

“The Psychology of User Choices”

1. Abstract

An abundance of psychological phenomena influence the way in which a user may prefer a given option or select a course of action within a system. While the intersection of psychology to human-computer interaction should come as no surprise, the implications of these psychological phenomena can be invaluable in the study and design of human-computer interactions and designing a system in which users prefer and are most likely to make the desired choices. Known phenomena such as the Zeigarnik Effect, the endowed progress effect, the perception of achievement/reward structures, the near miss effect, and several others often play strongly into user’s perception of their choices and thus their decided course of action. These effects of course then have intriguing applications toward how we might approach problems as HCI designers, how we may design a UI, and what steps or paths we may build into a task flow or marketing. Within this paper, a sampling of such psychological phenomena as well as their potential implications across a spectrum of applications to HCI will be discussed.

2. User Choice Psychology

Several influences play into human choices at any given moment. Personality factors, past behavior, perception of choices, mood, and an increasing list beyond these. Given all these factors for which an interaction designer may have no insight into, it can seem improbable and at times impossible for one to design systems and choices such that users are likely to make the best decision.

Thankfully, due to known and tested phenomena within cognitive and social psychology, interaction designers can understand common factors or situation designs for which users are much more likely to make a specific type of decision. With this knowledge, interaction designers can better plan and present possible choices and interactions, and more confidently feel that users will choose the correct course of action for the best possible experience.

2.1 The Zeigarnik Effect

The Zeigarnik Effect relates to memory and task completion. The Zeigarnik Effect notes that completion of a task often lends itself to forgetting, but the act of interrupting a task encourages the mind to remember details of it more strongly. The act of interruption forces the brain to place a task on pause. In doing so, the brain actively works to remember where it left off on the task for later completion, because our brain desires to complete a task.

This means that interruption of users (which commonly tends to be avoided) may have positive effects if the interruption occurs surrounding a task that the user must remember how to do. An important but hard to use function in an application, for example, may be a strong area to interrupt users with other tasks to ensure that they retain understanding of the function’s components.

Naturally, crafting this interaction correctly in an interface can pose difficulties for even a savvy designer. Interrupting a user can cause frustration, especially if the tasks the user is interrupted with feel menial or the user is in a hurry to get to a core component of the

application. Such a design would likely be best suited in an onboarding tutorial system, and even then, would still require fine crafting to ensure the user gains the maximized benefit of the effect from it.

If a large component of the system is, for example, completing some sort of multi-part data entry, the data entry could be broken up into several different screens corresponding to different methods of entry or features. After the user completes each screen in the tutorial, the focus of the tutorial may briefly shift to learning another feature, then returning to the next screen of the entry process. In this way, the features of each screen of the process are broken apart in a meaningful way, interrupted at a reasonable break so that users do not feel the interruption is jarring, but their mind is still focused on the completion task and so the Zeigarnik effect takes hold. Thus, by the end they hopefully will more efficiently remember the process of this entry because of the short breaks to teach other features between each key component screen.

For learning software, the Zeigarnik Effect could easily be applied by a timer system or landmarks in a course, forcing the user to take a break before a quiz on the topic or before beginning the next section. Allowing users to do something within the application for the break would encourage their mind to stay goal-oriented toward the task, so that they do not wander off for their break and never return to complete the work. Something like a small match-3 puzzle game for instance may still keep a user's mind active, keep them in the application, but still interrupt their progress on the task enough for the Zeigarnik Effect to materialize.

In sharing a message or advertising, the Zeigarnik Effect also has interesting applications for experience designers. Audiences often have a goal of completion – they do not like something to go mentally unfinished. The use of music or narrative visuals that compel a viewer to see or hear them through may cause a message to be heard to its completion when the audience may otherwise flip channels or tune out. When a story is shared and is interrupted part way through, at a later point when asked where they story left off often the listeners remember – it is compelling to finish the story to its end and thus the interruption is more memorable – a classic trait of the Zeigarnik Effect. Thus, compelling narrative components – either musically or visually, can compel a user to continue through a tutorial, finish watching an advertisement, or listen to an important message. If the user gets interrupted by daily life or other tasks while a designer utilized these components, it is even more likely for the user to have stronger memory of the content they consumed before the interruption occurred.

2.2 The Endowed Progress Effect

The endowed progress effect observes that users are more likely to commit to completion of a task if they believe it has already begun. If something feels that it has been started upon but left unfinished, users desire a completion state so that their minds can rest easily and focus less on the task. As can be observed, this effect pairs well with the Zeigarnik Effect – users are more likely to remember information about an undergone task so that they can work to complete it, and endowed progress keeps them committed to completion as they have already begun the task journey.

Endowed progress is a rather easy phenomenon for an experience designer to invoke. If there are steps to sign up for an account for example, showing the user they are already part way done simply by engaging in a call to action can lead them to finish. Progress bars such as

LinkedIn's profile completion are another example of endowed progress – simply by creating an account a user has already begun the process of filling out all the information on their profile – which can be a very large task. However, the user already feels they have embarked on the journey to completion. As the bar fills when the user completes more sections, they feel a desire to push to finish the task. “Freemium” games such as King’s Candy Crush often employ an endowed progress model by giving users free “paid” points at the start to complete a beginning level and earn an achievement – the act of completing the level is superficial, but the completion of it puts users in a mindset of having started the process of beating the game. Messages on eCommerce sites noting “You are only X dollars away from free shipping!” achieve this effect as well – users may not have even been aiming for free shipping, but feel they have now started a journey toward achieving it.

2.3 The Near Miss Effect

The near miss effect is a psychological phenomenon related to the reward centers of our brain. When a user experiences an almost success – something clearly close but not quite the desired goal, the user becomes more likely to continue to work toward the goal. Dopamine is released as users feel the rush of “almost victory” – to the brain, this feeling can often be as strong as victory itself, even if it may not feel as positive in the long term.

This phenomenon is most commonly seen in “dark UX” patterns used in casinos – two jackpot symbols on a three-line reel makes a user believe they were close to jackpot winnings, and more likely to persist at gambling. In games, especially “Freemium” mobile variety such as King’s Candy Crush, users may be shown the number of moves away from victory they were, often causing them to try again as they see how near their victory was. When a user fails a task within an interface, interaction designers can leverage the near miss effect by showing users how close to completion they are with a few minor changes to behavior or entry. In recognizing how close success seems to be, the near miss effect can often compel users to try again.

2.4 The Barnum Effect

The Barnum Effect correlates to the way in which users distill and interpret information, particularly when they believe it is personalized to them. Often related to the trait of gullibility, the Barnum Effect is most often showcased with personality related descriptions such as horoscopes. By creating generic descriptions that can be synthesized by any person to apply to nearly any situation they may be facing, very broad advice can feel very personal, causing users to rate highly that this information is fitting to them. A Barnum description may be a statement such as “At times, you are outgoing and social, while at other times you are self-reflective and reserved” – something most may believe applies to them because of its vague nature and malleability to nearly any situation.

The applications of the Barnum Effect to interaction design beyond charlatan tricks might not seem readily apparent. However, the Barnum Effect shows a powerful way of presenting statements to encourage a user’s agreeance and foster relatability in nearly any scenario. The structure of a “Barnum statement” and its vaguely morphable nature may give interaction designers an area of consideration when trying to foster a sense of relation with a user – such statements may make a user feel that the system “knows” them. This may be especially effective when giving encouragement to users after a failure within an interaction, as the

system's seeming sense of understanding builds a relationship in which the user does not want to "fail" the interaction and thus the system.

The potential flaw of the relational use is that in structuring Barnum statements related to a point of failure in the system, the statements gain context versus the normal ambiguous nature of a Barnum statement's relation. This may weaken the user's relation to the statement, and destroy the effectiveness of the phenomena. An example such as the Barnum description "You have a tendency to be critical of yourself" as an apt choice. This statement can apply to nearly any area of a user's life. However, when placed in an interface with altered wording such as "You may be feeling critical of yourself, but don't give up!" the statement may lose some power due to being contextually bound – the user may not be feeling critical of themselves at that moment in the interaction, and the vague power of the Barnum effect is shattered. Knowledge of the Barnum Effect and its ability to be used to build understanding with users however, may be of benefit in certain interactions as designers work to foster a relationship between system and user.

2.5 The Dunning-Kruger Effect

Dunning-Kruger is an interesting effect that can often highlight user error and usage style within a system. The Dunning-Kruger effect shows that users who have a lower ability may often believe they have a much higher ability level than they do, as they are unable to recognize their inabilities due to the low level of skill. In a similar way, higher ability users often believe they have less skill, as they readily recognize their own areas of weakness due to their understanding.

In the design of interactions, these effects must be taken into account. Lower level users may often dive in head first and become quickly frustrated when they meet obstacles or errors due to their lack of comprehension, and higher level users may be tentative to use advanced features out of fear of lacking skill. Designers can create buffers such as tips and corrective nudges for lower level users, and encouragement for users showing proficiency to try out new advanced features with a walkthrough of the features in a "tutorial" manner that feels safe for the user to explore them.

Using an accurate form of compensation requires knowledge of the user's skill level however, which we cannot count on the user to provide due to this very effect. Thus, systems that work to overcome this effect will likely keep track of user behavior to determine proficiency or areas of deficit, and target such efforts within those areas.

2.6 Halo/Horns Effect

The halo or horns effect relates to perception of a product or company, which can of course change the experience a user has overall. This effect shows that when something is considered very good or very bad in one area, we have a first impression that this same thing will be good or bad in other areas. To relate to people, if someone is considered to be very mean, one is more likely to think them ugly, unintelligent, rude, or other negative traits. Within a system, if a product is considered to be slow, buggy, unintuitive, and so on – especially as a first impression, users are more likely to view the product negatively on the whole.

Designers of interactions and experiences can capitalize upon this effect by attempting to sport the "halo" of the effect in just one area of the product. If reviews of a product rate it as intuitive, friendly, fast, inexpensive, or other positive traits, users are much more likely to

enter into use of the product with a positive mindset toward its other aspects and features. Making a strong first impression with a specific trait of the product and ensuring users recognize and are able to make use of that trait may cause the user to perceive the product with a halo, and thus view it more favorably.

Of course, this effect is no substitute for good product and interaction design on the whole. First impressions may be a strong obstacle to overcome, but seeming positive will not last if the experience truly is not positive. Users may be more forgiving if they have placed a halo on an experience, but without it being truly deserved, in time their frustrations will mount. Thus it is important to not use this as a way to cut corners of design in other areas, but rather to stand out in a competitive market while still being comparable or better in most if not all regards.

2.7 Pygmalion/Rosenthal Effect

Describing the Pygmalion Effect easily leads to the adage of a “self-fulfilling prophecy”. That is, those with negative or positive stigmas often internalize them, and perform actions worse or better accordingly. If a company has done well in the past, more expectation to do well is placed upon them and often they perform better as a result of this expectation – with the converse also being true.

While this effect can easily apply to the overarching sales and design of products and company policies, it can also be observed with users utilizing a system. If a user frequently fails an interaction, they may feel the failure relates to themselves and thus perform more poorly as they feel they can do no better. In contrast, a user who often achieves success will likely persevere through more challenges in order to continue to have success.

The Pygmalion Effect correlates nicely with endowed progress and near miss, as it shows a full concept of user internalization of tasks and successes. If a user who frequently fails can feel success in some way (such as being congratulated when completing part of the task, rather than receiving a failure message only at the end), they may internalize this success and persist more toward further success. If an experience is designed to analyze the behavior of users within it, such a system designed to show partial successes in users that have frequent failure may build a positive experience by flipping the Pygmalion Effect.

2.8 Bystander Effect

Often seen in social experiments, the bystander effect notes that as the number of people present in a situation increases, the likelihood of action being taken – most specifically in a critical situation such as injury – decreases. This effect is often correlated to groupthink and social conformity, as a large number of people also not acting makes any specific person feel as though they will be acting against the social norm if they do something.

This effect is important to note within the design of emergency systems or social action systems. As an increasing number of systems are used daily to gather information, report accidents, or assist in data collection, designers must understand this effect in order to ensure users are willing to use systems, and that when they use them they are also not conforming to social standards that pose risks through inaction.

To give an example, it is increasingly common to see social media video footage of an accident or crime being committed, and often comments can be seen to the effect of “who was filming and not stopping this?”. It is very easy for a user not in the situation to criticize, but the bystander effect makes psychological sense of why several users may take video of

an incident and not act – everyone is taking a video so the user feels they should as well, but no one is acting to stop the situation so this trend of inaction continues.

If social media systems used geotag details coupled with scrapping of hashtags and messages left on such posts for key terms, they could push information to users reminding them of ethical action. By inciting a change from the usual bystander routine, and placed directly before each user as a result of their conformist actions, users may feel more compelled to break the bystander effect normative.

This proposition of course has adverse effects related to safety of bystanders, feelings of invasiveness due to data probing by such platforms, and perception by users in a social situation of such messaging. However, such a scenario does show the potential concerns the bystander effect creates for system use (particularly systems that intersect with the real world), and how possible solutions could be considered to mitigate them for systems in which elimination of the bystander effect is paramount.

2.9 Focusing Effect

In the focusing effect, a user often anchors most heavily on the first piece of information they are given. This can be seen to easily correlate to halo/horns effect, in which a user allows a strong impression of one aspect of a system to wash over their impression of all other aspects.

When designing systems, an interaction designer must take great care to ensure that the first pieces of information users are given at critical junctures helps them to make the best decision, motivates them toward the end goal, or whatever the action desired by the presented interaction is. By not wasting the opportunity to provide the user with relevant information during their first step in a specific interaction, designers can better ensure that users make the correct choices, given they will likely weigh this information most heavily in their process.

An example of the focusing effect in action poorly executed is the insistence by many companies that every possible important piece of information in an application or website be “above the fold” (the top 600px of a screen, corresponding to the front folded edge of a newspaper). While this ensures users are likely to see the information when the page loads, they are not likely to retain it, as you cannot possibly guarantee with so much information crammed toward the top that the first piece they look at is exactly the first piece that will allow them to make the best choice.

A better design would seem to be one that ensures that each page of specific types of information is optimized to the type of question it answers (“what am I looking for?”, “is this option the right fit for me”, “should I sign up for this?”), and that the first chunk of information on each of these pages relates to these questions users are likely asking through the process, so that they can easily make a proper interaction decision given the leading information on the page.

2.10 Cocktail Party Effect

The cocktail party effect is most often discussed in auditory information, but can have applications to visual interfaces as well. In it, the phenomenon shows our ability focus on a particular auditory channel, such as a conversation at a cocktail party, while filtering out all other noise and still being able to recognize and attend to our name being called amidst that noise. That is, our name is a salient cue that we recognize even with our attention focused elsewhere and actively filtering unrelated noise.

In interfaces, we can build visually salient cues to trigger this effect as well. A notification icon or popup can instantly catch a user's eye, and so should be used with care to not distract a user from task unless absolutely necessary – much like calling out one's name during a party if they are in the midst of conversation is rather rude unless necessary. Our names are often a salient visual cue as well, and so the use of a user's name (if known from account signup, for example), may also prompt their attention. Designers can use this understanding to craft interfaces that allow users to complete tasks and engage with the system as planned, but call out to them when important and are able to easily catch their attention despite the potential visual noise of advertisements and the like that users are actively filtering out.

2.11 Online Disinhibition Effect

The online disinhibition effect is quite simply the behavior of many users with looser tendencies when interacting online. Users may be more blunt, cruel, or antagonistic due to the lack of face-to-face interaction and thus the lack of a feeling of repercussion for their action. Similarly, users may also become more caring and open, as the lack of face-to-face interaction makes them feel empowered to speak up when they would normally act with introversion.

Designers building social systems often must take these effects into account. In many online games such as League of Legends and Overwatch, “toxic” players (those who may yell at other players in voice or text chat with harassing speech, “grief” players by intentionally causing them to lose, and so on) must be shown strong repercussions such as bans, removal of chat features, or lowered scores for their actions, as without these negative corollaries to their actions, they will continue treat other players poorly or escalate such behavior due to their perceived social freedom online. This of course can cause a negative experience for players who are not acting in such a manner, which may cause them to stop playing the game. Online forums and social media also often must deal with this effect – which is why blocking, hiding all of a specific user's content, and reporting to system admins or moderators are common features of such social systems.

2.12 IKEA Effect

Interestingly named for the corresponding store, the IKEA effect observes that users are much more likely to value something which they had a hand in making, regardless of its actual quality. While this effect is often correlated to hobbies where one does do-it-yourself projects with their own hands, it can also be extended to the world of interface interactions. If a user feels they have created something, such as a customized profile where they chose the background, banner image, and so on, they are much more likely to value their creation due to its personalization and their hand in “making” it. When a user values something within a system, they are much more likely to continue to use the system, as it now has worth in the user's eyes.

In modern interfaces, a more standardized design is often preferred for most account detail pages and the like – areas where users may in the past have customized. This shows an effect tradeoff of user expectation and ease of use versus the personalization value that can be noted. However, this does not mean that this effect cannot exist in other forms. Allowing users to customize settings, change login messages, update details, share information, and so on are ways in which users can feel they have built something within an interface, and

thereby prescribe value to it.

2.13 *Functional Fixedness*

This phenomenon describes how users may get stuck perceiving only a limited pool of traditional actions rather than thinking outside of this box. A chair for example can be used to sit on, to stand on, to block a door, to fend off an attacker, and a variety of other uses. However, within a given situation a user may fixate only on the traditional modes of use, and when needing to change a lightbulb not realize that they can stand on the chair to do so when they are viewing it only as a tool for sitting.

This effect can of course be observed in interfaces. If a specific gesture on mobile typically does one action (such as pinch and flick for zoom), we may have difficulty imagining another gesture or even button allowing us to zoom, or we may not ascribe that specific gesture to another action for which it can readily map (such as flicking a pinched item to the top of the screen to expand it, for example). If the circling arrow icon is perceived to always indicate “refresh”, we may be confused as a user if this icon is used in another scenario for another function.

Designers must be aware of the mental models users are likely entering an interface with, and work to map functions and icons to conventional methods, or explain and show strongly (so that users remember and act accordingly) the difference from traditional ways so that users can break their fixation by recognizing it through callout of it.

2.14 *Perceived Scarcity*

A psychological phenomenon related to economics, the perceived scarcity phenomenon shows that when users believe something is rare, they are more likely to value it more and thus pursue it, even if their interest was not as high prior to learning of the thing’s rarity. If a user is told there are only so many of something, such as a reward, product, or account type, they are much more likely to place value on it and seek to obtain it.

This effect is often used in the design of eCommerce interfaces. The popular marketplace Amazon for example, uses wording like “only 6 left in stock” on items to instill a feeling of scarcity and encourage a user to buy at the current price. Other sellers may exist for the item, and it may be restocked soon – but the fear that the item will be gone forever or the buyer will lose out on a good price for it causes the item to seem more valuable and the user then more likely to purchase it.

If a specific type of membership to an application or website seems more prestigious and hard to obtain, given the opportunity to obtain it users are much more likely to consider it. This of course cannot be too difficult as to dissuade the user from trying, nor can it be too common – “pro” membership to many systems often make this mistake as anyone can purchase at any time (though perceived scarcity is not likely their aim in such situations), thus making the account type feel widely available and thus users only view it in terms of perceived benefit, not its perceived rarity. Designers can thus for example, encourage users to act during specific campaigns or promotions by pointing out the scarcity of time for which the offer is available (such as a free 30-day trial of a product when the user signs up for email, but is only available for one week only) in order to take advantage of the perceived scarcity effect.

2.15 *The Paradox of Choice*

Within this phenomenon, it is observed that while users desire freedom to make choices, too many choices can lead to a feeling of being overwhelmed and cause unhappiness and frustration in the user. Users often make choices based on the idea of “satisficing” or something that works “well enough”. With too many choices, a user has to do far too much comparison and decision making, and feels exhausted and angered by the amount of cognitive work. When users are presented with a handful of options, they are much more likely to decide quickly and happily, versus when they are presented with a large number of options.

It is simple to see how this is useful for designers of interactions. Presenting a user with too many options, especially too many choices on the same screen, can overwhelm them and cause them to leave the interaction entirely to reduce the stress of choice. By giving the user a few options, even if you expand to many by giving them a few more options within their chosen option (narrowing, and then giving a second set of choices within the narrowed scope), the user will feel more comfortable making several “micro-choices” over one large and intensive choice.

When surveying users, this can be very important to the design of questions in order to obtain specificity without frustrating the user with the list of options given in the survey. When helping a user purchase something or customize something, working in small option sets at a time and expanding in detail from there may help the user complete the process rather than becoming overwhelmed and exiting.

3. Conclusions

An abundance of psychological phenomena affect the way in which we perceive the world as users and make decisions on which actions to take. This paper has discussed a handful of interesting effects we may often encounter, as well as applications of these effects specifically to human-computer interaction scenarios.

The desired outcome of this paper is to foster knowledge in interaction designers of how these effects can be used advantageously to guide users to use systems as desired and to encourage continued use of the systems, as well as to spark curiosity in designers to seek out additional phenomenon and consider their potential applications in the design of interactions and systems for users.

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