REVIEW ESSAY: EMOTIONAL DESIGN by DONALD A. NORMAN

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John Mueller
mueller@ucalgary.ca
University of Calgary

Norman, D. A. **Emotional Design: Why We Love (Or Hate) Everyday Things** (Book).
New York: Basic Books, 2004, 257 pages (cloth) $40.00 (Cdn., at Chapters.ca) ISBN 0-465-05135-9

Norman, Donald A. don@jnd.org
URL: http://www.jnd.org/, Donald Norman's home page

Emotional Design (2004) is the fourth book by Norman on the engaging topic of "everyday things." Previously in this series we find:

- The Invisible Computer (1998), reviewed here,
- Things That Make Us Smart (1993), and
- The Design of Everyday Things (1990)

The previous books do not need to be read to appreciate "Emotional Design," but that would enrich the feeling of synthesis that is reached in the fourth volume. Norman's past efforts have focused largely on long neglected usability issues, but now his work moves to combine functionality with aesthetics, and with rational explanation. Norman describes his personal journey in the final chapter on "Personal Reflections." I recommend that chapter be read first, as an orientation for newcomers to the everyday-things series, or as refresher for those who have read the earlier volumes.

To some extent, this book seems an effective rebuttal to what I will call the cognitive conceit, the primacy of cognitive processing. Cognition has commonly been pitted against emotion, by lay people and academics. That is, the intellect has been assumed to be capable of dominating emotion in a mature adult, with emotional displays being "immature". In this view, emotions are just a distraction to be overcome. It seems to me that most psychology books make a token bow to instincts, reflexes, and the like, but then quickly rush on and assume that the combination of the environment and the intellect can trump heredity. However, in the past decade, modern cognitive science research has demonstrated that cognition and affective processing truly are interwoven and inseparable, and that in many respects the affective reaction establishes priorities. Everything has a cognitive component, to assign meaning, and an affective component, to assign value. Therefore, the manifestation of the two in behavior (functionality) means that good product design must accomodate the integration of affective, behavioral, and cognitive reactions. Norman's previous volumes have focused on usability, the behavioral manifestation, whereas this volume addresses the impact, even the primacy, of affective reactions.

Norman briefly illustrates the working of these three design aspects as they have been applied to movies by Boorstin (1990), but they apply to products in general. The key characteristics of the affective, behavioral, and cognitive components are summarized in the following table.

THREE ASPECTS OF PRODUCT DESIGN

VISCERAL DESIGN: Do we like or dislike the object?

- Affective response, emotion.
- Dichotomous:

  good - bad
  safe - dangerous
  pretty - ugly

- Triggered by appearance: sight, sound, smell, feel, etc.
- Fast, automatic, unconscious, inalterable; prewired part of the brain
- People very similar (albeit individual differences in magnitude)
- The "wow" factor: not just "eye candy"
- Includes feelings of self: that (product) "is (is not) me"

BEHAVIORAL DESIGN: The pleasure and effectiveness of use.

- Triggered by the visceral response, "good" vs. "bad"
- "Bad" leads to muscle tensing, "escape" syndrome
- "Good" leads to enhanced productivity
- Not conscious -- good tools are "invisible," the "flow"
- Somewhat sensitive to experiences and education
- Three facets: function, performance, usability
- Iterative testing can benefit only here

COGNITIVE/REFLECTIVE DESIGN: The intellectualization and rationalization of a choice.

- Understanding the product
- The pride of ownership, integration into self image
- Can moderate the behavioral reactions, but not really the affective
- Most sensitive to experiences and education
- Most vulnerable to cultural variability

Experience starts with affective processing

Temporally, the affective reaction precedes cognitive analysis (e.g., Zajonc, 1980). This affective response is a value judgment which seems to function as a survival reaction, essentially "safe or not safe," and we have become very adept at this initial classification. Nature does visceral (emotional) design and we are very well tuned to utilize strong emotional signals; they occur automatically and have unavoidable consequences. These affective reactions are genetically programmed: things associated with food, warmth, and familiarity (e.g., Zajonc, 1968), for example, yield positive affect ("safe"), whereas things associated with heights, sudden changes, extreme events, crowding, and foul odors, for example, yield negative affect (potentially "danger").

If a negative reaction occurs to a product's appearance, that leads to narrow thinking, focused on details. The down side of such restricted cue utilization has been examined for nearly 50 years (e.g., Easterbrook, 1959; Kausler & Trapp, 1960). The best result of such focusing may be the ability to focus on details and not be distracted until the negative affect is resolved. Although this may be a good strategy for escaping "danger," it handicaps creative thinking and problem solving. However, if a

positive reaction occurs, people feel good and recent research has established that positive affect encourages creative thinking (e.g., Fredrickson & Joiner, 2002, Isen, 2004).

Historically it was assumed that artistic merit was independent of productivity and functionality and engineers certainly promoted this position! Cool designs were acceptable for the New York Museum of Modern Art perhaps, such as the 1960s Jaguar XKE, but it was assumed that somehow beauty was achieved at the price of functionality, durability, or something more pragmatic. However, research such as Isen's now actually shows the contrary: attractive things are perceived as easier to use, and attractive things do work better. Because of this, product designers may even get away with some usability lapses if the product is appealing or fun to use. At last, a confirmed role for the "warm fuzzies" and beauty!

Affective responses are triggered by many **perceptual features** of appearance, for example, visual, auditory, olfactory, or tactile features. Visual appeal may be the most obvious, such as in the various iterations of the iMac's design and the old XKE or the new Mini Cooper, but other senses can also play a part. For example, sounds can evoke pleasure, as when your cellphone produces your favorite signal (although it is then shared with bystanders who may not value it the same way!), or the sound of a Harley motorcycle. However, sound can also be mere noise pollution (e.g., background sounds in public places such as airports), with the result that the dominant affective reaction is annoyance or actually stressful. Some products have even been scrupulously designed to create pleasant sounds when in operation, such as the Segway personal transporter which actually tries to make "music" rather than noise when in operation (p. 120).

However, some affective responses do not derive from such raw perceptual components, yet these may be just as powerful. These typically have their roots in various forms of "**cognitive models**," that is, a construct from inside the person rather than sensory input from the outside. When the product contradicts the expectations inherent in the cognitive model, the user experiences negative affect. The negative reaction occurs because the failure of the model constitutes a violation of "trust" -- the familiar or expected is replaced by something strange. Of course, when the product matches the cognitive model, the result is satisfaction, thus good product design would attend to what the user expects to happen next. It is the user's cognitive model that is key here, not the designer's.

A particular type of cognitive model follows from the persistent tendency for humans to **anthropomorphize,** that is, to attribute human qualities to inanimate objects. Rational or not, we tend to interpret the actions of a device in terms that would be appropriate to describe a human coworker doing the task, and when it does not work that way we are upset. Psychology has tried for over a century to work around anthropomorphism, and engineers would surely dismiss it altogether. However, the fact remains: we anthropomorphize, and good product designers cannot dismiss this human trait, they must deal with it. As Norman discusses, the anthropomorphism problem is, and will continue to be, particularly acute in the development and acceptance of robots, but it can appear any time a human interacts with something else.

Another special class of cognitive model is the **self image**. If a product looks to be a good match with how we see ourselves, or how we would like to be, it evokes pleasure and a desire to purchase. However, if it doesn't match the affective reaction can be quite negative. Given that this cognitive model will be different from one person to another, it is difficult for a product to be designed generically to fit all such self images. Instead, designers might draw on the possibility that a self image may be shared somewhat with others, for example, one's self image as a runner may be involved in choosing shoes that other runners wear, or a self image as a gourmet may be involved where one decides to be seen grocery shopping. The group stereotypes are cognitive models, and although they are not really as specific as one's self image it may be a reasonable compromise for mass market designing.

How can a product for the masses be made "**personal**"? Customizing doesn't really do it. That is, the option to get a particular color and fabric is still not "me." Fortunately, as Norman (2004) says, "we are all designers" (p. 213). Over time and with continued use, we come to value certain products as special. They have served us well, we understand these tools because extended use produces a very well-developed cognitive model. As a result, disappointment seldom occurs, and we tolerate or discount things that may have been issues early on. Our f**avorite things** are special and evoke positive affect when we use

them. As Norman (2004) notes, the trick for designers in addressing this aspect is to make products that degrade slowly and gracefully (p. 221).

Questions remain, such as "How do you design a product so that it is effective for both needs, focused processing and creative thinking?" Real products involve continual conflicts among the three levels. However, even simple awareness of the three aspects by product designers would be an improvement over leaving things to the engineers. At best, engineers think they need to address functionality alone. Ironically, they seldom watch actual users or customers, so true usability often is not optimized. As Norman (2004) notes, watching users is important, because they are not often effective at expressing their concerns and needs (p. 72). For example, engineers would not have considered cup holders important for cars, but in hindsight this feature resonates emotionally with consumers. One assumes consumers are also limited in their capacity to expresses their likes, given the unconscious nature of the affective responses, with good affective design also more apparent with the benefit of hindsight.

In the final analysis, the major reason for attending to all three aspects of design is that aesthetically pleasing objects often help you work better. However, balancing all three design aspects is a true challenge. Good behavioral design alone will not assure a product's appeal and acceptance, and good affective design is not reducible to just marketing. Like all the books in the everyday-things series, this one is highly readable, it provides much food for thought, and it should satisfy a wide readership.

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Author Note

John Mueller is a Professor in the Applied Psychology Division at the University of Calgary. His interests include cognitive psychology, affect and learning, computers and learning, and academic freedom. He can be contacted through e-mail at mueller@ucalgary.ca.. His web site address is http://mueller.educ.ucalgary.ca/