complete comprehension and knowing of the mind, human evolution, and those things that have led us to be what we are today.

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