II.   The Trial and Error Heuristic

Structure in structured problem solving refers to the graphic and verbal heuristics they employ. Trial and Error is an example of an early verbal heuristic. Typically, heuristics do not explicitly involve aspects of brain physiology in their explanation or definition. They came into use as tricks of the trade learned on-the-job or self learned from experience. Their validity arose from results in practice not from considering how the brain thinks. Various problem-solving methodologies have been developed that are based on collections of heuristics proven in practice or accepted on the weight of their plausibility. Specific collections of heuristics distinguish methodologies.

Heuristics can have names and classifications. Trial and error falls under the heuristic to simplify. Consider how it works and its implications of brain activity.

A very common use of trial and error is in recall, such as, recalling a person's name. Consciously stepping through the alphabet one letter at a time, and expecting the subconscious to discover the needed name, is how this works – when it works. It is so highly successful that it is commonly used without concern for how the brain does it. A name may also be recalled using a cue with which it was memorized, such as, an event, another name, a food, etc.

In essence, it appears that each cue voiced in the mind acts as a seed to cause the desired association to be recalled. This discovery has led some to the assumption that the name and its first letter, or an associated cue, constitute a filling system maintained in the brain. While that may be plausible it is not an established model from the laboratories of cognitive scientists. We don't yet know how the brain does it. Nonetheless, seeding is a common heuristic in problem solving.

Separate roles for conscious and subconscious signal processing

An important observation about this simplification heuristic is how it separates activities of the subconscious and conscious in problem solving. It appears that the conscious relies on the subconscious to discover a solution concept following seeding by the conscious. In practice, nearly each cue causes the subconscious to offer one or more trial solutions before the correct association is found. Each trial solution is vetted for correct association before moving on. But, who is doing the vetting? The conscious seemed to have posed the problem because it did not know the answer in the first place. So how can it now know when a trial solution is wrong?

Somewhere in this process the brain discovered it did not remember a particular name. So it decided to use the alphabet heuristic. In my experience, my brain, by this point, has already tried a random seed or two and has not made any progress. It then remembers to use the alphabet heuristic and proceeds to test sequential letter seeds. Hence, a process of using random seeds is tried first and then the brain shifts to testing using organized (logical) seeds, A – Z.

Separation in function and time

The new bilevel model of the brain places conscious and subconscious on different levels. [1] Subconscious exercises random thinking and finds ideas while conscious uses logic with which it voices rational communication of these ideas. It also invokes another finding from the laboratories of modern cognitive science research. Namely, that the conscious lags the

subconscious in comprehension of an idea. The subconscious is aware about 1/3 second before the conscious. Evidently the subconscious randomly proffers a solution concept to the conscious and 1/3 second later, if not rejected, the conscious begins to voice the concept for communication purposes – both internal and external voicing.

The 1/3 second lag is a very long period of time on the scale of subconscious and conscious processing of neuronal activity. With our chemical and physical sensors creating warnings, and other useful information for maintaining our homeostasis, there are thousands of different issues to address. More of them are handled by the subconscious than the conscious while it is busy also translating the neuronal signals of thinking to logical language.

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1. S. Dehaene, 2014, 'Consciousness and the Brain – Deciphering How the Brain Codes Our Thoughts', Viking.