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Behavior Model For Performance Assessment

by

S. Alenka Brown-VanHoozer
Argonne National Laboratory - West
Engineering Division
P. O. Box 2528
Idaho Falls, ID 83403-2528

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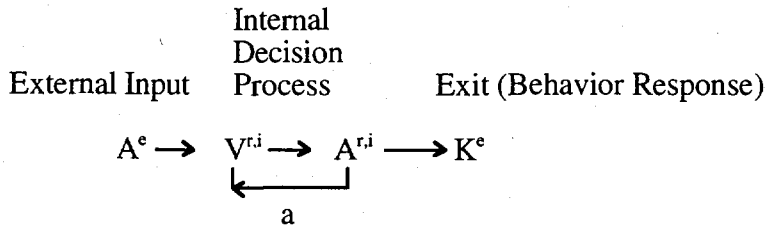
S. Alenka Brown-VanHoozer, Ph.D.
Argonne National Laboratory
Idaho Falls, Idaho
email: alenka@anl.gov

"Every individual channels information differently based on their preference of the sensory modality or representational system (visual auditory or kinesthetic) we tend to favor most (...our primary representational system (PRS)). Therefore, some of us access and store our information primarily visually first, some auditorily, and others kinesthetically (through feel and touch); which in turn establishes our information processing patterns and strategies and external to internal (and subsequently vice versa) experiential language representation, (Brown-VanHoozer et al, 1998)."

Because of the different ways we channel our information, each of us will respond differently to a task - the way we gather and process the external information (input), our response time (process), and the outcome (behavior). Traditional human models of decision making and response time focus on perception, cognitive and motor systems stimulated and influenced by the three sensory modalities, *visual*, *auditory* and *kinesthetic*. For us, these are the building blocks to knowing *how* someone is thinking. Being aware of what is taking place and how to ask questions is essential in assessing performance toward reducing human errors. Existing models give predications based on time values or response times for a particular event, and may be summed and averaged for a generalization of behavior(s). However, by our not establishing a basic understanding of the foundation of how the behavior was prediciated through a decision making strategy process, predicative models are overall inefficient in their analysis of the means by which behavior was generated. What is seen is the end result.

Rosen's Predicative Model, and Card's et al., Model Human Processor (Salvenday, 1997), specify that information flows in discrete sequences leading toward a specific outcome or behavior. Where Rosen's is based on a predicative anticipatory model, Card's is based on stages; both independent of the analog cues that are windows into the thinking process of the individual. For example, a person who responds to a process alarm successfully in a critical context may perform the following strategies:



Where:

A^e is the external alarm input
$V^{r,i}$ is an image retrieved from memory
$A^{r,i}$ is a sound(s) retrieved from memory
K^e is the external response to the decision made based on the comparison between the internal image and remembered sounds.
a is the feedback loop the individual conducts until the sound compliments the the internal remembered image.

These strategies form information bases with which we perform tasks, and design diverse systems. Our conscious awareness of our environment is based on a feedback loop comprised of external sensory input that we assimilate into strategies at the unconscious level, (Brown-VanHoozer et al, 1999). The processes formed from our strategies provide designers the ability to meta model (build a model of a model) the user; thus matching the mental model of the user's with that of the designer's where information shared is neither assumed nor generalized - it is closer to equivocal. This minimizes error through a sharing of each other's model of reality. How to identify individual mental mechanisms or processes, how to organize the individual strategies of these mechanisms into useful patterns, and how to formulate these into models for successful knowledge based outcomes is the goal of all behavior models.

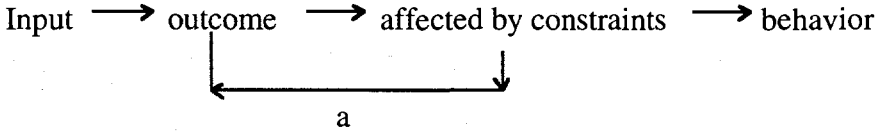
There are techniques in building this foundation which provide a better understanding of how humans learn, make errors and inappropriate decisions, and so on. Card proposes the "rationality principle," where:

Goals + Task + Operators + Inputs + Knowledge Process Limits $\rightarrow$ Behavior

"...which states that a person acts so as to attain goals through rational action, given the structure of the task and inputs of information and bounded by limitations on knowledge and processing ability," (Salvendy, 1997). The terms used lack definition (i.e., "national

action," "processing abilities," "knowledge processing limits,"), and so form a generalization about the behaviors involved in task achievement (or success).

Everything in the cited expression points to process. "Knowledge" is a nominalization which describes the processing of experiences formed by specific strategies and stored in long term memory. "Goals" are obtained through a number of processes that build upon each other and each process is constructed of the basic strategies, visual, auditory and kinesthetic cues. The "task" is performed last, it is the desired outcome (goal) limited by individual, social and neurological constraints. Eventually though leading to the behavior.



Where the feedback loop 'a' is the unconscious actively pursuing a logical outcome toward a specific behavior.

Identifying individual mental mechanisms or processes, organizing the individual strategies of these mechanisms into useful patterns, and formulating these into models for success and knowledge based outcomes is easily done and can be accomplished through the use of neurological cues. Once identified, analog models can be constructed from the cues, tree analysis models developed, and then digitized through such methods as Bayasian concepts or a continuous wavelet transform.

We are intent upon understanding behavior and constructing models from a macro level of understanding, the process. We have yet to accept the fact that we need to understand the 'how' at the micro level of strategy building. Knowing what to observe and how to state questions so as to gather precise information regarding strategies being processed provides the means to refine those models existing today in being more effective in their analysis of human behaviors.

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