

The Cognitive Psychology of Design and the Brain

WHITE PAPER

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Introduction

This paper discusses everything about cognitive psychology of human behavior and its impact on curating design and user experience. Why we do the things we do and think the way we think? What biases we bring to the table? And just how we perceive the planet around us?



Figure 1: Dierk Schaefer. CC BY 2.0.

As humans, we have an underlying “blueprint” for how we perceive and process the world around us, and the study of cognitive psychology helps us define this blueprint. As designers, we can leverage psychology to develop more intuitive and human-centered products in addition to experiences. Instead of forcing users to conform to the design of a product or experience, we can use some key principles from psychology as a guide for designing based on how people are.

The intersection of psychology and design is extensive. There’s an endless list of principles and theories that occupy this space, but there are a few that are more ubiquitous than others. This paper includes the principles of aesthetic and behavioral experience based on the studies of the brain and neurological research, which are useful as a systematic way of thinking about different ways to make your own designs more persuasive. Mostly, these principles are not detailed enough to serve as prescriptive design guidelines. Also, not all the principles will apply to all design problems.

Let’s look at what these are and where they are effectively leveraged by products and experiences we interact with every day.

Understanding the Brain

Our brains are a central processing unit for everything we do. The brain is the organ in our bodies that most directly controls our thoughts, emotions, and motivations (Gloor, 1997; Rockland, 2000; Shepherd, 1998). The exploration of the brain starts with the anatomy of the brain and the localization of different brain functions.

“When thinking about design, consider what parts of your brain are being affected.”

In the 1960s, American neuroscientist Paul MacLean formulated the 'Triune Brain' model, which is based on the division of the human brain into three distinct regions and is in the forebrain region. MacLean's model suggests the human brain is organized into a hierarchy, which itself is based on an evolutionary view of brain development. The three regions are as follows:

1. Reptilian or Primal Brain (Basal Ganglia)
2. Paleomammalian or Emotional Brain (Limbic System)
3. Neomammalian or Rational Brain (Neocortex)

According to MacLean, the hierarchical organization of the human brain represents the gradual acquisition of the brain structures through evolution. The triune brain model suggests the basal ganglia was acquired first, which is thought to oversee our primal instincts. This is followed by the limbic system, which is important to emotion, motivation, memory, and learning. Then the neocortex, which is thought to be responsible for rational or objective thought. The MacLean's model claims that activity in the three brain regions (basal ganglia, limbic system, and neocortex) is largely distinct when we are engaged in each of the mental activities outlined above. For example, when we are in danger and must respond quickly, as an act of self-preservation, the reptilian structure is aroused, preparing us for action by initiating the release of chemicals throughout the body. When we are watching a shocking news story or receive an upsetting message, the limbic system is stimulated and, again, chemicals are released, which create our experience of emotions. Finally, when we are making decisions, solving problems or reasoning, the neocortex is engaged, without the involvement of the other brain structures.

There are many different conceptual models of the brain. It is important to note that many of them lack any scientific basis – this model does not. Brain models are not there to “prove” anything but rather to stimulate creative thought as to how designers (and others) may offer all round stimulation of the mind and create better experiences for it. Triune Brain model, while flawed, has become very useful in emotional design and user experience design. The ability to communicate with the user at a level below the conscious can be used to drive experiences and useful decisions.

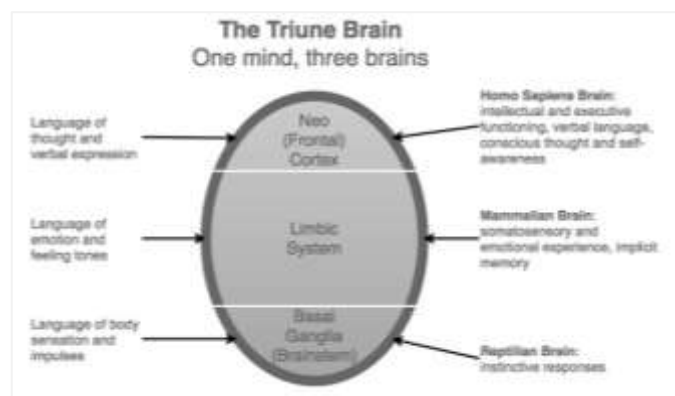


Figure 2: Diagram 1: Gould, J. (2003). Triune Brain Concept

Perception and Principles of Aesthetic Experience

So, what makes a good design? How do we make sense of what we see? Is it merely an opinion, or is there something more to it? Perception is the set of processes by which we recognize, organize, and make sense of the sensations we receive from environmental

stimuli (Goodale, 2000a, 2000b; Kosslyn & Osherson, 1995; Marr, 1982; Pomerantz, 2003). Perception encompasses many psychological phenomena. In this section, we focus primarily on aesthetic principles that captures how we perceive and why design and art worked the way they do?

“Our brains receive about 11 million bits of data per second, but we’re only able to process roughly 50 bits per second.” - George Markowsky

Design is substantial and persuasive because of the way our brain processes complex visual information. We tend to not understand the world specifically as our eyes see it. Instead, our brain actively tries to form sense of the numerous stimuli that enter our eyes and fall on our retina. We'd think that vision is controlled by our eyes, pulling in images and projecting them in the back of our mind. If this was the case, there wouldn't be style or art. As a matter of truth, thirty areas within the back of your brain undertakes different aspects of an image. The various vision processing zones of the brain is individually recreating the conception of design. So, in a way, the watcher is also an artist. Style and art stimulate the brain more than a sensible image or persona does. Therefore, it affects us differently. Arbitrarily inserting objects on a screen doesn't produce a similar reaction. There should be purpose to the visual distortion/arrangement for the mind to choose up. It might be nearly not possible to lock down all the assorted varieties of style that are out there. Sure, we can categorize them into larger buckets and generalize with words like “clean,” or “grunge,” and designers perceive what reasonable design to expect from those words. Though at the surface, there's a distinction between the design styles, at their very core, the brain is being aroused by those principles within the same approach.

The aesthetic principles below are supported studies of the brain and neurologic analysis, that are bestowed during a type of ways and the way it impacts the aesthetic expertise.

Grouping

Perception helps us make sense of the confusing stimuli that we perceive in the world. One way to bring order and coherence into our perception is our ability to group similar things. This way, we can reduce the number of things that need to be processed. We can also better decide which things belong together or to the same object. In other words, we organize objects in a visual array into coherent groups. This technique is used heavily in design and plays off the mind's natural tendency to try and find connections in elements.

When you look at a design structure and notice subtle touches — like the links of a specific color — this is not just a nice design touch, or good usability. It is taking advantage of the way your mind bunches together things like shapes or color hues. For example, in logos like FedEx, the arrow is created in the mind by grouping the negative space between the letter “E” and “X.” The neural mechanisms that we are taking advantage of are equivalent to those that developed as a survival attribute in the cerebrum to shield us from predators and defeat their camouflage.

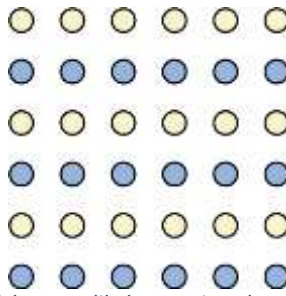


Figure 3: When looking at this array of dots, we likely perceive alternating rows of colors. We are grouping these dots according to the principle of similarity.

Isolation

The Von Restorff effect (also known as the isolation effect) predicts that when multiple similar objects are present, the one that differs from the rest is most likely to be remembered. The principle of isolation is removing the gratuitous visual information that might clutter the design and concentrate on the essentials. It directs attention to what matters by extracting and showcasing what is critical to the mind. This is the main reason why all call-to-actions (CTAs) look different from the rest of the action buttons on a site or application.

Contrast

Contrast occurs when two or more visual elements in a composition are different. In design contrast is used to generate impact, highlight importance, create exciting graphics and create visual interest and dynamics. This contrast is how the human retina and brain responds more to the edges and sharp stepped changes in color or gradation. The visual information mainly is in change like the outline/edge of a person and the color wash background. Therefore, this becomes a more interesting and attention-grabbing area for the eye and brain to focus. So, by adding other dimensions of contrast to the design, like texture or color, the design attracts the cells and holds their attention. Creating areas of contrast is vital to a dynamic and well-composed design.

Symmetry and Balance

A symmetrical object taps into the same neural machinery made to help the mind detect other people or predators. The additional symmetrical and balanced one thing sort of a face is, the additional perceived beauty that's taken by the mind. No face is absolutely symmetrical, but once the 2 sides area unit nearly equal, they're seen at a metacognitive level as additional stunning. When you create symmetry and balance in a design using guides like the grid and specific sizing of elements, you are creating something that is more perfect (almost hyper real) compared to what is found in naturally created objects or organisms. It can be argued that most designs are asymmetrical; however, there must be a balance in the designs. If that balance is not there, the mind will see the layout as asymmetrical and potentially awkward or wrong.



Figure 4: CSC Finland's logo is perceived as an integral whole although the two constituent geometrical shapes seem to be pointing in different directions and have differing colors.

Metaphor

Designers understand the use of metaphor very well. It is used in creating a familiar user experience by tapping into real objects that people already understand. In this case, the understanding of metaphor is a bit different. The metaphor is a sort of mental tunnel between two objects that at first seem unrelated. On an unconscious level though, the mind has already made the association. Some examples of this are Shakespeare saying, “Juliet is the sun.” In this case, he is relating Juliet to being warm and nurturing, not that she is an object in our solar system. Good metaphors are easy to grasp and are universal. Some design or imagery is compelling – because of the use of metaphor – the moment we see it. That is because, before we even understand why, our mind has already deciphered it.

Principles of Behavioral Experience

Behavioral Design is all about creating the right environment for people to decide or act towards their goals. It can be applied to encourage a desired behavior, to stop unwanted behaviors, as well as to form habitual routines. Design should be able to understand the natural behavior of people and of the world; it should exploit natural relationships and natural constraints. As much as possible, it should operate without instructions or labels.

Imagine a pair of scissors. Even if you have never seen or used them, immediately after you look at them, you know how to use it just by looking: no picture, label, or instruction needed. The holes are there so that you can put something into them, and the only logical thing that will fit are your fingers. The holes are affordances: they allow you to insert your fingers. The different sizes of the holes provide constraints to limit the number of fingers that will fit: the bigger hole suggests several fingers might fit in, the small hole only one. The mapping between holes and their movements as well as what happens in the world is clear and results in an immediate understanding, easily learned, and always easy to recall. A pair of scissors is an example of good design and usability; its visible structure provides clear clues to how it works through its affordances, constraints, and mappings.

Affordance

Harry Harlow was an American psychologist best known for his maternal-separation experiments on rhesus monkeys to unravel the affordance of objects: the perceived and actual properties that determine just how a thing could possibly be used.

Affordance is an object’s property that show the possible actions users can take with it, thereby suggesting how they may interact with that object. For instance, a button can look as if it needs to be turned or pushed. The characteristics of the button which make it look “turn-able” or “push-able” together form its affordances. A chair affords support and therefore, affords sitting. A cup affords us to carry and drink liquids, a pen to write letters and draw pictures. Wood is normally used for solidity, opacity, support, or carving. Flat, porous, smooth surfaces are for writing on. Glass is for seeing through and for breaking. Affordances provide strong clues for the operation of things. Knobs are for turning. Slots are for inserting things into. When affordances are put to proper use, the user knows what to do just by looking; no pictures, labels, or instructions are required. Complex objects require explanations, but most things should be simple. If simple things need pictures, labels, or instructions, the design is a failure.



Figure 5: How doors often have poor affordances. When you come up to a door, it's not always clear do you push or pull the door.

Constraint

Most of the time, shopping malls have huge parking lots, where customers can conveniently park their car before going shopping or to the movie theater. To enter the parking lot, customers need to get a ticket, which they use to pay for parking according to the amount of time their car is in the lot. After that, they can insert the ticket into a machine that will open a gate, allowing them to get out of the parking lot. However, because the card is only readable on one side, most customers fail to figure out immediately which of the sides is the correct one and then resort to a trial-and-error method, which causes frustration, wastes time, and increases traffic lines to leave the lot. This happens because there are no visible cues on the card (i.e., there is no knowledge in the world). Therefore, most of the time, there is no information in the mind of the customer, who forgot or did not notice which side of the card is readable, when they took it out of the machine for the first time upon entering the parking lot.

Not all the knowledge necessary for precise behavior needs to be in a person's mind. It can be distributed some in the mind, some in the world, and some in the constraints of the world. Behavior is determined by combining the information in your memory (i.e., in the mind) with that in the world. However, the world imposes constraints to allow the behavior because the physical properties of objects, the order in which parts can go together and the ways in which an object can be moved, picked up, or otherwise manipulated, constrain possible operations. Each object has physical features, projections, depressions, screw threads, appendages, etc. that limit its relationships with other objects.

Mapping

A characteristic mapping exploits the spatial side of the utilitarian format of segments and the things they influence or are influenced by. In case that two switches, control two lights, the left switch should work the left light and the right one, switches the right light. If the lights are mounted one way and the switches another, the regular mapping is demolished. Some normal mappings can be social and organic, for example, the comprehensive standard that a rising dimension addresses 'extra', and a decreasing dimension 'less'.

Mapping is about having a clear relationship between controls and the effect they have on the world. You want this mapping to feel as natural as possible. Stove tops are a great example here. When you see the first image, the mapping is not very clear because it's

difficult to determine which control operates each burner. Versus the second image, it's far clearer the control that controls each burner, which has a better mapping.

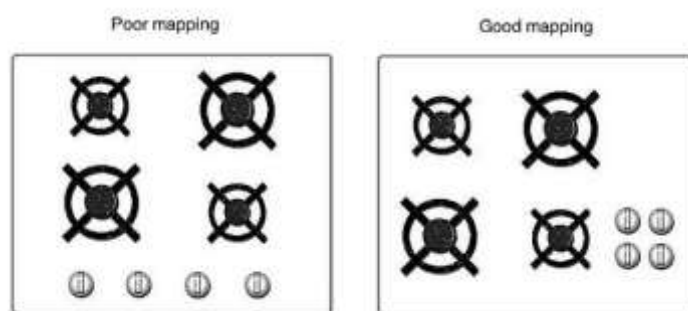


Figure 6: Stove Burners Mapping

This slider also has a strong mapping, since it's clear moving it to the right will increase its value versus moving it to the left will decrease it.



Figure 7: Web Slider

Apple shook up the world in 2011 when it introduced natural scrolling to Mac OS X Lion. This reversed the familiar pattern of scrolling a page down by holding your fingers on the trackpad and dragging them downward. Instead this was reversed such that you would drag your finger up on the trackpad to scroll the page down. This reversal more closely mapped with the way we used iPhones and iPads. The controversy here is really about a mapping. Was the new mapping too jarring because it changed the conventional mapping that had been used across Mac and Windows for decades? Or was it more natural because it mapped to how you would push a piece of paper up to move it down and also matched the new behavior created on mobile phones. There's no easy answer here, though we'd turn off natural scrolling on our Mac because we prefer the convention established decades ago, more.

Principles of Persuasive Psychology

Persuasion in design is frequently viewed as a subset associated with UX, but it goes beyond UX and the mechanics of traditional usability. It's about understanding the emotions that influence people's behavior and decision-making, and then acting on that information to design compelling user interactions. Persuasive design applies psychological principles of influence, decision-making in a consumer context, engagement strategy, and social psychology to every stage of the design process, and this recognizes potential barriers plus psychological triggers to generate the desired activities.

UX professionals tend to think of persuasion in design, solely in the context of e-commerce sites, but the concept is applicable to other areas as well: intranets, mobile devices, gaming, services and, in fact, any product or tool that is intended to bring about positive behavioral change. For example, energy meters installed in homes, can influence consumer behavior by making people more aware of their energy consumption and how they can reduce it. A mobile app can complement a weight loss program and an intranet can support collaborative working practices. These examples require a technological system to influence behavioral change and increase engagement.

Usability practitioners can use the principles of persuasion to help design more effective user experiences and can leverage to increase engagement as well as help people to make informed choices. Making things easy, relevant, and trustworthy by building persuasive features into the interface, helps elicit desired user behaviors—ones that align with the product's business objectives.

Reciprocation

The reciprocity principle is one of the basic laws of social psychology: It says that in many social situations, we pay back what we received from others. In other words, if John does you a favor, you are likely to return it to him. Reciprocity works in a variety of situations; businesses use it in advertising, marketing, and propaganda. For instance, it has been shown that a free sample encourages people to buy the corresponding product because they feel that they must return the favor of being given something for free.

Reciprocity is a principle that you can not only use to your advantage, but also to your users' advantage in user-interface design. If you want your users to trust you with their information and come back to you repeatedly, plant the reciprocity seed by being nice to them upfront and minimize their interaction time. Ask as less questions to your users as possible. On the web and elsewhere, start by giving before taking, and people will reciprocate.

Authority

The authority principle is an example of the human tendency to use judgment heuristics. In this case, the implicit assumption is that those in positions of authority may wield greater wisdom and power, and therefore, complying with them will lead to a favorable result. As humans, we are inclined to make the easier decision, rather than the accurate, more effortful one. The principle of authority can help alleviate the strain of decision-making. To help sell products, inform your prospective customers about expert reviews, awards and accreditations of the product.

Commitment/Consistency

We want to act consistently with our commitments and values. If people commit to an idea or goal, they tend to be motivated to honor that commitment. Loyalty schemes with defined targets (such as: 'Buy 10 cups of coffee and get your 11th free!') tend to perform better than open-ended schemes. Commitment and consistency are powerful motivators to increase engagement and persuade users to fulfill their goals. Designs, which allow users to make a small, low-cost commitment, will more likely convert customers than ones that make commitment a costly process. An all-or-nothing design will deliver nothing from most users. There are many questions that need to be answered to ensure we meet user needs at every step of the decision-making process, but it all boils down to facilitating the trust of our users and increasing the usability and the perceived value of our products and services.

Scarcity

The less available a resource, the more we want it. Make sure to emphasize any limited supplies or time-limited offers. The scarcity principle is a well-documented social-psychology phenomenon that causes people to assign a high value to things they perceive as being less available. In real life, Black Friday is a good example of scarcity: a sale that occurs on only one day of the year (the day after Thanksgiving in the United States) and consists of a limited number of products offered at discounted prices. In the case of Black Friday, the mobs of eager customers are most often a good thing for retailers, until the mob turns violent.

Liking

The more we like people, the more we want to say yes to them. Create a positive impression on people through your website's color scheme, design, choice of images, and tone of voice. The key to effectively employing the liking principle is user research. If you don't know your users well, it is very difficult to anticipate what techniques (similarity, familiarity, cooperation, association, and praise) will have a positive impact. Research techniques, such as surveys, interviews, and usability testing can all contribute data towards this exploration.

Social Proof

We look to others to guide our behavior. Customer reviews and testimonials are one of the most popular ways to explore this aspect of persuasion. Psychological phenomenon is where people reference the behavior of others to guide their own behavior. This tendency is driven by our natural desire to behave "correctly" under most circumstances—whether making a purchase, deciding where to dine, determining where we should go, what we say, who we say it to, and so on.

Positive Reinforcement

A positive reinforcement is a reward for a desired behavior. The reward should be sufficiently powerful and durable so that it increases the probability of occurrence of desirable behavior. Positive reinforcement results from the application of a positive consequence following a desirable behavior. For example: letting customers know when they are doing well and what will keep them engaged.

Loss Aversion

Most people will behave so that they minimize losses because losses loom larger than gains, even though the probability of those losses is tiny. The pain of losing also explains why people have a strong dislike towards losses. For example, when gambling, winning \$100 and then losing \$80 feels like a net loss even though you are ahead by \$20. People's reaction to loss is more extreme than their reaction to gain (The order here is also important — where you first lost \$80, then come back and win \$100, it would shift your reference point and make you feel happy). People do not like to lose things once they have them, so alerting customers when they are about to lose out on something is an opportunity to maintain engagement.

Anchoring

The Anchoring principle means that you need to be very careful about what you put in front of your users, especially in the early stages of the interactions. We see a classic example of this in second hand car sales. The initial price tag often tempts the buyer to set their frame of reference, even if the listed price is higher than what is "legitimate". Anchored by this number, the buyer sees anything below as a good price, even if it is higher than what they might be offered elsewhere.

Defaulting

People tend to choose the easiest option to avoid complex decisions. Defaults provide a cognitive shortcut and signal what people are supposed to do. People do not like to disrupt the status quo — it is easier and more comfortable to stick to what we already know. This makes the selection of "default" options one of the most important choices you make. While setting the user defaults, you provide a cognitive shortcut that signals what people are supposed to do.

Susceptible Moments

Opportunities to cross- and up-sell must be timely so that they are delivered at the point at which people are most receptive.

Principles of Perceptual Psychology – Gestalt Psychology

“Cognitive behavior patterns that influence the user experience and product perception.”

Gestalt psychology was founded by German thinkers Max Wertheimer, Wolfgang Kohler, and Kurt Koffka. These principles focused on how people interpret the world. The Gestalt perspective formed partially as a response to the structuralism of Wilhelm Wundt, who focused on breaking down mental events and experiences to the smallest elements. Max Wertheimer noted that rapid sequences of perceptual events, such as rows of flashing lights, create the illusion of motion even when there is none. This is known as the phi phenomenon. Motion pictures are based on this principle, with a series of still images appearing in rapid succession to form a seamless visual experience. According to Gestalt psychology, the whole is different from the sum of its parts. Based upon this belief, Gestalt psychologists developed a set of principles to explain perceptual organization, or how smaller objects are grouped to form larger ones. These principles are often referred to as the "laws of perceptual organization." These principles are much like Jacob Nielsen's heuristics, which are mental shortcuts for solving problems.

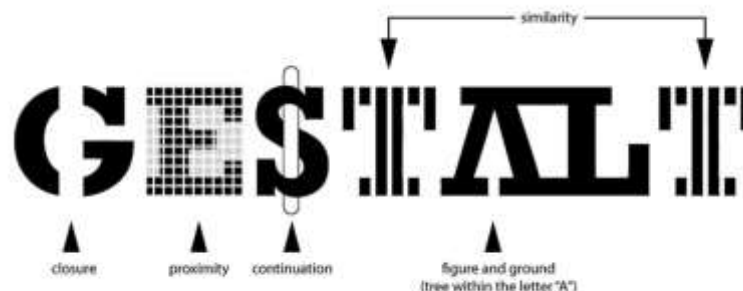


Figure 8: Gestalt Psychology

Closure

According to the law of closure, things are grouped together if they seem to complete some entity. Our brains often ignore contradictory information and fill in gaps missing in information. In the image above, you probably see the shapes of a circle and rectangle because your brain fills in the missing gaps to create a meaningful image.

Pragnanz

The word Pragnanz is a German term meaning "good figure." The law of Pragnanz is sometimes referred to as the law of good figure or the law of simplicity. This law holds that objects in the environment are seen in a way that makes them appear as simple as possible.

Proximity

According to the law of proximity, things that are near to each other seem to be grouped together. In the above image, the circles on the left appear to be part of one grouping while

those on the right appear to be part of another. Because the objects are close to each other, we group them together.

Similarity

The law of similarity suggests that similar things tend to appear grouped together. Grouping can occur in both visual and auditory stimuli. In the image above, for example, you probably see the groupings of colored circles as rows rather than just a collection of dots.

Continuity

The law of continuity holds that points that are connected by straight or curving lines are seen in a way that follow the smoothest path, rather than seeing the separate lines and angles, which belong together.

Inclusiveness

This Gestalt law of perceptual organization suggests that elements that are grouped together within the same region of space, tend to be grouped together. For example, imagine that there are three oval shapes drawn on a piece of paper with two dots located at each end of the oval. The ovals are right next to each other so that the dot at the end of one oval is closer to the dot at the end of a separate oval. Despite the proximity of the dots, the two that are inside each oval are perceived as being a group rather than the dots that are closest to each other.

Working and External Memory

Human working memory holds information relevant to the current task. When tasks are too hard, users should be able to offload some of the working-memory burden to user-interface features that can serve as an external memory.

Working Memory

Human working memory can be conceptualized as a buffer or scratchpad in which the mind deposits information relevant to the current task. When people use websites or other user interfaces, a frequent cause of difficulty is that they forget information from a previous step even though it is needed at a later stage to complete their task. This is not because users are particularly forgetful. Nor it is because they don't bother paying attention. The reason people forget information in the middle of the task is that the user interface requires them to keep in their working memory more than what their brains can hold. The working-memory buffer has a limited capacity. If a task requires too much information to be kept in the working memory, you need to free up some of the occupied slots to make space for that information.

The concept of working memory was first illustrated in a famous series of experiments by the psychologists Alan Baddeley and Graham Hitch from University of Stirling, in Scotland. In Baddeley and Hitch's experiments, people had to store some digits in their working memory and remember them after doing a second task. When the number of digits they had to remember was small (1–2), their performance in the second task did not suffer. But when they had to remember more digits, their performance deteriorated, because they had less working memory available for completing that task.

Working-Memory Buffer



Figure 9: Working Memory Buffer

Working Memory, and User Experience

In our field, a common concept that is well related to that of working memory is the concept of cognitive load. If a task incurs a high cognitive load, it usually means that it puts a high burden on the working memory. Tasks that tax our working memory are generally perceived as hard. So, to make the experience pleasant and usable, designers must make sure that the user's working memory is not overloaded. A good user experience is good for everyone, not only for those people who have a large working-memory span. As a matter of fact, a general good practice of design is to limit the burden put on the users' working memory. In other words, make sure that users can easily access all the information they need for a task, without having to commit it to working memory.

External Memory

External memory refers to any tool or UI feature that allows users to explicitly save and access information needed during a task. Supplement the working memory with a form of external memory — a virtual scratchpad where users can store all the info that they need without having to commit it to their internal memory.

A typical example of web task involving a high working-memory burden is item comparison: the user must weigh in the pros and cons of several alternatives and choose the best. Whether comparing hotels, shoes, or insurance plans, comparison involves by recalling the available options and deciding which option combination is optimal. Tools like comparison tables are a form of external memory — they allow users to select a set of items of interest and explicitly compare their pros and cons, lined up with each other, in an easy-to-see table.

How emotions can Change Behavior

"Emotions shape all activity in adaptive ways. In the absence of emotional markers, decision making is virtually impossible." - Saver and Damasio (1991)

Deciding is an act influenced by both emotion and rationality. Rationality requires justifications for following through on a decision, but no decision can be made without emotion. Emotions are both anticipatory and reactive. It is that gut instinct guiding your intuitive, survival-based reactions that enables us to make decisions and to consider outcomes based on the decisions you make. It is necessary to understand what emotions support the desired behavior to be able to design effectively. Whether you are designing a product, new technology, app, or an entire business, the connection to the humans you are impacting is paramount to what you put out into the world. Extensive research has proven how our brains' neurotransmitters react and how they are triggered with events,

interactions and with the user experience of application software. Positive user experiences are shown to impact positively in your brain and as a result you experience happiness, motivation, excitement, concentration, satisfaction, relax, calmness, security, you feel in control, confidence, self-esteem and well-being in many ways.

Understanding the feelings of users has always been the dream of user experience researchers. Are they enjoying themselves? Are they frustrated? Are they genuinely interested and engaged? Understanding how users truly feel in reaction to an experience can help you to optimize specific aspects of the experience to exude certain expressive states.

But how can we design to capture something seemingly as elusive as emotion when it is not consistent and is often capricious? Can you people recognize the emotions they are experiencing and articulate what is influencing their emotions at any moment? Can they do this accurately? Understanding the basics of the brain's chemical response to different experiences is a helpful first step in driving your design toward connecting to the end user. In this portion, we will focus on the 4 feel-good chemicals released by the human brain in reaction to perceived positive experiences.

Dopamine

It is a neurotransmitter that helps control the brain's reward and pleasure centers. It also helps regulate movement and emotional responses and it enables us not only to see rewards but also to act for moving toward them. It plays a major role in reward-motivated behavior. The brain releases dopamine during task-based interactions—it is immediate and fleeting. Dopamine is the buzz of a text or a like on an Instagram post.

Oxytocin

It is a powerful hormone and acts as a neurotransmitter in the brain. Oxytocin is the “love drug,” nicknamed so because it is associated with trust, friendship, and connection. When you hug someone, or feel part of a group, your brain reacts with oxytocin. And it is delightful. (Check out Paul Zak's TED talk for an enlightening take on oxytocin)

Serotonin

A natural mood regulator, serotonin makes you feel emotionally stable, less anxious, more tranquil, and even more focused and energetic. If you're in a good mood, you've got serotonin to thank. And if you're in a bad mood, you've got serotonin to blame. Serotonin is feeling pride. It is working towards a goal and finding real and lasting value in your actions.

Endorphins

It is responsible for masking pain or discomfort, which explains their association with the “fight or flight” mechanic. When it comes to designing happiness, endorphins help you “power through.” Endorphins allow you to push farther and harder as you work towards distant goals. They are responsible for your feelings of excitement or satisfaction.

Conclusion

You can use these design and psychology principles to predict and explain how your customers think and act. Behavior is strongly influenced by unconscious thought, but it is often more predictable than you might expect. Understanding the foundations of human cognition will help you explain and anticipate user behavior.

If you are involved in interface design and do not have formal training in psychology or human factors, your work will benefit from understanding the theory that determines which

designs work best. These psychology principles enable you to design websites, products, and services that are easy to use as per users' needs and motivations. Persuasive design acts on insight gained through research, enabling you to design beyond the merely functional aspects, to create features that change users' behavior. By understanding at what point in their journey individuals will be receptive to emotional triggers, you can ensure that design features, such as images, text, and tone of voice resonate with them and persuade them to act.

Exploring these principles reveal the cognitive processes occurring in the human mind almost subconsciously when engaging with a product or app. Our job is not to ignore or hijack these but engage with them, therefore, making the case to include cognitive psychology as part of the UX design process as important. This is because it will enable you to explain your design decisions intelligently.

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Neha joined HCL 3 months ago in the Experience Design and Engineering (EDGE) Practice. She has an extensive experience of 5+ years in designing effortless experiences for Digital Products and loves anything that involves the creative process from concept to execution. She loves exploring new methods to manifest her ideas, from illustrations to digital media.