Title:
Evolutionary Perspectives on Language, Cognition and the Brain

Abstract:
The strength of cognitive neuroscience is that it encompasses a wide diversity of academic disciplines. A full understanding of human cognition requires us to incorporate knowledge and theory derived from these different areas of study. Because our cognition has an evolutionary history, understanding how evolution works – particularly with respect to the co-evolution of brain and behavior – provides an important perspective on our understanding of modern cognition. Evolutionary perspectives in fact place constraints on the ways in which we conceptualize modern cognition: Theories about how modern human cognition works that cannot be clearly grounded in an evolutionary framework are for that reason unlikely to be valid, no matter how well they might seem to fit the data. Understanding the cognitive neuroscience of language is a particularly good example. Language is of course one of the most important behavioral adaptations of the human lineage. Clues to the evolution of language are evident in the fossil endocranial record, particularly when placed in the context of comparative analyses of primate brains. Brain size itself is associated with several important behavioral dimensions central to language: The complexity of the social environment itself, as well as the expected richness of conceptual understanding. Thus, as brain size increased during our evolutionary history, hominins with increasingly interesting and rich conceptual understanding lived in increasingly complex and interactive social environments. Furthermore, it will be argued that aspects of grammar that have been claimed to be universal across languages are more plausibly explained as cultural conventions reflecting shared, deeply-ingrained conceptual understandings about the world. Clues about language evolution are also evident in the endocranial surface in the vicinity of Broca's cap in the left hemisphere, which overlies areas relevant to language processing in modern humans. Asymmetries in this region on fossil endocasts suggest a deep ancestry to enhanced communication in our lineage. Finally, a key question in brain and language evolution involves why Broca's region in particular became co-opted for language, given that it appears to substantially predate the human lineage (and therefore language itself). One hypothesis is that it evolved to pay special attention to any kind of sequential pattern information in the environment. Research probing this hypothesis in humans and great apes will be reviewed and preliminary results discussed.