# *HOW TO BUILD AN ADDICTING APP*

A literature review of how applications use behavioral economics and psychology to get you Hooked and what we could learn from them to build a habit forming application of our own

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Cognitive psychologists define habits as an automatic response to situational cues - acquired to previous repetition of a mental experience (Andrews, 121). When we apply this definition to some of the technology we use, we will discover that we have formed a number of habits towards certain products. However, this is not our personal fault – our actions have been keenly engineered. In 2011, a research report claimed that 26% of users open a downloaded app just once. However, another 26% will use it 10 or more times, enough to form habits (Empson). As you could imagine, corporations put a lot of thought into how to convert the first kind of users to the second kind. They must not only learn what makes a user click but also what makes a user tick. And as far as the evidence goes, they have been very successful in manipulating us. Seventy-nine percent of smartphone owners check their phones within fifteen minutes of waking up (Facebook Newsroom). Another study found that a third of Americans would rather give up sex than their phones. Considering the fact that the desire for sex is driven by the primitive brain, it is clear evidence that we are hooked (Telenav Press Room). These products are engineered to be irresistible and activate the most primal areas of our brain such that once we hear that phone ding, we have to run to it. Consider this, Steve Jobs claimed he never let his children use the iPad (Bilton). People who have been part of the design process for successful products are aware of exactly how addicting and dangerous their products are.

In this paper, I am going to explore the habits we have formed with apps and how successful app developers leverage models from psychology and behavioral economics to produce intended results for their products. I will look into how product designers use familiar concepts such as endowment effects and behaviorism to get us hooked onto their products. I will also conduct some analysis of products that leverage these concepts to become indispensable parts of our lives. The paper will culminate in forming a recipe to turn the usage of an app into a habit.

First, let's discuss the familiar endowment effect that claims we feel the loss of something we already own more severely than we enjoy the gain of something of equal value (Kahneman, 1325 - 1348). When planning for user acquisition/retention, designers leverage this knowledge that people are likely to pay more to retain what they already own than for a new product. Consider free trial models: since the initial cost is zero, it is likely that users will adopt a product since it only delivers gain with no loss. However, once the free-trial is over it is much less likely that the user will give up the product since the endowment effect is active. Thus, with the endowment effect a user may be willing to pay more after a trial than before one. If we look at the tech world, we immediately see that numerous companies are using this technique to acquire users: some examples being "After your free trial, Amazon Prime is just $10.99/month", "Try (Spotify) Premium free for 30 days. Only $9.99/month after" and "Start your free trial to unlock the power of LinkedIn". The endowment effect that Kahneman found with Cornell mugs is being exploited by apps to encourage users to adopt them and pay more than they usually would be willing to.

Having spoken about acquisition, we now consider what is it that designers do to make these apps habit forming. How do they make sure that theirs isn't an application that is only opened once after it is downloaded? BJ Fogg, at his Stanford "captology" lab attempts to answer these questions by studying the psychology of consumers. He leans on theories that are familiar to behavioral economists and applies them to product design. He claims that for somebody to do something, the person must be motivated, must be able to perform the action and must be prompted to do the action. Companies use this by placing triggers for easy actions when a person is motivated. For example, after you finish an episode of House of Cards, wanting to know what's in the next one, Netflix automatically plays you the next episode. Another prime example is Yelp, which sends you a notification telling you to "check out hot new restaurants around you" a bit

before lunchtime when you are likely deciding to go out to each. This notification may have been annoying if it showed up at 9AM when a person is entering the office. But, at 11AM when a user is thinking about grabbing a quick bite, they will value the notification and maybe even take the suggestion and look at the restaurants nearby. This trigger is great since it is delivered right when a user is motivated and is likely to prompt the desired action. However, this is where it gets interesting, Nir Eyal (a writer very influenced by Fogg) mentions rather intuitively that if the user completes an action following a trigger and doesn't enjoy it, they are unlikely to return regardless of whether the action may be good for them in the long run (Eyal, 16).

Before looking at his solution to get users to return, let us think about what we would have thought of doing in context of our knowledge of "hot" and "cool" systems. Recall that our brain has two systems of thinking, the hot system that is quick and emotional and the slower cool system that is cognitive and emotionally cool. Decisions that provide immediate rewards are made by the "hot" system which is associated the primitive brain (Mischel, 9). These decisions are usually triggered by cues and are quick and emotional. Furthermore, from Bernhein and Rangel, we learnt that in this "hot" state, a person's long run self has no control over their decisions (Bernheim, 3).

Thus, the triggers we are most likely to follow are triggers that deliver immediate rewards since to our "hot" system they seem almost irresistible. So, app designers want to provide immediate rewards to a user's response – eliciting an almost Pavlov's dog-like reaction to our future triggers. Maybe this is why we will immediately see what your friend has shared when Facebook sends you the trigger "Check out something your friend shared". And maybe this is why it's harder to listen to the meditation app's trigger that tells us "it's time to do some box breathing". This is exactly what Eyal's suggestion is: provide "immediate, variable rewards".

We were spot on with the immediateness but Eyal adds in variability since it is novelty that sparks our interest and makes us pay attention. In experiments conducted by BF Skinner, he found that pigeons tapped on a lever for food more often when the tapping led to an uncertain amount of food dispensed (Eyal, 138). Companies use these kinds of rewards to build engaging products all the time. The classic example is the old slot machine where the pursuit of a reward makes a user want to play round after round. Even in the earlier Facebook notification example, there is tremendous variability in what the post shared may be. It is our curiosity that captures our attention and makes us click on the notification. A great example of using variability to keep users obsessed is Tinder. They could so easily let us know who has already swiped right on us and will surely be a match if we swipe right. But they choose to keep the result of each swipe a mystery, making us swipe around much more than we otherwise would.

Eyal further claims that while this combinations of hot triggers, simple actions and variable immediate reward is powerful, it isn't enough. He says that we need our users to get invested in our product in terms of their time, effort or social capital (Eyal, 182). Eyal claims that we irrationally value our own efforts, citing a study that found that students were more willing to pay for origami they created than the same origami created by a stranger (Eyal, 138). He claims that IKEA leverages this by putting its customers to work since they develop a love for furniture they build themselves. Apps leverage this by asking a user to put something of value into the application after the reward. Besides the tailoring effect that this user's data has on the product, it also makes the user feel more invested in the product and makes them more likely to come back. Apps make us put in various things of value, for example: Spotify gets you to make your own playlists and learns what you like, Twitter makes you choose followers you value, Photoshop requests your time and energy so that you have an invested skill in the product (maybe that's why they like to give

student discounts). Thus by asking for interaction and value from you, apps are able to morph not only to seem more appealing but also to really make you feel like they belong to you.

Designers want their apps to become addictions, not just habits. How else are they going to compete against the thousands of other choices you have as a user? And more importantly, how else are they going to get you to make in app purchases (buy lives in candy crush) or make you watch adds (Spotify) when you have a plethora of other choices to migrate to. Besides the things that we spoke about earlier, they rather counterintuitively use timers to really make a user pine for this app. Like the forbidden fruit from the garden of Eden, some researchers at UCLA found that in a group with eating disorders – a food was far more likely to be eaten if a person was told not to eat it rather than encouraged to eat it (Mann, 319-327). Maybe this is why candy crush uses timers to cut you off and Tinder stops you after a certain number of swipes. Furthermore, if you consider Ziegarnik effects – waiting for a response could make your app highly addictive if the response is likely something that a user would eagerly await. Thus, the cut off mechanism could exploit this effect to make a user obsess over your app if their task is incomplete (Waude). Cutting a user off makes a user keep thinking about the product and may even lead them to buy the premium version which gets them past the cut-off point. However, it is important to note that most apps which use this kind of a cut off mechanism are sure to tell you when your cut off has elapsed as well, just in case the user forgot about the incomplete task.

In this way, product designers exploit the endowment effect, behaviorism, neuro-economics and various other psychological techniques to get us hooked onto their products. The cycle of triggers, actions, rewards and investment connect the user's problem with a designer's solution so often that using the solution eventually becomes a habit. This is why whenever we feel lonely we feel like scrolling on Facebook, when we're bored we binge on Netflix and whenever

we get a notification – we just have to open it. We mentally connect an emotion or a situation with a product leading to a high level of dependence on these applications.

Having seen what successful applications do to keep users engaged, let's put together a pipeline for designing an irresistible app. When we first think about our idea, we should wonder what do users really want and what pain is the product relieving. This will be our "internal" trigger (eg: if I'm bored, I should use Netflix). Our aim will be to connect the internal trigger with our solution in the user's mind. Now comes the hard part – how do we get users to come to our service (the external trigger). While the trigger itself may just be a simple flyer or marketing email, what will be challenging is translating that trigger to an action. According the Fogg behavior model mentioned above, the acceptance or denial of a trigger is contingent largely on the motivation and the ability of a user (Fogg). So, the first thing we should do is to get our product to be as easy as possible to use. Next, we should be sure to hit a user with a trigger only when they would be motivated to use the solution. Ideally, this will also be when they are experiencing the internal trigger. For example, we should give out flyers for an app like Yelp pre-lunchtime rather than after dinner.

Now that the user has taken the trigger, we must consider what the simplest action a user may take on your application in anticipation of reward. We should try to make this action as simple as possible and deliver immediate rewards on its completion. If we were making a camera related app, the first thing a user should be able to do is click and share a picture. This is exactly what Snapchat did, as soon as the friendly ghost disappears from the loading page, you have a camera where you can take a hilarious selfie and send it to your friends. Now, we must reward the user and make the reward as obvious and immediate as possible. With social apps like Snapchat and YikYak where rewards may be delayed until another user "reacts" to the user's action, it may be

a good idea to incorporate something more immediate.[a] For instance, you could give the user points like Snap points or Yak karma. While delivering this reward, you should try to make it variable so that a user is left constantly thinking about how they were rewarded. You could even include triggers that don't need an action but simply make a person think about your product just like every messenger app includes a "typing…" notification. And the last but not at all the least, we should try to use the user's action to store some information about the user to get them "invested" in the app. This could just be building up a profile, friend-list or history of activity but this will make users much more likely to return. An ideal investment could be something to load up the next trigger given to the user. For example, sports apps often make you select your favorite teams so that they can keep you posted with the latest news about them.

And that's forms one iteration of the habit forming loop. We must repeat this process from external trigger to reward until it forms a habit and users associate their internal trigger with the application. Once at that stage, users will open your app when they feel the internal trigger. When users feel lonely, they'll open Facebook. When users feel bored, they'll open Netflix. And once you have trained them, when users feel their internal trigger, they'll open your app. With this, our generalized recipe to transform your app into a habit is complete. Note that this is a very generalized recipe and not a one size fits all guideline. As mentioned with the exception regarding Zeigarnik effects in the footnote, there are particular cases where an application may correctly choose to deviate from this guideline to be even more habit forming. That being said, as a

[a] However, this may not be the same for all applications. Here's a silly example, you may not be too eager to know how many YikYak points you get, but you surely want to know whether your crush liked your Instagram picture. So, if you were Instagram you may want to make sure they're waiting for a response rather than give an immediate reward as per Zeigarnik effects discussed earlier.

generalized method, it does encapsulate a lot of behavioral economics observations to form a powerful pipeline to transform your application into a habit.

When Fogg spoke about some of these techniques, members of the audience immediately identified these techniques as “millionaire makers” as well as “dangerous” – both of which have proven to be extremely correct. It is important to remember that this is a powerful weapon to make your product successful but we should be sure to use it with a lot of care. And so, we have shown that we can leverage concepts from behavioral economics that include but aren’t limited to prospect theory, endowment effects, neuro-economics, behaviorism to build highly addictive applications.

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