

Enacted Representations

How we make our experience by acting in the world

We are visual creatures, but...

- Consider how touch works
 - active exploration produces a sense of shapes and positions that is not created by static contact
- Could it be the case that vision really works like that too?
- “Perception is not something that happens to us or in us, it is something we do.”

Enacted perception

- “*What we perceive* is determined by *what we do* (or what we know how to do); it is determined by what we are *ready* to do... we enact our perceptual experience: we act it out.” Noe 2004

- “Different sense modalities also display different action-to-stimulation signatures.” (p. 171)
- “Perception is an activity that requires the exercise of knowledge of the ways action affects sensory stimulation.” (Noe, 2007)

Three virtues of the Strong Sensorimotor Model (SSM)

1. Emphasis on skills rather than qualia as determinants of the content of perception.
 1. Tactile Visual Substitution System
2. The fit with predictive learning
 1. motor anticipation
3. Simultaneously do justice to “the idea of an objective mind-independent reality and to the sense in which the world as perceived is the world of a specific type of embodied agent.” p.176
 1. Different bodies imply different perceptual experience

Sensorimotor (Hyper)sensitivity

- SSM is tied too tightly to the specifics of our senses.
- Many (enacted) representations “are geared, tweaked, nuanced to inform reason, selection, comparison, and choice. They thus reflect only the broad outlines of possible kinds of sensorimotor engagements.” (p. 191)

- “... conscious perceptual experience relects the activation of representations that have less to do with the fine details of world-engaging sensorimotor loops and more to do with the need to assign inputs to categories, types and relative locations so as better to sift sort, select, identify, compare, recall, imagine, and reason.” (p. 192)

- “... the perceptual experience of differently embodied animals could, in principle, be identical, not merely similar, to our own.”

but similarly enculturated!

- “We have seen that the own-world of animals is constitutively shaped by the particularities of their means of structural coupling. It is the same for human beings with the enormous difference that the means of structural coupling of humans includes their technical inventions” (Havelange V., Lenay C. & Stewart J. (2003). Les représentations: mémoire externe et objets techniques. *Intellectica* 35, 115-131.)

Pause and Breathe

A lot remains to be learned about Enacted Representations

- Additional investigations
 - more ethnography
 - developmental processes
 - behavioral experiments
 - eye tracking
 - computational modeling
 - brain imaging
 - philosophical implications

Surrogate Situations

External representations

Surrogate situation defined

- Any kind of real-world structure that is used to stand in for or take the place of an aspect of some target situation (pg. 154).
- E.g. Architect’s plan, navigator’s chart, your calendar ...
- Abstractions can be created here
 - (getting distance between the representation and thing that is represented)
- Surrogate situations are pervasive, various, and important
 - (A clear call for more cognitive ethnography)

Place value multiplication

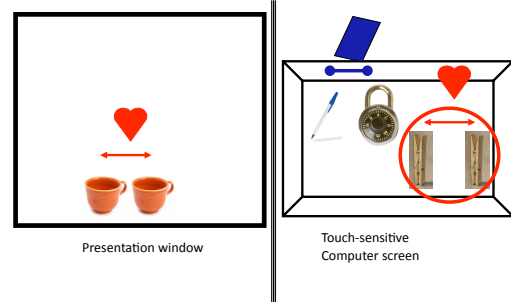
- “Each cycle of this operation involves first creating a representation through manipulation of the environment, then a processing of the (actual physical) representation by means of our well-tuned perceptual apparatus leading to further modification of this representation. By doing this we reduce a very abstract conceptual problem to a series of operations that are very concrete and at which we can become very good...This is real symbol processing and, we are beginning to think, the primary symbol processing that we are able to do.” (Rumelhart, et al., 1986).

Emulator Circuits + Surrogate Situations = abstract thought

- Suppose we engage a surrogate situation using emulator circuits.
- Now we can reason about things that are abstract and absent.
- “The model is it’s own best world”
- “Surrogate situations allow us to build *environmentally extended emulator circuits.*” (pg 156)

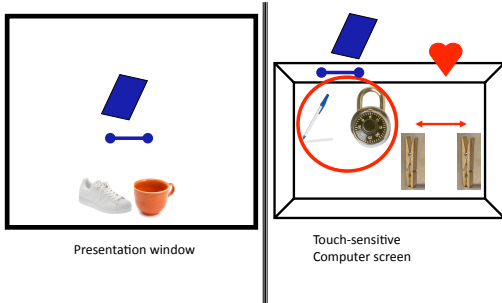
Conceptual Match to Sample:

symbol mediation grounded in enacted representation



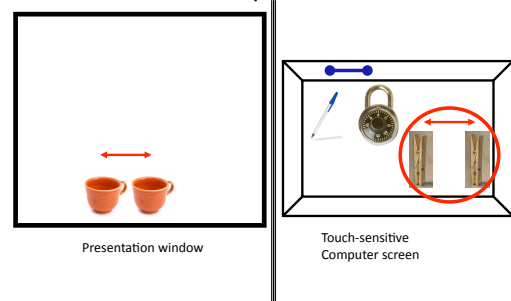
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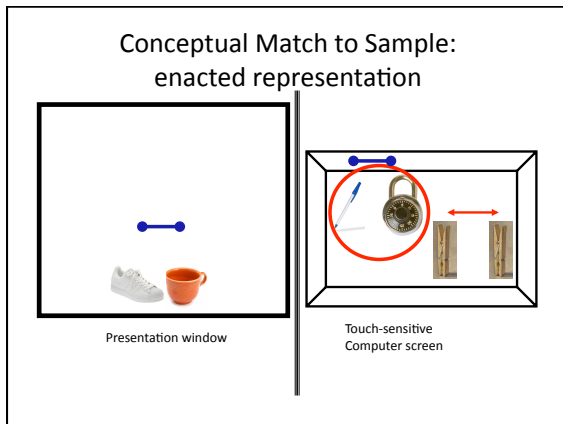
symbol mediation grounded in enacted representation



Conceptual Match to Sample:

enacted representation





Are special neural resources needed to process symbols?

Processing Self-generated information

- Rastrolateral prefrontal cortex (RLPFC) is implicated in evaluating self-generated information.
 - possible moves in a game
 - processing sub-goals in problem solving
 - prospective memory – remembering to do something after a delay

Could this explain relational match-to-sample?

- “the ability to become aware of and explicitly process internal mental states – cognitive as well as emotional – may epitomize human mental abilities and may contribute to the enhanced complexity of thought, action, and social interaction observed in humans”
- (Christoff et al 2003: 1166; StM: 148)

Clark’s hypothesis

- “...there are specific neural innovations that make it possible for some creatures, but not others, to benefit deeply from the ability to associate concrete tokens with abstract relations.
- To use that ability to leverage further abilities (e.g., thinking about higher-order relations) requires capacities (e.g., those involved in the evaluation of internally generated information) that the external scaffolding alone does not provide.” (StM 148)