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The Psychology of Everyday Things

By Donald A. Norman. New York: Basic Books, 1988. 257 pp. Cloth, $19.95.

For whatever reason consciousness evolved, our awareness of ourselves in our ecological niche would be expected to be experienced as compatible. The industrial revolution challenged this compatibility because many individuals worked and lived in inhumane conditions. The technological revolution provides another (less compelling) challenge to this compatibility. Donald A. Norman's goal is to help relieve feelings of incompatibility by putting the blame on the poor design of everyday things in our environment rather than on ourselves. When we fail to deal appropriately with our environment of water faucets, doors, and VCRs, we usually blame ourselves. Norman demonstrates that much of the blame should be placed on the designer and, in so doing, illustrates once again that psychology is relevant to our everyday life. Theories developed and tested in the laboratory can be used to rationalize behavioral successes and failures in everyday life. Although the book seeks to show that the incompatibility is due to the environment and not the participant, it does not address the reason that we blame ourselves. Perhaps our psychology might also speak to this issue as well as the other.

Norman, a cognitive psychologist, appears to have been drawn to issues of design in his studies of slips of the tongue and slips of action (Norman, 1981). His treatment of performance slips reflects in many ways the growth of thinking in psychology over the last decade or two. At the height of information processing (Neisser, 1967), most explanations of behavior turned inward inside the performer's head. With the influence of Gibson (1979) and his followers, psychologists are looking to the environment for explanations. Thus when we stumble, check first what we stumbled on, and if this is not sufficient explanation, turn to processes in the head—or at least the feet.

In addition to its treatise on applied cognitive psychology, the anecdotes alone qualify this as an engaging self-help book. We all take comfort in the successful engineer who is stumped by a microwave, digital watch, VCR, or even a child's toy. Norman embellishes his presentation with Jaques Carelman's examples of everyday things that are deliberately designed to make us aware of their function. For example, we have all spilled liquid from or had other difficulties with containers of liquid. Carelman designs a coffeepot with the handle and spout on the same side. Norman uses the door to exemplify poor design and to make the case that successful design is possible by making the door's function apparent in the design. None of us sees doors as menacing obstacles, yet we have all experienced difficulties in knowing whether to push or pull and on the right or the left. According to Norman,

this information should be built into a well-designed door. The designer can eliminate much of the ambiguity by the design of the handle. A flat horizontal bar affords only pushing whereas a vertical bar extended further away from the door supposedly affords only pulling. However compatible these designs are, they will not be totally successful unless uniformly standardized. The latter is a remote possibility; we have not been able even to standardize the side of the road for driving. Although, in general, Norman and designers do not want to rely on the written word for specifying appropriate actions, for me, nothing is as successful on doors as the written instruction *push* or *pull*. I find that these tend to be some of the first foreign words I learn on visits to other countries.

What psychological concepts does Norman use to gain insights to the successes and failures of everyday things? His currency includes conceptual models, affordances, constraints, and mappings. A conceptual model is nothing more than a fancy term for the perceiver's representation of the device in question. It is not simply iconic in the sense that its function is also represented. Thus, Carelman's Tandem Convergent bicycle (model for the affianced) is seen as impossible because each cyclist is pedaling towards the other on a three-wheeled cycle. The impossibility of his Tandem Divergent bicycle (model for the divorced) is equally apparent because the cyclists are pedaling away from each other. Devices vary in terms of how much their surface features specify their function. The two dials on Norman's refrigerator appeared to specify separate systems for the fresh food and freezer portions. In fact, the temperature was controlled by a single system with a separate control for the relative proportion of cold air sent to each unit. Without the appropriate conceptual model, it was not possible to set the two compartments at the desired temperatures.

Affordance, made known by J. J. Gibson (1979), refers to how the thing in question should be acted on. Affordances of things are easily made apparent in terms of how young children interact with them. It is difficult to stop a child from kicking or throwing a ball, turning a knob, or jumping on a bed. Luckily, few actions in life are directly afforded—otherwise we would be bored stiff. However, the mundane things in life could be dealt with more easily if their surface properties afforded the appropriate action; for example, a pair of scissors permits fingers to go into the holes. Although not emphasized by Norman, constraints are closely tied to affordances in the sense that the appropriate behavior is specified by the object if it has the appropriate affordances or constraints.

Mapping refers to the relationship between two things. Psychologists are well aware of the importance of stimulus-response mappings. With arbitrary mappings between stimulus and response, increasing the number of alternatives leads to a dramatic increase in task difficulty. Natural stimulus-response mappings, on the other hand, show very little or no increase with increases in the number of alternatives. In many cases, however, the natural mapping is not obvious, or there is no natural mapping. The gearshift levers on my bicycle go in opposite directions for the front and back gears. Thus, I have had to master a higher order rule—the left lever for the pedal gear

shifts forward for lower gear, whereas the right lever for the back wheel gear shifts backward for lower gear. Although the mapping between the direction of the lever movement and the gear change has no natural mapping, having both shift in the same direction should be easier to learn and use.

With this armament, Norman critiques everyday things such as light switches, typewriters, and electronic appliances, and not so everyday things such as nuclear power plants. Yes, this may be common sense but it is good common sense and not so common before explicitly analyzed. Thus, I am not impressed when people remark that some observation is obvious and, when I have a chance, I relate Borromini's experience in Renaissance Florence. Borromini offered a design for the roof of the Duomo, which had remained uncovered for decades because of an inadequate design. The town fathers refused to grant the commission until they had seen the plans. Borromini did not want to reveal his design because he knew that, once revealed, it would seem obvious. The town fathers would not be obliged to grant Borromini the commission for an obvious solution. Borromini explained with the challenge, "I can stand an egg on end." Faced with a skeptical audience, he proceeded to do so by squashing one end just enough to stand the egg upright. Many remarked that they could have done similarly, and Borromini's point was established. The commission was granted, and the Duomo has been covered to this day.

Norman's formula for improving the quality of everyday things is user-centered design. He discusses seven principles for good design or transforming difficult tasks into simple ones (I would say simpler): (a) Exploit knowledge in the world as well as in the head. The user should be able to see or call up important functions with the minimal amount of memory. (b) The task should be simplified as much as possible. (c) The user should see what is happening. Norman says that "the easiest way to make things understandable is to use graphics or pictures." However, many pictures are useless without words. (d) Natural mappings should be used. (e) The appropriate actions should be constrained as much as possible. Lego toys are a good example of constraints—in many cases, there is just one solution for the placement of a given piece. (f) The system should be designed to handle errors. (g) Standardization works and should be used if possible.

Good design will not remove the difficulties and challenges of everyday life. As members of *Homo curiousitus*, we seek out challenging and difficult puzzles to solve. Good design of everyday things will give us more time to confront things in a more meaningful and fulfilling way.

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