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Cognitive Catalysis: Sketches for a Time-lagged Brain

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Introduction

Although sketches are often used to communicate ideas to others or to record the progress of a design, their primary and privileged function is to support the user's brain as he or she imagines possible objects. Repeatedly, designers emphasize the extent to which drawing mediates and facilitates their thought. When Bryan Lawson interviewed 11 well-known architects about their working methods, he found that they nearly all used rough freehand sketches to help them get ideas (Lawson 1994). Designers commonly speak of "holding a conversation with a drawing." My colleagues and I had similar responses when as part of a UK government-funded team research project, we interviewed 35 fashion designers about their use of sketches (Makirinne-Crofts et al. 1992).

In a thesis I suggested five ways in which sketches may support design cognition (Fish 1996). I present these functions as hypotheses (Figure 7.1):

Hypothesis 1 (translation of representational type)

Sketches have attributes that make them intermediate between depictive (picture-like) and descriptive (language-like) representations. Such attributes are used to facilitate the bi-directional translation between descriptive and depictive modes of thought.

Hypothesis 2 (inventive or unexpected perceptual retrieval)

Human perception and object recognition processes evolved to enable accidentally impoverished stimuli fast access to long-term memory for perceptual completion. Sketch attributes exploit such unconscious processes,

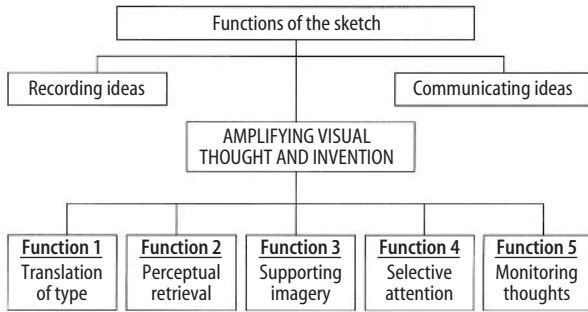


Figure 7.1 Some functions of the sketch.

providing memory search and retrieval cues that improve the availability of tacit visual knowledge for invention.

Hypothesis 3 (support for superimposed mental imagery)

Sketches are percept-memory hybrids. The incomplete, physical attributes of sketches act as a stimulus for percepts that invite completion from memory and imagination. Such properties encourage the generation of transient mental images that, after a matching process, are transformed and spatially superimposed on an internal representation of the sketch.

Hypothesis 4 (selective attention to visual components)

Sketches amplify inventive thought by isolating and representing separately those attributes of visual experience that are of special relevance to a particular task. This amplification assists the user to attend selectively to a limited part of the task, freeing otherwise shared components of cognitive capacity and reducing the complexity of preparatory visual processing.

Hypothesis 5 (conscious monitoring of visual thought)

Sequences of sketching acts support the conscious awareness of one's own cognition. Enhanced awareness assists creativity, providing voluntary control over highly practised mental processes that can otherwise become stereotyped. Unforeseen percepts from untidy or accidental stimuli can elicit unconscious processes which break the mould of habitual thought, while a temporal record of recent ideas makes it easier to change one's mind at appropriate stages.

While it was clear that these cognitive functions were interdependent, I was then embarrassed by the difficulty in finding a single unifying function. Of course, our brains have many modules for independent tasks that are often performed in parallel. So it is possible that the search for a single non-trivial unifying function is vain. Minsky (1985) has suggested that the search for any unified theories of mind is "physics envy." However, physics envy or not, I think I can now see ways by which several of these functions are related in interesting ways. Unfortunately, since the thesis was written, I have discovered two new functions of sketches, so the baffling complexity of our brains is still a major problem. Here I concentrate on showing a connection between the first three functions (Hypotheses 1–3 above).

These hypothetical functions were intended to be compatible with the Baddeley and Hitch model of working memory (Baddeley 1986; Logie 1995).