

Language, brain, culture

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This thematic issue of *Linguistics and the Human Sciences* presents a range of new work exploring relations between language and brain function, a topic of particularly intense interest in the human sciences over the last two and a half decades. While we are very far from being able to observe direct processing of language in the brain, recent work in, for example, archaeology, primatology and neurology, as well as in linguistics itself, has expanded the range of questions that can now be asked within and between disciplines, and greatly increased the sophistication of developmental models. In this issue, development is considered from two perspectives: ontologically, within the timeframe of an individual child's development of language (or difficulty with this development); and phylogenetically, in the evolution of the human species, a perspective which raises intriguing questions about relations between human ability to use language and the abilities of primates to interact symbolically through sound, gesture and graphics. Relations between these two perspectives have particularly interested systemic functional linguists in recent conferences and publications (e.g. Thibault, 2005; Williams and Lukin, 2004).

The papers are also 'developmental' in a third sense: some are written by mature scholars reflecting on the current status of concepts which have been crucial to their research over decades and indicating useful future directions, while others are contributed by younger scholars attracted by new findings in their disciplines and now looking to linguistic theory for an account of language which is able to extend their research.

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Sydney Lamb first suggested 'relational network' theory in 1966 in his seminal work, *Outline of Stratificational Grammar*. In his paper for this issue he provides both a succinct critique of the linguistic and neurological difficulties involved in a 'symbolic' account of how the brain processes language, and a comprehensive argument for the ability of relational network theory to account for language brain function in a way that is both operationally and developmentally plausible. Lamb insists that his model be able to account for both linguistic and neurological data, so it is an unusually comprehensive transdisciplinary argument. He is surely correct in observing how frequently the fact that 'linguistic structure is ... a network of relationships' is overlooked in transdisciplinary research in models of language – brain function.

Clare Painter explores uses of 'protolanguage' in both ontogenetic and phylogenetic research, focusing particularly on the work of Bickerton (e.g. 1990; 1995; Calvin and Bickerton, 2000) and Halliday (e.g. 1975; 2004; also Matthiessen, 2004). She presents a timely clarification of the different explanatory status of protolanguage in formalist and functional theories: timely, because the term is now so widely and variably used in models of language evolution across disciplines. Of particular interest is Painter's critical examination of the assumption that 'language as representation' is primary. Bickerton's assumption of this primacy causes him to conclude that protolanguage is a form quite separate from language despite the fact that use is made of linguistic symbols (because syntax is lacking from protolanguage). Halliday's contrastive position is that both 'representation' (experiential meanings) and 'communication' (interpersonal meanings) are equally significant in language ontogenesis and, by extrapolation, possibly in phylogenesis. In Halliday's account, it is possible to perceive how protolanguage (now differently defined) might evolve into language, including the lexicogrammatical system.

The question of the likely significance of interpersonal meanings in phylogenesis is taken up by young researchers working in archaeology and primatology. The archaeologist Ben Marwick, noting that 'there is very little literature by archaeologists on the evolution of language through the identification of interpersonal systems' extends his previously published 'archaeological narrative of language evolution' (Marwick, 2003) by exploring this dimension of meaning. Marwick suggests that, in fact, interpersonal meanings played a crucial role in phylogenesis, allowing early hominids to coordinate information gathered over a much larger range than that traversed by other species, and thus increasing the predictive quality of options available to group leaders.

The primatologists J. Taglialatela and L. Taglialatela, who are members of a research group led by Sue Savage-Rumbaugh studying the interaction of captive bonobos, consider the ‘conversations’ in which these animals engage, both intra-specifically and inter-specifically in interaction with humans. Taglialatela et al. (2004) had previously shown systematic differences in interactive modalities selected by the bonobo, Kanzi, in response to polar and wh- interrogatives addressed to him. Here, the argument is extended to show that research into the nature of bonobos’ interaction when they are in close proximity, which supplements the better-known ‘broadcast’ or ‘alarm’ call data, indicates that it is both structurally different and clearly the result of learning. Furthermore, it seems to exhibit features of turn-taking and ‘differential responding based on turn-taking.’ There is also evidence that call structure may subtly vary between groups, and in fact be developed through learning within groups, and therefore the significance of a call might only be interpretable by members of the group in which it developed.

The linguist Jessica de Villiers then takes us into the highly complex problem of relations between language and Autism Spectrum Disorder (ASD). Her paper is prospective: she argues that the precise relationship between language and ASD is poorly understood, but that linguistically based discourse analysis has a rich potential to clarify it. Significantly, she indicates the features of the linguistic system which are likely to be the most fruitful to study in the immediate future. She thus opens up possibilities for linguistically-based dialogue in the study of ASD.

Paul Thibault, in the first of a two-part article, asks ‘what kind of account of language and, more broadly, meaning do we need to explain minded, languaged agents and the activities they participate in?’ He extends his recent interest in agency and language by considering the significance for an account of agency of an inherent relation between interpersonal and experiential meanings in a metafunctional account of language. Crucial to his case is the concept of propositional ‘arguability’ (Halliday, 1994).

Iain Davidson’s extensive review discussion of Jackendoff’s *Foundations of Language. Brain, Meaning, Grammar, Evolution* presents an engaging example of a palaeoanthropologist in transdisciplinary dialogue with a linguist, though admittedly a palaeoanthropologist with a deep interest in the evolutionary origins of language (Noble and Davidson, 1996). His review might also be read as itself a ‘dialogic turn’ in discussions of language evolution, since both his and Jackendoff’s theoretical orientations are starkly different from the range of other contributions to this issue. This difference will, I hope, spark further contributions to this journal from scholars working in the human sciences as well as linguistics itself. Interestingly, Davidson takes as his starting-

point Jackendoff's observation that exploration of the evolutionary origins of language can no longer be 'wilfully ignored' within linguistics.

Finally, Robert Munro reviews a text of considerable significance for future research in language-brain relations, inter alia – Bod et al.'s *Probabilistic Linguistics*, which explores the potential of computational modelling and machine learning to represent the systemic properties of language.

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