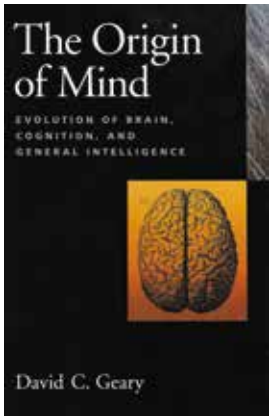


THE ORIGIN OF MIND
DAVID GEARY | 2005

DAVID GEARY

1 BIOLOGICALLY PRIMARY LEARNING

Geary defines primary learning as being a set of skills that are biological in the sense that we have evolved to learn them — without needing to be explicitly taught them and through little conscious effort. These skills are considered to be modular, as each is largely independent of the others. Learning these skills happens when we are very young and without awareness of it happening. As there are no tests that can identify the exact nature or span of such skills, the criterion used is the logic that if such skills are learned easily they must be of this nature.

2 BIOLOGICALLY SECONDARY LEARNING

Geary points out that we have not evolved to learn to write. It doesn't happen spontaneously, as does speaking and listening. As such, writing is classified as being biologically secondary learning. While biologically primary learning is thought to be modular in nature, secondary is thought to operate from a unitary system. It is this system that characterises much of learning in schools. It revolves around the relationship between long-term and working memory — what Sweller later called the human cognitive architecture. This has distinct implications for how we teach children.

TAKE TWO EVOLUTIONARY PSYCHOLOGISTS

David Geary is well known in educational circles due to his association with cognitive load theory. Merlin Donald is not, though he wrote about the role of working memory even before Sweller. Both say powerful things and their theories sit nicely alongside each other. Together they form a narrative that gives meaning to our understanding of cognition.

BIO PRIMARY LEARNING HELPING OUT BIO SECONDARY
Researchers working within the Cognitive Load Theory paradigm, over the last decade, have explained certain results being due to biologically primary learning *giving a hand* to biologically secondary learning. Having no cognitive load, this learning comes *resource-free* so to speak.

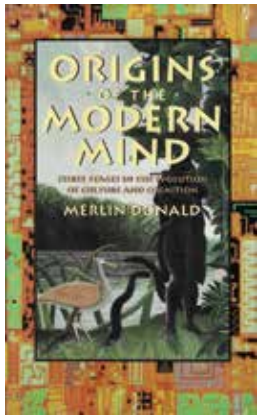
VESTIGES OF PREVIOUS STAGES
Merlind Donald emphasised that, as an evolutionary pattern, earlier stages of cognition didn't disappear when overtaken by the next. Indeed, he tells us that if stripped of symbolic language, we are not equivalents of the archaic hominid mind. Much is familiar to our everyday functioning.

THE EXTENDED MIND
Twenty years ago CLT absorbed developments in other spheres of cognitive science by accepting the existence of cognitive loops across body, objects, others.

EMBODIED COGNITION
"Gestures can support WM processing by temporarily off-loading WM resources normally devoted to internal maintenance of information" Paas & Sweller, 2012

SITUATED COGNITION
"The physical learning environment is considered as a distinct causal factor of cognitive load."
Choi, van Merrienboer & Pass, 2014

DISTRIBUTED COGNITION
"The collective WM concept has an important focus on the learning of individuals in the group."
Kirschner, Sweller, Kirschner, & Zambrano, 2018



ORIGINS OF THE MODERN MIND
MERLIN DONALD | 1991

MERLIN DONALD

1 MIMETIC STAGE

Before spoken language, communication was based on representational acts — mimicry. Thus this was called the Mimetic stage. It was conscious and self-initiated public communication based on a need for social problem-solving that evolved into the next stage.

2 MYTHIC STAGE

Spoken language allowed narratives that went beyond the here and now. Being about the past or future and about places elsewhere, they were, in effect, *myths*. They reconstructed the past and created the future. Gesture combined and enriched this capability.

3 THEORETIC STAGE

This shortest stage had the biggest cognitive impact. Because ideas-as-text could be stored externally, dialogue could last beyond a lifetime. So, knowledge built up, piece by piece. Individuals' visuospatial sketchpads were externalised to contain more ideas.