
Words and sentences form part of the thinking process, and they do so in virtue of both their contents and materiality: their physical existence as encountered and perceptible items. Treating language as real external structure created and maintained by situated niche constructing agents brings together the study of language and thought, and ‘embodied cognitive science’. This work highlights the transformative effects of bodily form, bodily activity and material environmental scaffolding on cognition.

“Cognitive niche” is an animal-built physical structure that transforms problem space(s) in ways that aid thinking and reasoning about some target domain(s). Linguistic activity might be a mode of cognition-enhancing self-stimulation in a system with no ‘Central Meaner’ orchestrating the whole.

Pure translation models of language understanding: Encountered language merely serves to activate complexes of internal states or representations that are the real cognitive workhorses. Public language items are mere vessels to be kicked away once content has been transmitted from person to person.

Alternative view: Language affects cognition even on the short timescale of individual acts of thought and reason. The role (and the power) of spoken or written words and sentences is to provide a new kind of cognitive niche whose features and properties complement but do not need to replicate the basic modes of operation and representation of the biological brain.

The power of added worldly structure (perceptible material symbols): it is the visible, audible or tactile materiality of language that is both its key distinguishing feature and the source of much of its cognitive potency.

Labeling creates for the learner a new realm of perceptible objects - the associated tags (or labels) upon which to target her more basic capacities of statistical and associative learning, altering the computational burdens involved in certain kinds of learning and problem-solving. Symbols provide a new perceptible target for selective attention and thus a new focal point for the control of action (e.g. chimpanzee Sheba and the treats).

Words as constituents of hybrid thoughts: The precise numerical thought is obtained courtesy of the combination of the symbol string of a given language and the appropriate activation of a set of more biologically basic resources.

Words as anchors for thinking about thinking: ‘thinking about thinking’, a distinctively human capacity, directly depends upon language. The process of linguistic formulation of thoughts creates the stable attendable structure to which subsequent thinking can attach. Linguiform reason is a key cognitive tool enabling us to objectify, reflect upon, and hence knowingly engage with, our own thoughts, trains of reasoning, and personal cognitive characters. Language can thus act as a kind of cognitive super-niche: a cognitive niche that allows us to construct an open-ended sequence of new cognitive niches.

Language as complementary to more basic forms of neural processing: Language works not by means of translation into appropriate expressions of ‘Mentalese’ but by a coordination dynamics in which words and structured linguistic encodings act to stabilize and discipline (or ‘anchor’) intrinsically fluid and context-sensitive modes of thought and reason. The fine details of recent context affect recall and representation in fundamental ways. Words and linguistic strings are basic tools to discipline and stabilize dynamic processes of reason and recall.

Linguistic inputs are thus modes of systematic neural manipulation. Words and sentences act as artificial input signals, often (as in self-directed inner speech) entirely self-generated, that nudge fluid natural systems of encoding and representation along reliable and useful trajectories. Language-laden minds are thus able to sculpt and guide their own processes of learning, recall, representation and selective attention. Thus, the symbolic environment can
influence thought and learning both by selectively activating other internal representational resources and by allowing the material symbols themselves, or image-like internal representations of them, to act as additional fulcrums of attention, memory and control.

Thoughts take shape thanks, in part, to the properties of looping into the world via inner rehearsal. Although we can use inner rehearsal simply as a cheap verbal-information preserving loop, it might also function as a stream of self-created inputs that productively drive many other forms of processing. Similarly, gestures during problem-solving do not merely express ideas that are fully present to our verbal reasoning. Rather, the gestures are themselves elements in a loose-knit, distributed representational economy, whose contents might conflict with those of other elements in that same economy. Such conflicts create points of instability that can be productive in moving our reasoning along.