from the maternal calls of our prelinguistic ancestors. However, these are characteristics of speech, not of language. Had evolution proceeded by slightly different steps, language might have emerged with signing as its preferred modality, with speech as a fallback for those with impaired visual systems. Language has two major (along with many minor) distinguishing features that have nothing to do with modality and that persist regardless of the modality chosen: One, it employs referential symbols, and two, it assembles those symbols to form structured wholes. How symbols emerged and how structures emerged are consequently the two most basic questions in language evolution. Falk's work, although useful and thorough, entirely fails to address either of these questions.

Although referential use of symbols is basic even to a structureless protolanguage, Falk gives us no reason for supposing that mother-infant exchanges would have needed any referential content. Reassurance, disapproval, warning, and all the other types of messages required for such exchanges could have been – indeed, most probably were – conveyed by prelinguistic means: a quick grab and/or a quick slap are often preferred even by modern human mothers to "That berry is poisonous, darling, so don't eat it," and are certainly no less swift and efficient. Senseless, soothing sounds work far better at calming a fractious baby than the most persuasive of verbal arguments. Naturally, when language came along, those soothing sound patterns would have been co-opted to form part of the very specialized genre employed by mothers and other caregivers to address infants. There are two developmental histories here, however, not one; that these may now have become linked carries no implications whatsoever for their earlier phases.

We are all continuists nowadays – at least in the sense that nobody worth taking seriously believes that human capacities derive from anything but generally accepted evolutionary processes. The people whom I have called continuists in the past would be better described as genre continuists – they believe, with a certainty sometimes bordering on the dogmatic, that every human capacity developed from a similar prehuman capacity (if language communicates, it must have come from prehuman communication). Why don't they come straight out and deny the existence of exaptation? I see no support for genre continuism in the work of Darwin or any other leading evolutionist, but Falk seems to accept it without questioning either its basis or its antecedents.

Falk claims that "vocalizations of hominin mothers would have taken on less emotional and more pragmatic aspects as their infants matured." How? Why? No reason is given, no description or explanation of the process is offered – it is taken on trust. She claims that "prosodic (and gestural) markings by mothers would have helped early hominin infants to identify the meanings of certain utterances." This totally begs the question. For the infant to identify those meanings, they first had to be there, in mother's utterances. But how did she acquire them? Are we in for an infinite regress? Impossible to say, because the cited remarks in section 3.2.1 constitute virtually the totality of Falk's proposals about how meaning got into language.

In her conclusion, Falk expresses the hope that "readers will consider the ideas developed in this paper as possible alternatives to suggestions that language could not have emerged from an earlier primate communication system." However, those ideas cannot be alternatives because they address only the emergence of the speech modality and not that of language itself. Those of us who reject genre-continuist scenarios do so because none of those scenarios have come anywhere near explaining how symbolic units evolved or how syntactic structure evolved. Frankly, I cannot see why the issues involved should be as opaque as they seem to be.

When the obvious becomes invisible, ideological blinkers are often to blame. Usually it is those who reject genre continuism who are accused of ideology. For instance, in a recent *BBS* commentary, Crawford (2002) stated that our species has "a very strong desire to be special," a desire that "sometimes hinders our attempts to understand our nature." It wouldn't bother me one iota if it turned out that humans were as banal as grasshoppers. However, it remains a fact, not a desire or a conjecture, that humans do have one or two unique adaptations, which include symbolic, referential units and the ability to link these in rule-governed (and potentially infinite) structures. Some of us want to have those adaptations explained – not just explained away. What's so special or ideological about that?

Which came first: Infants learning language or motherese?

Heather Bortfeld

Department of Psychology, Texas A&M University, College Station, TX 77843. **bortfeld@psyc.tamu.edu** **http://people.tamu.edu/~bortfel/**

Abstract: Although *motherese* may facilitate language acquisition, recent findings indicate that not all aspects of motherese are necessary for word recognition and speech segmentation, the building blocks of language learning. Rather, exposure to input that has prosodic, phonological, and statistical consistencies is sufficient to jump-start the learning process. In light of this, the infant-directedness of the input might be considered superfluous, at least insofar as language acquisition is concerned.

A topic of much speculation among researchers who study language acquisition is the observation that caretakers consistently address their infants with a unique tone and manner of voice. This form of speech has come to be known as *infant-directed,* or *motherese.* The apparent universality of this phenomenon only serves to underscore it as (possibly) a key factor in humans' easy passage through the early stages of language learning. Theorizing about the relevance of motherese to language acquisition began years ago (e.g., Ferguson 1964; Fernald 1984), and efforts to causally link the two phenomena have been a fixture in the language-learning literature ever since. In particular, as questions about the underpinnings of infants' remarkable ability to acquire language have become increasingly complex, appeals to universally available "guides" in this process have become increasingly common. Although there is still no consensus about the relative contribution of the way caretakers address infants to the total language-learning toolkit, there is general agreement that this strange way of talking to infants must serve some evolutionary purpose. In her article, Falk addresses a paradox that is often neglected: If motherese evolved to help infants acquire language, how did those who initially produced it learn to speak? The evolution of language itself is perhaps the more appropriate link between motherese and language learning, as suggested by Falk.

Learning to recognize spoken words is a difficult task. Instances of words vary phonetically and acoustically, depending on the discursive, syntactic, and phonological contexts in which they occur. This is in addition to variations introduced by changes in talker identity, speaker affect, and so forth. At the earliest stages, word recognition (e.g., grouping tokens according to type) must be guided by features of the tokens themselves. Although it remains unclear precisely which aspects of the auditory signal initiate recognition, acoustic prominence – an important characteristic of infant-directed speech – is one factor that has been considered influential in jump-starting this process. Data supporting this view indicate that infants generally prefer to listen to acoustically salient speech, where "salient" can mean either affectively or emphatically so. However, my own and others' recent research indicates that when it comes to recognizing a variety of tokens as instances of a particular type (e.g., a specific word), infants are more sensitive to the acoustic similarity among tokens than to their acoustic salience. Infants appear to preserve substantial memory for acoustic detail from one encounter with a word to the next, which in turn guides early word recognition. If word learning were predominantly guided by acoustic prominence, then we should not see this kind of sensitivity to acoustic differences.

Infants face another difficulty when it comes to speech segmentation. In fluent speech, words are not separated by pauses, and the

https://doi.org/10.1017/S0140525X04240110 Published online by Cambridge University Press

cues that may serve to signal word boundaries vary from language to language. Nevertheless, and despite these challenges, normally developing infants begin to succeed at recognizing words in fluent speech as early as 7.5 months of age (Jusczyk & Aslin 1995). This has been attributed, in large part, to caretakers' tendency to repeat content words when addressing their infants. In fact, repetition of the full form of a word is perfectly reasonable – even expected – in speech directed to infants, and this repetition is quite distinct from the reduction to pronominal form that occurs across mentions of content words in adult-directed speech. Although repetition is often listed as one of many characteristics of speech directed to infants, it is generally viewed as subordinate to the prosodic quality of such speech. So although repetition appears to be an important feature in guiding speech segmentation, it is not the aspect of motherese that is most often referred to as influential in language learning. However, as Falk points out, naming is a fundamental aspect of theories on the origin of symbolic categorizing, and so should play an important role in theories of language acquisition.

In other work, my colleagues and I have observed that infants' early recognition of highly familiar words (e.g., their own names) serves to anchor them in the speech stream for subsequent parsing. Our data indicate that not only will 6-month-old infants listen longer to a word previously paired with their own name in fluent speech relative to a word paired with another name, but they do not listen reliably longer to the word that followed another name relative to a nonfamiliarized control word. These findings hold even when infants' first names are replaced in fluent speech with the words "mommy" or "mama" (depending on how an infant's caretaker refers to herself when addressing her infant). This is the youngest age at which speech segmentation has been shown to take place, indicating that infants' recognition of their own names and the names of important others is a basic tool that they can use to break into the speech stream early on.

Both sets of findings reported here are consistent with Falk's analysis. Her observations are an important step toward refocusing the debate about the origins of motherese from one about how infants learn language (in all its complexity) to one about how language itself evolved. Although the relevance of one set of questions to the other should be apparent, there has been a general unwillingness on the part of those who study language acquisition to address the language evolution side of the debate. In avoiding that question, we have missed the most logical link between motherese and language learning. Rather than viewing motherese as a bias on the part of caretakers that has led infants to acquire language, motherese may instead be considered the egg that begat the chicken itself. That is to say, without motherese there would perhaps be no language at all. With this analysis, arguments about the underpinnings of language acquisition come full circle (e.g., back to claims about the origins of language). Falk has mapped out an elegant way of thinking about this problem. One can only hope that it will influence how researchers think about the influence of motherese on language learning.

How plausible is the *motherese* hypothesis?

Paul Bouissac

French Linguistics, University of Toronto-Victoria College, Toronto, Ontario M5S 1K7, Canada. **paul.bouissac@utoronto.ca**
http://www.semioticon.com/Bouissac/Home.htm

Abstract: Falk's hypothesis is attractive and seems to be supported by data from primatology and language acquisition literature. However, this etiological narrative presents a fairly low degree of plausibility, the result of two epistemological fallacies: an implicit reliance on a unilinear model of causality and the explicit belief that ontogeny is homologous to phylogeny. Although this attempt to retrace the early emergence of prelinguistic capacities in hominins falls short of producing a compelling argument, it does call attention to an aspect of linguistic behavior which may indeed have evolved under the pressure of nurturing constraints.

Dean Falk notes in her conclusion that only the invention of the time machine could bring to a close the academic controversies concerning the origin of language. That may be true, but in the meantime we have no choice but to debate the plausibility of various narratives and to construct arguments based on indirect data. The reasoning may appear more or less compelling and the data more or less relevant. It ensues that theories of the origin of language differ by their degree of plausibility within the confines of commonsense logic or "bounded rationality" (Gigerenzer & Selten 2001). The linguists who promote the genetic mutation hypothesis develop an argument by default: It is not because there is yet any direct evidence that this is the case but, rather, because they cannot explain otherwise the apparent ease with which children universally master language in spite of the assumed incompleteness of the input. Those who prefer the gradualist approach, following Darwin's view that evolution proceeds through small changes selected by the environment, look for the steps that may have led to human language either as an emergent phenomenon or as a cumulative process. Dean Falk proposes a narrative of the latter kind. The question is not whether she is right or wrong – because by her own admission there cannot be any definite answer – but what is the degree of plausibility of her *motherese* hypothesis.

Falk's argument is attractive because it locates the origin of language in the mother-child dyad, which is the locus of language transmission among modern humans, but its degree of plausibility is not very high due to questionable epistemological assumptions. First, the argument follows a unilinear model of causality. Looking for a single cause as the source of an event that has consequences for our survival is certainly statistically adaptive. *Homo* has evolved cognitive strategies to locate quickly the origin of disruptions in its environment as the best way to control a potential danger. If the cause is correctly identified, predicting what comes next is usually easier. Wasting time scanning too much information in order to get a complex picture of various factors can be fatal in real life conditions. Scientific inquiry is likewise driven by the urge to identify causes; however, assuming a single cause for each phenomenon is an epistemological fallacy. There are other candidates, in the same order of possible origins of articulate language, such as primate vocalizations with meaningful acoustic variants (Owren et al. 1997; Rendall et al. 1999; Zimmerman et al. 1995) or intensive vocal interactions aimed at courting, pair bonding (Deacon 1997, pp. 385–410), expressing commitments (Silk 2002), and social grooming (Dunbar 1997), which are not mutually exclusive and are equally plausible as adaptive vocal behaviors leading to protolanguage, and which could even be construed as prerequisites for motherese, rather than the reverse as Falk claims. Her argument arbitrarily isolates the mother-child dyad and locates it artificially in relatively safe surroundings. To many, in agreement with Falk, a gradualist hypothesis appears more plausible, if only because the social nature of language makes it unlikely that a single mutation of this importance in a single individual could have been selected. Since simultaneous identical mutations are highly improbable, the proponents of a sudden emergence now tend to favor exaptation as their explanatory principle (Pinker 1994).

This, of course, is not incompatible with Falk's argument, but neither does it mean that a single cause can account for the evolution of language. Moreover, the single point of origin considered by Falk, in spite of its multimodal framework, fails to explain how the most specific properties of human languages such as referentiality and syntax could have developed from these early phatic vocalizations. Invoking bootstrapping to explain the move from phatic to referential communication begs the question if it is not explicitly shown how it may have proceeded, and under which evolutionary constraints. Finally, the use of the term "motherese" is particularly misleading in this context because, in contemporary pragmatics, it applies to the mother's or other adult's ID verbal productions which tend to distort and simplify already fully constituted languages. If motherese presupposes the possession of a

https://doi.org/10.1017/S0140525X04240110 Published online by Cambridge University Press