Design for Stress

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by Daniel Formosa

I t happens all too often. Poorly designed products and interfaces cause anger and stress, or worse, are misunderstood and misused when people are under stress. Daniel Formosa reveals the sources of these problems and analyzes how, when professionals expand their understanding of design and emotion to include stress, problems are reduced at the same time that safety and reliability are enhanced.

In a scene from the 1989 film “The War of the Roses,” the Christmas tree in a feuding couple’s living room catches fire (as they tend to do at times). Oliver Rose, played by Michael Douglas, runs for the household fire extinguisher and, in his socks on the wooden floor, slides into the burning room. Fumbling with the extinguisher, tree and drapes now ablaze, he resorts to the instruction label, shouting frantically and reading aloud from the top: “One: Store in a cool place.”

In an emergency, priorities change. But do we, as designers, know how or what to do about it? Suggest the topic of design and stress to any design group and the first reaction will be “Oh yeah—we’re under a lot.” While I’m sympathetic to these feelings, the topic of this article is design for stress. This is an age of impatience and urgency, and stress affects people’s reactions when they’re dealing with products and interfaces. Most of the time, this is just an annoyance, but in other cases, it’s literally a matter of life and death.

Investigations into this and other human aspects of design are relevant to design’s future and part of an even bigger issue: Design as a profession is becoming less about the object and more about the person. Technology has reached a stage at which many products boast virtually identical features and capabilities. In many cases, the defining difference between two products is not the underlying technology, but the connection the product makes with the individual user. That’s why understanding people—really understanding people—is the next frontier.
It’s not just a matter of marketing; companies need to know more about human issues—physical, as well as psychological; social, as well as tribal. Design teams therefore need to know more and more about people. Playing to a deeper understanding than ever before, designers need to translate their knowledge into meaningful products and services. This presents both a challenge and a tremendous opportunity.

Stress is one aspect of human existence that urgently needs attention. Although it’s not a new phenomenon, stress at all levels is more pervasive than ever in our day-to-day lives. Relative to design, stress can be considered in two ways:

1) Products or interfaces may be operated by people who already are under stress. The solution depends on our ability to design products that will be used correctly, even by people who may be experiencing the symptoms of stress.

2) Products themselves can cause or contribute to stress—a consequence of poor design in the product, the interface, or the environment in which it’s used.

These two factors are not mutually exclusive. When encountered by people already under stress, products that would otherwise have been reasonably usable can be deemed poorly designed. And, of course, poor design can exacerbate stress. For users under stress, the rules of design are different. Anticipating and accommodating stress requires an understanding of its causes and its effects on our physical and cognitive processes.

The causes of stress

Simply defined, stress is an internal response that occurs when a demand on a person exceeds that person’s capability. Stress can surface in situations ranging from minor events to emergencies. Some people become anxious just using a digital camera for the first time, and we’ve all seen people give up trying to use a product, sometimes after a surprisingly short attempt. In the life-or-death category, plane-crash investigations often point to overreaction by the pilot following what might otherwise be a recoverable problem. The FAA’s report on American Airline’s flight 587, in which the plane’s rudder snapped, suggests that the panicking pilot moved the rudder back and forth sharply following an initial bout with turbulence. While these examples represent two extremes, stress lies at the root of both.

Examples of stressful encounters, in ascending order of seriousness, are listed below. But even here, situations vary as do individual abilities to cope.

- Day-to-day stress (being late for work, technophobia, a crying child, financial concerns, and so forth)
- Job-related responsibilities (deadlines, performance reviews, promotions, peer pressure, and so forth)
- High-stress job requirements (as with firefighters, air traffic controllers, medical personnel, and the like)
- Minor medical problems (which would include dealing with moderate-to-serious but recoverable problems, such as a scraped knee, twisted ankle, or broken bone)
- More serious health-related or life-threatening emergencies (accident, fire, assault, as examples)

The effect

Stress affects our ability to perform. In certain circumstances, a rush of adrenaline may heighten our senses and shorten our reaction times. We have all had personal experiences during which an increase of adrenaline seems to have pushed us to perform.

More commonly, stress can be overwhelming, causing our thought processes and physical performance to deteriorate. It can bring about loss of concentration, haste, and mistakes. In situations in which the consequences of failure are great, the level of stress can be correspondingly higher, creating an even more serious and escalating problem.

Human reactions while under stress are not entirely unpredictable. Instinct, or “imprinting”
that may have been instilled through training or experience at an early age, can affect our reactions years later. Childhood experiences, even many decades old, can have an influence on our thoughts and actions regarding products we encounter today. Some of these experiences may be common to many of us. Some, however, may vary by individual and therefore seem more erratic.

**Contributors to stress**

Design related contributors to stress are abundant, stemming from:

- An increased reliance on electronic equipment in all areas of life. Most important are areas in which failure can have dire consequences. These can include security devices, healthcare devices, and transportation.
- The emerging reliance on home healthcare products, with consumers assuming increasing responsibility for their personal medications, health monitoring, or treatment. Again, “failure” can have its costs.
- Technology overload. The fact that technology has become relatively inexpensive has also caused it to be pervasive, creating technical encounters in all areas of daily life. Complex interfaces often require fresh education in things we previously knew how to do. Turning on a television in someone else’s house (or even your own, for that matter) can be mind-boggling. A cumulative effect, the combination of several minor annoyances throughout the day, can readily occur.

**Usability hierarchy**

The design of products, interfaces, and environments can have an aggravating or a calming effect, becoming either part of the problem or part of the solution.

Studying people and the usability of products and interfaces for many products in many product categories, I identified and grouped the numerous influencers into a Usability Hierarchy (see diagram below). These are the influences (strongest to weakest) affecting people’s thoughts and actions when they are performing tasks. This hierarchy exists in all activities, including day-to-day responsibilities, but it is most critical to understand in cases in which people acting under duress may be putting themselves or others at risk. Anxiety, adrenaline, a need to act quickly, rushed thought processes, and other stress factors can naturally lead people to respond according to these principles. Starting with instinct, the influencers at top are strongest and will work to override the ones below.

**Instinct**

People under duress react to stimuli by instinct. Our instincts are the instructions embedded in our brains that were either present at birth or imprinted at an early age. Many day-to-day examples of irrational behavior can be attributed to instinct. For example, we all know that, even when you’re in a hurry, pressing an elevator button repeatedly does very little to speed up the elevator. Still, it’s an unavoidable impulse.

Possibly more serious, a rudder lever on a sailboat needs to be pushed left to turn right, a nonintuitive movement commonly opposed by forces in the brain lying somewhere between instinct and preconception. This can lead to unintentional boat-bumping by novice sailors, with consequences that can range from harmless to serious.

**Preconceptions**

People next act according to preconceptions. These learned expectations can be based on
past experiences with a similar (or even a dis-similar) product or interface. Preconceptions are strong drivers of behavior and are difficult to overcome. The preconceptions category includes such factors as the way we expect something will work, the reasons we believe something just happened, or what we believe will happen “if I do this.” For example, when a user presses a button on a touch panel—at an ATM, for instance—a delayed reaction in the interface can cause the user to try pressing harder a second time—something one might attempt on a mechanical button such as a doorknob. When the display finally reacts, not a result of, but coincident to, pressing harder, that person will continue to press hard every time.

Physical design cues
Physical shapes carry meanings, and we’ve learned through years of experience to process these meanings quickly. The shape of a door handle, for instance, may communicate “pull” as opposed to “push,” causing people to act accordingly—more often than not, it seems, in error.

Graphic symbols, colors, and simple words
At the next level of impact are colors or graphics printed on the product. These can have primary, secondary, or even tertiary meanings. Red, for example, typically indicates danger, something bad, stop, or some other blood-inspired warning. Emergency call boxes on the streets of New York City incorporate a red button with a flame symbol for the fire department, and a blue button with a shield symbol for the police. The colors relate to the colors of the vehicles used by each department and, even more basically, help to convey messages of fire and safety associated with the two symbols.

Complex graphics or text
Depending on the product, graphics in this category may be molded into the product, printed on the product, or attached as a label. They are less effective in that they take more time to visually process. They are also typically smaller in size, more detailed, and if molded, low in contrast, thus commanding less attention. In descending order of success at communicating are pictograms (complex graphic symbols), words, sentences, and paragraphs. To highlight this point, consider the Heimlich maneuver poster displayed in restaurants to help choking victims. In an emergency, the illustrations communicate much more quickly than the text—a fact greatly appreciated, no doubt, by the choking victim.

Diagrams on the Heimlich choking poster communicate much more readily than the text—a point appreciated, no doubt, by choking restaurant patrons.
**Read-Me-First guides**
These are great to have, but even when they’re well designed, many of us ignore them. They are also easily lost.

**Instruction manuals**
Manuals are often avoided, and they are also easily lost or not readily accessible when they’re needed. Instruction manuals seem to be a last resort.

The first three items in the Usability Hierarchy—instinct, preconceptions, and physical design cues—work in our favor by allowing products to be self-evident. This is an ultimate goal. Self-evident products reduce or eliminate learning curves, reduce errors, are less intimidating, increase satisfaction, and deliver many positive feelings, including confidence and empowerment. However, instinct and preconceptions dominate, and both are unfortunately out of our control as designers. Our most effective element is physical design, but it is incumbent upon us to remember that even the best physical design cues will take a back seat, logically or illogically, to instinct and preconceptions.

The next two categories—graphic symbols, colors, and simple words; and complex graphics or text—command the next level of attention. Symbols, colors, and simple words, when well designed or well written, can be readily identifiable and communicate quickly. As you would expect, as graphic complexity or meaning increases, more processing time is required by the user. Complex graphics can sometimes be misinterpreted. Text can be less effective—or useless, to people who don’t speak that language.

The final categories, read-me-first guides and instruction manuals, need no explanation because we are probably all familiar with a tendency to avoid them at all costs. There is simply too much information overload in our lives for a manufacturer or design group to be able to rely on manuals. Products need to be well designed, adhering to the principles of design appearing much higher on the Usability Hierarchy.

Other resources, such as calling an 800 number or asking a co-worker or friend for assistance, may also be added to the list. The position of these two alternatives on the list may depend on the specific circumstances and availability. Calling an 800 number, for most manufacturers, is not an elegant solution—not because it may not solve a problem, but because the cost of a single 800 number call can equal or exceed the profit the manufacturer made on the product in the first place. And asking a co-worker or friend for help, as we all know from experience, can have mixed results.

**The designer’s responsibility**
Although all the influences in the hierarchy are important, the sequence needs to be well understood when designing for stressful situations. While instinctive products are the ultimate goal, reliance on instinct may not always be possible. Instinct may not exist for certain tasks that we are asking people to perform, especially if the task is inherently complicated.

Designing to accommodate preconceptions can be difficult. Preconceptions are not universal; therefore they are often hard to predict. Preconceptions are often based on an individual’s past experiences, as opposed to the experiences of everybody else. They are often the cause for many of the more irrational or unexplainable actions we see people attempt when trying to use a product. For example, when taking a sick child’s temperature, shaking a digital thermometer before use—a holdover for some people from the days of mercury thermometers—doesn’t do a thing, positive or negative.

Physical design cues are the highest influencer in the hierar-
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It is the responsibility of the design profession to act now, embrace change, and realize that the person—the next frontier—should be our new focus. Most discussions on “design and emotion” refer to immediate marketing goals, with the purpose of creating a desire to buy and use a product. Our knowledge of design and emotion needs to be expanded.

A better understanding of design and stress can reduce the amount of stress in our lives while improving products, reliability, and safety. As design professionals, we should work to understand and even predict people’s reactions under these circumstances. With the move toward design becoming more about people, the profession that truly understands people will own design—whether or not they are designers. Failure to respond will relegate designers to the role of technicians following directions determined by professionals in other fields.

It is the responsibility of the design profession to understand the relationship between design and stress, along with numerous other aspects of human psychology and behavior. ■

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