

BEYOND EVOLUTIONARY PSYCHOLOGY

The nature/nurture question is an age-old problem. *Beyond Evolutionary Psychology* deals with the relation between culture, evolution, psychology, and emotion, based both in the underlying biology, determined by our evolutionary heritage, and in the interaction of our brain with the physical, ecological, and social environment, based in the key property of brain plasticity. Ellis and Solms show how the brain structures that underlie cognition and behaviour relate to each other through developmental processes guided by primary emotional systems. This makes very clear which brain modules are innate or 'hard-wired', and which are 'soft-wired' or determined through environmental interactions. The key finding is that there can be no innate cognitive modules in the neocortex, as this is not possible on both developmental and genetic grounds; in particular, there can be no innate language acquisition device. This is essential reading for students and scholars of evolutionary psychology and evolutionary biology.

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CULTURE AND PSYCHOLOGY

Series Editor

David Matsumoto, *San Francisco State University*

As an increasing number of social scientists come to recognize the pervasive influence of culture on individual human behaviour, it has become imperative for culture to be included as an important variable in all aspects of psychological research, theory, and practice. *Culture and Psychology* is an evolving series of works that brings the study of culture and psychology into a single, unified concept.

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Beyond Evolutionary Psychology
How and Why Neuropsychological Modules Arise

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PREFACE

A profound question regarding brain/behaviour relationships is this: which aspects are innate, that is, are essentially genetically determined, and which are not? That is, which aspects have an initial structure that is genetically determined but rather loosely prescribed at a detailed level, their detailed nature then being precisely determined through developmental processes as a consequence of learning experiences and interaction with the environment? Major disputes have raged around this question, with many linguists supporting Chomsky's proposals concerning the existence of innate language modules in the brain, and with some evolutionary psychologists recently claiming existence of many other innate cognitive modules, even modules for folk psychology, folk biology, and folk physics. An opposing school, largely composed of 'evo-devo' theorists, have strongly denied these claims.

In our view, this dispute can only be resolved through a more detailed consideration of the specific brain structures that are innate in the above sense, thus avoiding sweeping statements about the brain as a whole, as is the common practice. Such detailed consideration must take seriously both neurophysiology and developmental neurobiology, based in epigenetic processes, instead of simply relying on theoretical speculations about the evolutionary origins of behaviour.

We argue that when this is done, a rather clear picture emerges as to which brain structures are innate, or 'hard-wired', and which are not. That is the topic of this book.

The conclusion is to recognize a number of brain modules that are indeed hard-wired, but these modules exclude the whole of the neocortex. If correct, this book shows that the existence of innate language modules and other innate cognitive modules is not biologically plausible. Rather, we argue that any and all cognitive modules must have essentially

developmental origins, based in a genotypic structure that (for example) creates a phenotype that is language-ready but not language-specific. In short, if language functions can be assigned to non-language cortex, as happens, for example, in cases of surgical removal of the left hemisphere in childhood (where the right hemisphere readily takes over the language functions normally assigned to the left) and in congenitally deaf people who acquire sign language (where the visual cortex performs language functions that would normally be assigned to auditory cortex), then there is no such thing as innate language cortex.

Much work is needed to develop the details of this proposal, that is, to identify the specific biological structures and mechanisms that underpin cognition generally, and language specifically. However, we are confident that the framework we outline here will stand the test of time.

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