Compulsion Loops & Dopamine in Games and Gamification

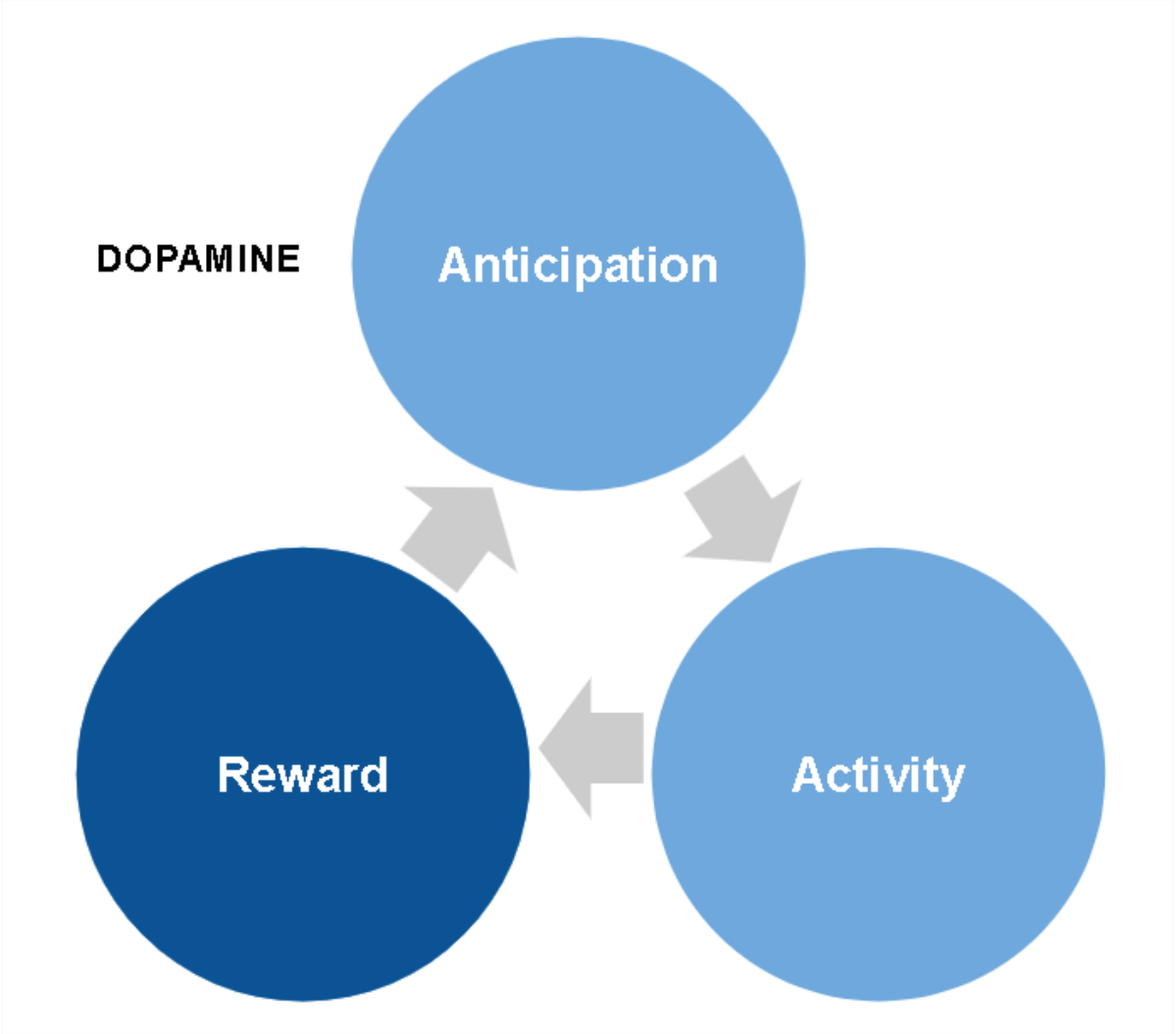
What is Gamification really about?

When you talk about Gamification to people, one word that comes back a lot is "Rewards". Well that's not what Gamification (or Games for that matter) is about! Whaaaat? don't get me wrong here, Rewards ARE important, but that's not what it's about. It's really all about Dopamine!

Dopamine is a drug produced by the brain. Simply put, it makes people do stuff seeking rewarding outcomes. It's responsible for addiction but also for things like seeking food or shelter.

Compulsion loops come from Behavioral Psychology and can be used to explain how games and Gamification makes the brain produce Dopamine. A compulsion loop is made of 3 steps:

1. Anticipation
2. Activity
3. Reward



Counter intuitively Dopamine is produced at the first step : Anticipation. If you look at BJ Fogg's Behavior Model anticipation would be the "Trigger" moment when you think about what you will do and its hopefully rewarding outcome.

But first to explain how to create anticipation that generates Dopamine we need to dig a bit deeper into the Rewards and Activities that are anticipated.

REWARDS

There is a lot to say about rewards and a lot of ongoing research and it would take too much time to go through all of it here. If you want more on that you can find some reference at the bottom of this article. For the sake of simplicity I will divide Rewards into two categories :

- Extrinsic
- Intrinsic

When I do something for something else, that "something else" is an Extrinsic motivation to the activity (that's kind of important because a part of the "clusterfuck" surrounding the theoretical discussions on rewards and motivation is due to the confusion between "What" rewards are extrinsic to. Let's just agree that here we are talking about motivations that are

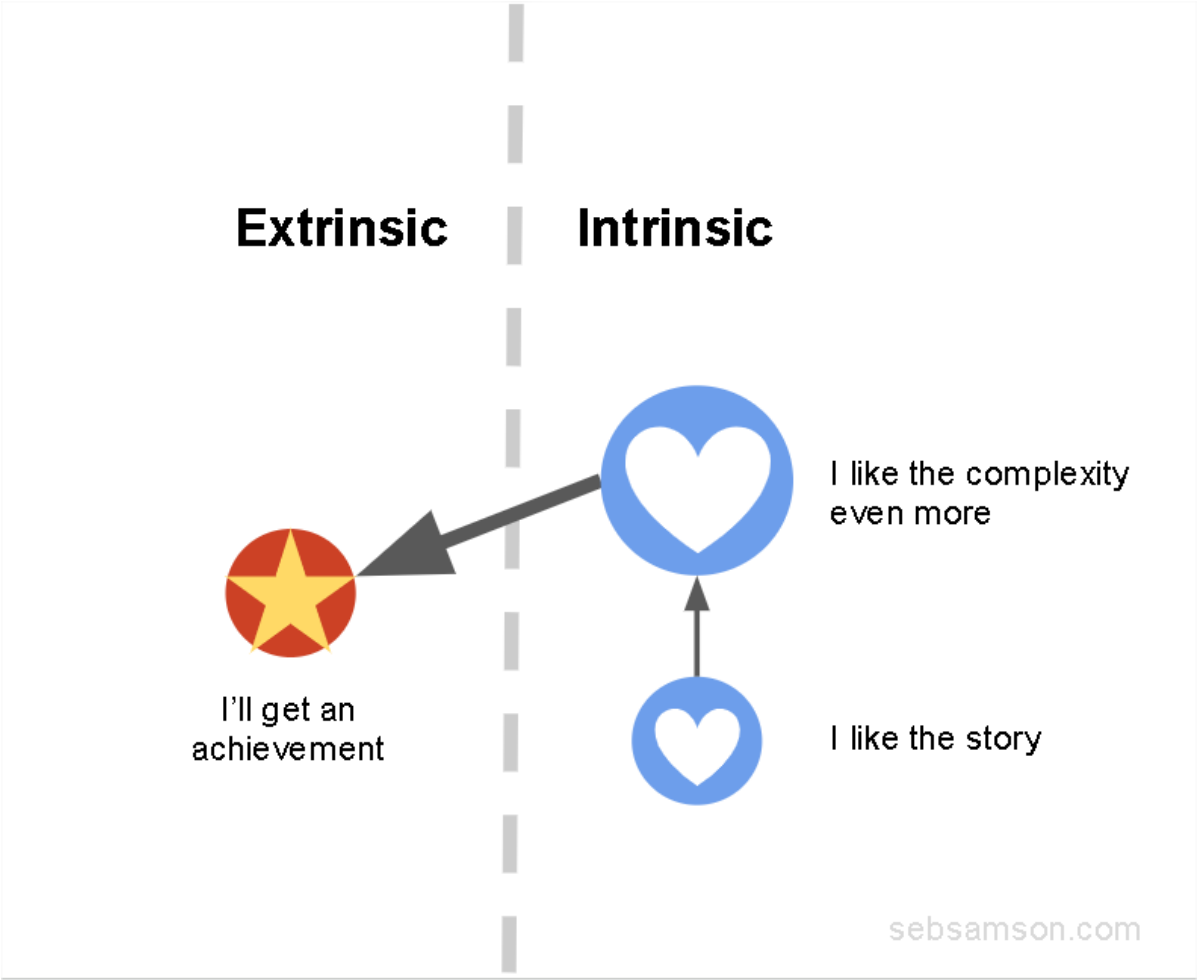
extrinsic or intrinsic to the activity and we should be able to talk about what really matters : how does it work?

Intrinsic motivation is when I do something for itself. The thing I do is its own reward.

Let's look at an example :

Say I am playing a video game because I love the story. Unraveling the story is its own reward. This is an intrinsic reward. While playing I discover that the game mechanics are actually great and I like the challenge they offer me. Progressively I start playing more and more for the mechanics and less for the story. There is a shift in my motivation. I play the mechanics because I like them. This is still Intrinsic to the activity.

Now Let's imagine that for some reason the game designer tough it would be a good idea to add Achievements to the mechanics to reinforce the wanted behaviors. Every time I succeed at a challenge using the game mechanics I love I get rewarded with an achievement that tells me I'm doing it right. That's nice and I start seeking these achievements. As I keep playing I start doing it more and more for the achievements. I might even start grinding to get them, getting me through mechanics I don't like that much which makes the game designer quite happy. What is happening is that my motivation is shifting from Intrinsic to Extrinsic. This shift is called the Overjustification effect. Where I was doing something for it's own sake I am now doing it for an extrinsic reward. What's important to know is that this is a one way trip. It's easy to steal Intrinsic motivation and shift it to Extrinsic motivation but the other way is much harder. If at that point the game stopped to give me achievements I would probably stop playing...



Overjustification Effect

Intrinsic Motivation is the Unicorn of game design. If you have it in your game or app, protect it ferociously and harness its power!! Ok... so how do we do that? Glad you asked! Well my friend we will use what's called "Scaffolding" with the Skills and Challenges that are intrinsically motivating in the activity.

ACTIVITY

Ok. Compulsion Loops come from Behavioral Psychology so "activity" is kind of generic. In our case we are talking about games and gamified apps. In this context the activities we are interested in are Challenges.

"Challenges" replace "Activity" in Games and Gamification

So what do I mean by Challenges?

Challenges = Skills / Difficulty

Difficulty means how hard it is for the player/user to perform something that requires Skills. That's simple enough right? So what are these skills?

Here's a non- exhaustive list I put together. The core of it comes from my time at Ubisoft Studios. They call it Rational Game Design and there's a nice article on how they use it on Gamasutra : Rational Design : The Core of Rayman Origins. I expanded the list and started to divide it in categories but really each app and game has it's own unique skills and this is just inspiration to find them

PHYSICAL CHALLENGES SKILLS

- Precision
  - Pointing precisely at a target
  - Ex: Headshot!
- Measurement

    - Forecasting the position of an object in space and time in order to perform an action
    - Ex: Moving enemy = size, distance, speed
- Timing
    - timing an action at the right moment
    - Ex: Guitar Hero. (long term timing is Planning)
- Reflexes
    - Reacting quickly with the right action
    - Ex: Zombie! Window! Haaaaaaa! OMG! OMG! OMG!
- Physical Endurance & Speed
    - repeating an input over a long period of time to the point it actually hurt!
    - Ex: Button mashing
- Dexterity
    - combining multiple inputs with the controller
    - Ex: Combos, Quick time events

MENTAL CHALLENGES SKILLS

- Management
    - Handling multiple resources with multiple factors simultaneously
    - Ex: Health, ammo, mana, mana potions, inventory cap, timers, crops...
- Planning
    - planning an action to be performed in the future and performing, anticipating a long term outcome of an action
    - Ex: Crops ready in 8h, Enemy reaching base in 2h, Come and collect your daily bonus
- Tactics
    - Figuring out the best way to reach a goal based on the situation (Short term version of strategy)
    - Ex: Assigning a path to a unit on a map to reach a strategic goal while avoiding an enemy camp. use grenades to damage the guy with a shield from behind... etc
- Strategy
    - Considering strategic stakes and establishing mid and long term goals toward an ultimate goal (Long term version of Tactics)
    - Ex: I'll send all my units to this base and crush my opponents by using the surprise effect
- Logic
    - Solving a problem by deduction
    - Ex: Puzzles, Buffs interactions, Detective deductions, enigmas
- Memory
    - Memorizing lots of complicated stuff and accessing that info when you need it
    - Ex: enemy patterns, Simon says, playing songs, memory cards games, Remembering bad iconography and coping for bad UX

SOCIAL CHALLENGES SKILLS

- Cooperation
    - Completing other's actions in the right way
- Coordination
    - Being aware of others actions and timing you own actions in consequence
- Leadership
    - Driving others toward a common goal
- Diplomacy

    - Handling relations between people
- Subterfuge
    - Making others do something without them knowing
- Bonding
    - Creating relations and reinforcing them

Ok, wow. That's a lot of skills but how do we use this? Lets look at an example:

Say I'm playing a shooter and there is a bad guy I need to kill. That's the Challenge. To Kill the bad guy I will need many skills. I need Dexterity to use the controller, I need Precision to aim, Measurement to evaluate his speed and predict where he will be to shoot him. Maybe he has a pattern of hiding and showing up so I might need Timing or maybe he doesn't and I will need Reflexes. I probably need some Management skills to keep track of my ammo and health and make sure I don't run out. I might have to use some Tactics to corner him. And if I have met this type of enemy before I will use Memory to remember how to kill him in the most efficient way.

Skills to shoot the bad guy : Dexterity, Precision, Measurement, Timing, Reflexes, Management, Tactics, Memory

So I used a lot of Skills to overcome this Challenge right? Each of these skills have their own difficulty and I will probably be better at some of them than others. I might suck with timing but be good with reflexes. Depending on how the challenge is balanced to fit my skills I will enjoy it intrinsically or not.

That's right. The challenge can be an intrinsic reward into itself. Mind-blowing is it not! The challenge is.. a Reward! Jackpot! Alright that's great if it's the case but what if it's not though? What if it's boring? Good question! Sometimes the skills and outcome are all just un-interesting and I need an extrinsic motivation to do it. Like cleaning my room. First I do it in fear of punishment, then because I don't want to disappoint my parents, then finally I internalize it completely and do it just because I like it clean. It is still an extrinsic motivation to the activity unless I am a Kung-Fu master of cleaning, unless I like cleaning just for the sake of it and could do this all day because it gets me in the Zone. That would be intrinsic to the activity. But lets be honest, most people don't get there... and the Internalization stops there.

In some cases Extrinsic rewards are as good as it get. Just be careful not to spoil Intrinsic motivation if you have it! Now, lets see how we can build on this precious Intrinsically motivating challenge.. Hey! If we are lucky we might not even need other rewards! Like when people play chess or LEGO right? Nobody needs a reward to play with LEGO!

This all depends on the interest of your player in mastering the skills you offer and the potential for progression in this mastery. Some skills are shallow, some are deep. This is where we will use Scaffolding! Scaffolding comes from learning theory and it's useful to us because we want the player to "learn" how to use their skills and then learn new skills.

Scaffolding is how you train your skills to reach the next challenge where you will use these skills in conjunction with new ones. The difficulty balance needs to be perfect for you to get in the Flow and the outcome needs to be meaningful!

Now we have a pretty hard task here. We need to find the skills and challenges we want our player to focus on. To do that we need to ask ourselves two questions :

1. Can I get better at it?
2. Is it fun?

If you can get better at it there is a challenge with skills under it! Congratz! But more importantly, is it fun to do it? Are the skills hard enough but accessible for me? And is the challenge meaningful to me? That's important because the challenge might be perfect for me in terms of skills but the outcome might not interest me (Why would I save that stupid helpless princess again?).

If you think about it schools have the same problem. They very often struggle to find something meaningful for the kids to be interested in solving math problems or completing essays. Well well! Who would have tough? Games have the same problems as school. Hah! But! Game Designers figured out the solution as well (most of the time).

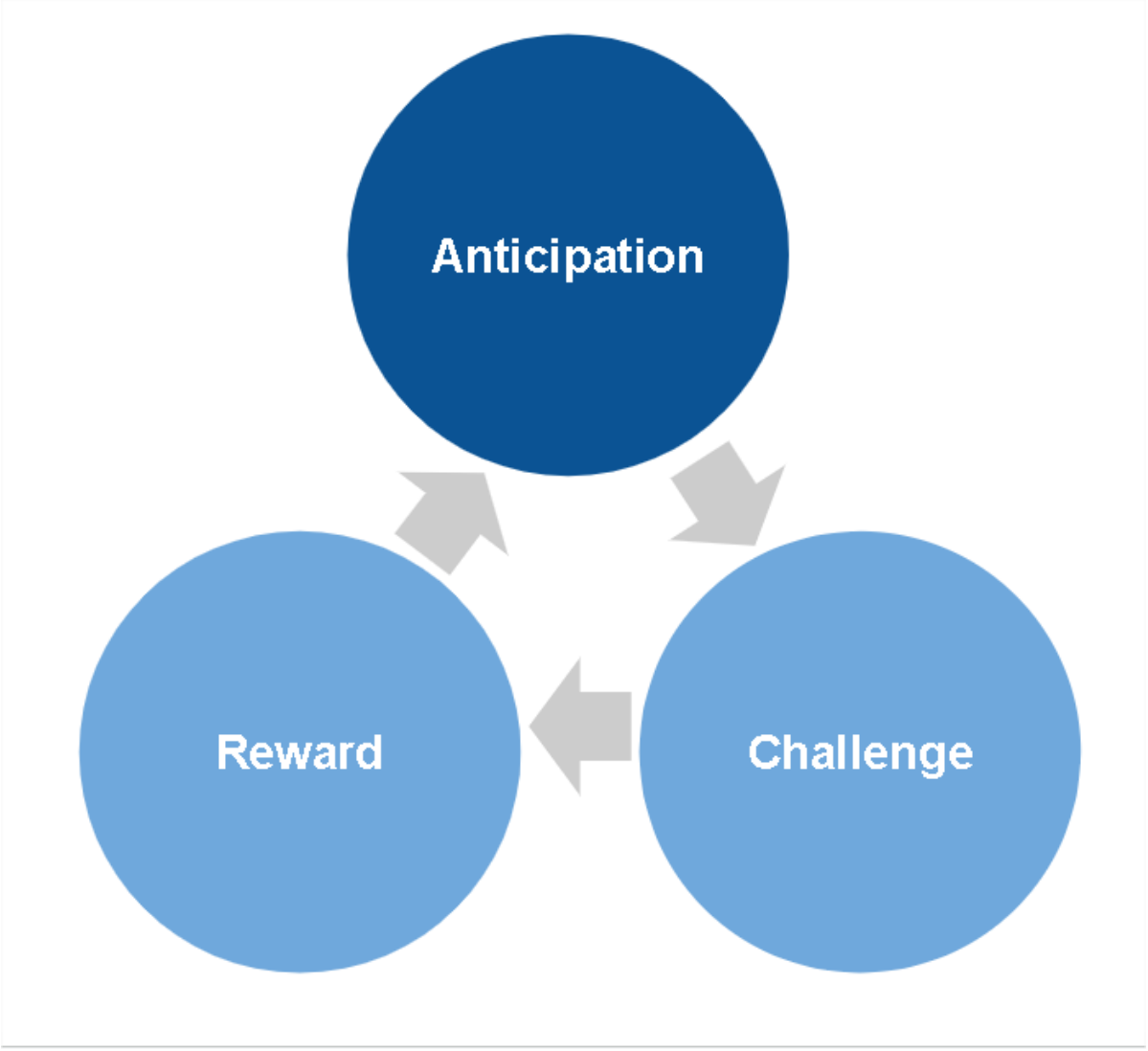
First of all "Play" is voluntary by definition (J. Huizinga) which checks de-facto the Self-Determination requirements of intrinsic motivation right? Well some part of a game might be boring and in the case of Gamification the activities we want the user to perform might not be play. The trick is to find which skills are needed and make sure we distinguish between the outcomes we want (game designer and app developers) and the rewarding outcomes we will offer the player/user.

The outcome we want might be reachable as a side-effect of the player/user engaging in a motivating challenge. For example there are games such as Fold.it which are crowd-sourcing scientific research on protein folding through a puzzle game or Ingress which crowd-sources Geo-Data through a Massively Multiplayer territory control game. Other games such as Scribblenauts are actually teaching literacy skills without meaning it. Just keep in mind that the challenges you offer don't have to be "about" the outcomes you want.

It is also important to know extrinsic rewards CAN be just another intrinsically motivating activity! It doesn't have to be scores, levels, stars or achievements. So If I can find something meaningful for the player/user (we'll come back to that soon) and give a good challenge progression providing just the right difficulty for some of the skills to be fun to master I have all I need to give something to anticipate.

Now I mentioned something earlier. For me to be interested in a challenge , It actually needs to be fun and meaningful. This brings us to the last step of our Compulsion Loop. (drum rolls)

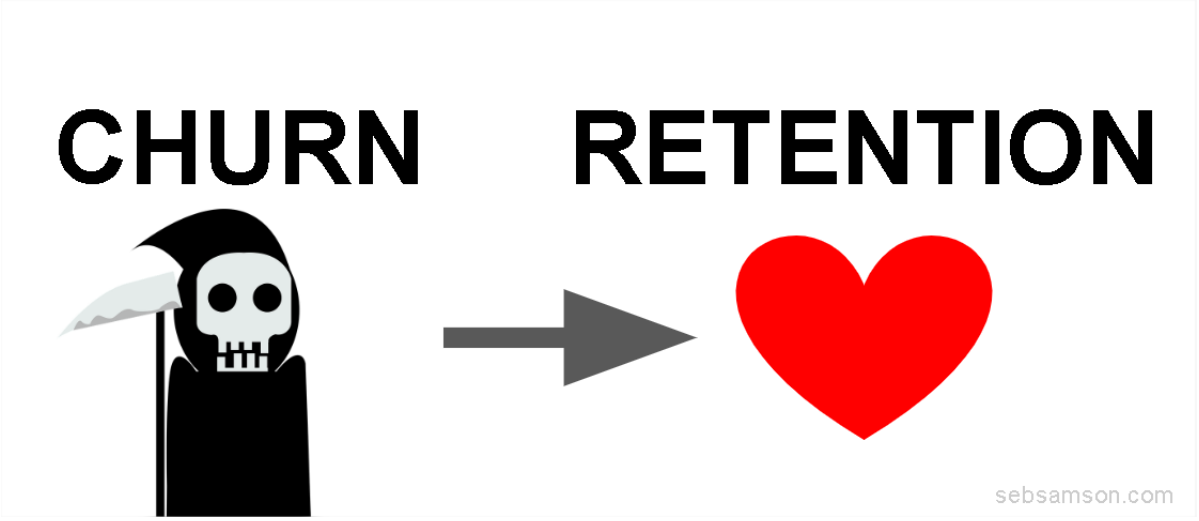
ANTICIPATION



Honestly. People have thousands of other games they could be playing instead of yours. Hundreds of TV shows to watch. Chores to do, work to go to, Beers to drink with their friends... and this is why your player/user might simply Churn. Churn is when people don't come back because they did not anticipate any accessible rewarding outcomes in your experience.

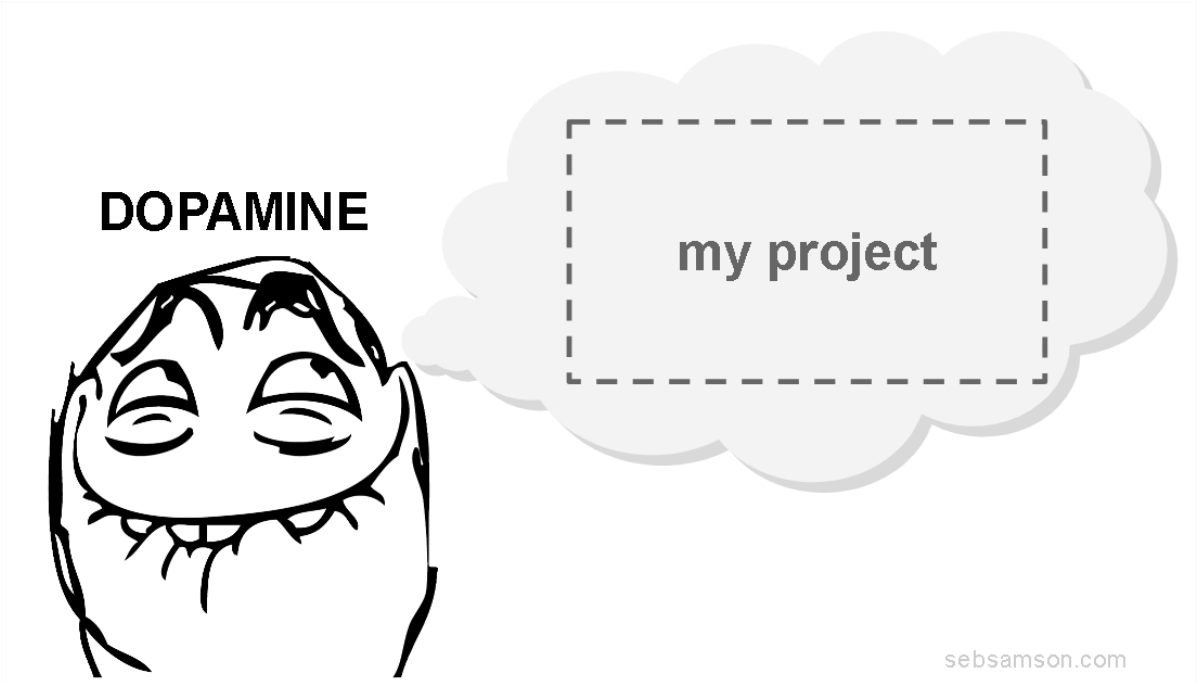
We have seen Rewards. We know they can be an Extrinsic or Intrinsic Motivation like when an activity is it's own reward. We have seen Challenges and Skills which have to be fun to master and meaningful... so what about it? Well these things are important to make people

come back to your game or app. That's what we call Retention.



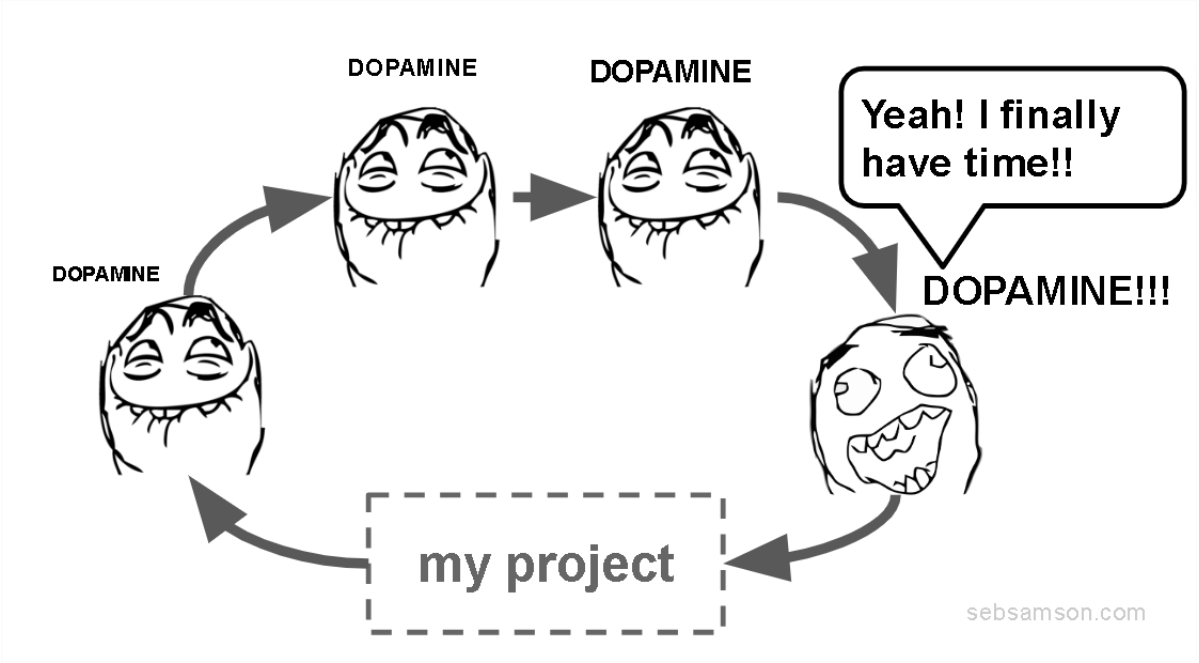
Churn = people don't come back :(, Retention = people come back :)

Now to exemplify how Anticipation is created I will ask you to think of a project of yours. Something you care about. A project that is interesting to you and that you feel you can make progress. It can be a small short term project or a big one as long as it is something you are looking forward to come back to. Go on! Think about it for a second...



When you were thinking about your project, you were producing Dopamine. Actually every time you think about it your brain produces Dopamine. Each of these moments are potential

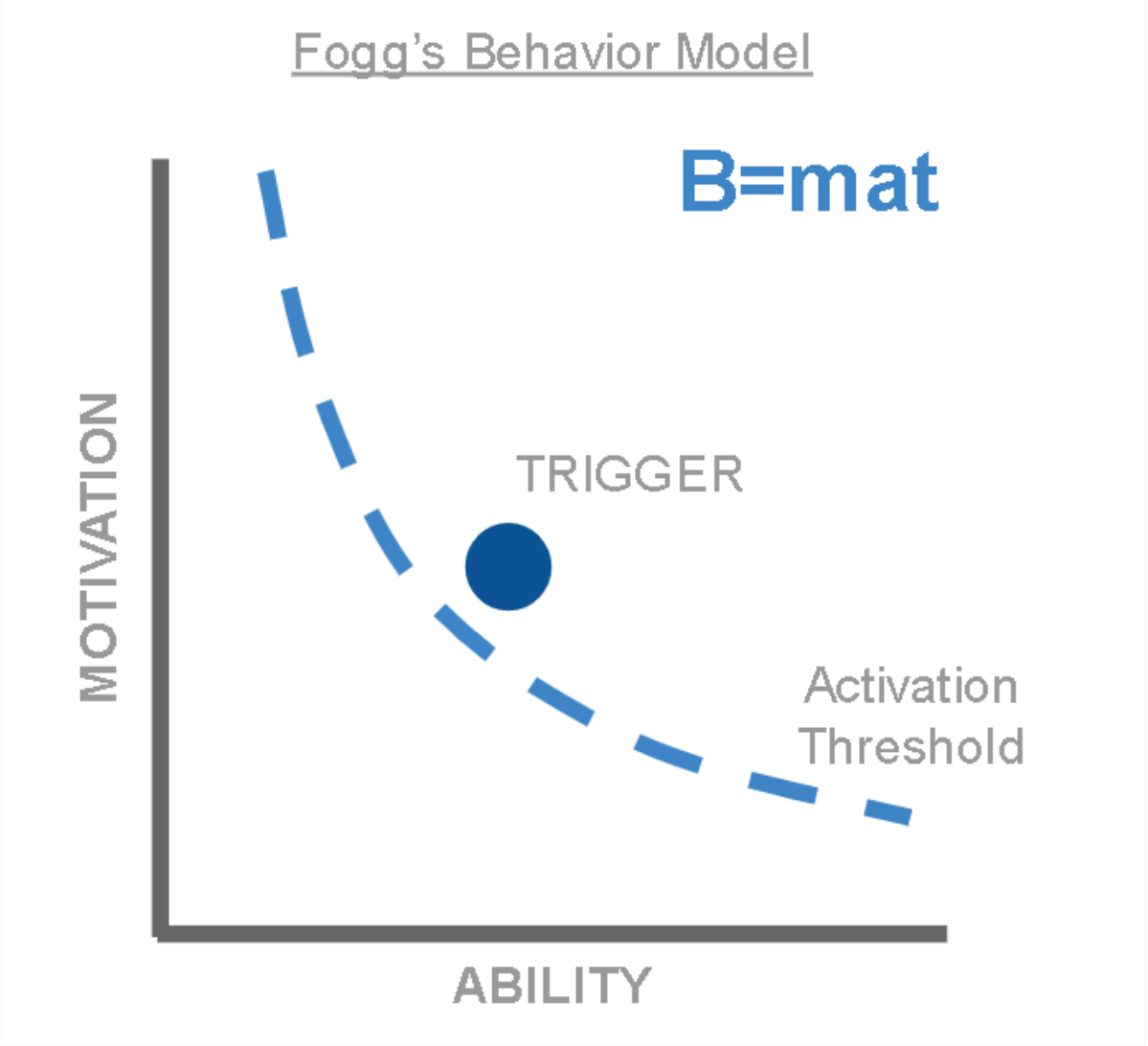
triggers for you to return to your project.



Your Compulsion Loop : Anticipation to return to your project which includes the challenges and Rewards

So because you are motivated by your project and you think about it, you will go for it as soon as you have Time AND/OR Money. That's Fogg's Behavior Model :

Behavior = (Motivation, Ability, Trigger)

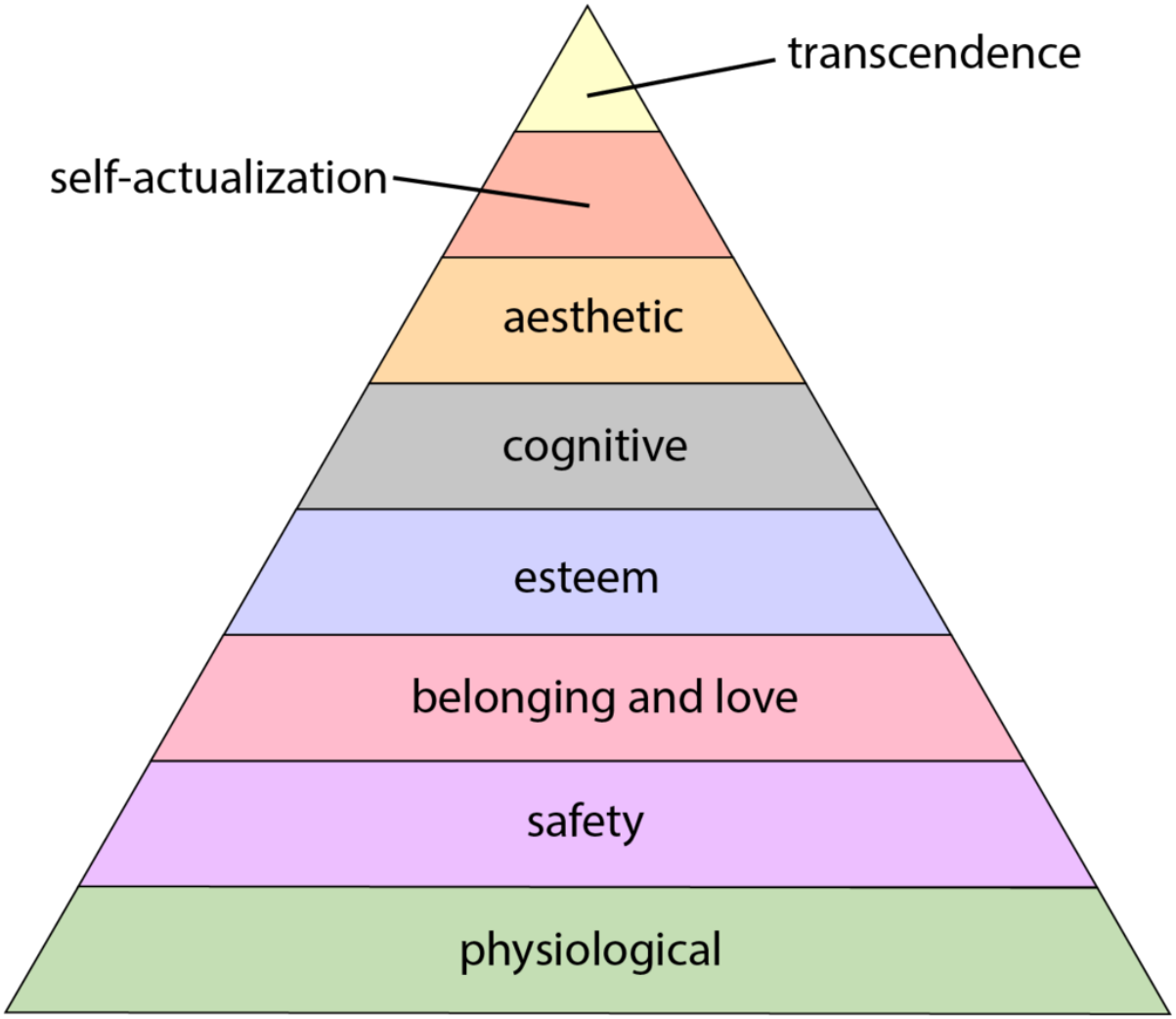


Fogg's Behavior Model

You are anticipating to return to your project because it is meaningful to you in some way. It's something you can progress in that Interests you. I'ts not always easy to find something meaningful for your target demographic. You might be trying to make a sick 8 yo girl blow in a tube 40 minutes 5 times a day to save her lungs or you might be trying to sell virtual card decks to 25-40 yo dudes gaming on the bus.

There is no universal answer to what makes things meaningful for someone but you have to research your target audience and understand what interests them. It might not be related directly to what you want them to do at first but if you understand what is meaningful to them you might find something you can offer on the side that is worth their attention.

As a rule of thumb I find that most of the "meaningful projects" that create anticipation usually answer psychological needs from the top of Maslow's Hierarchy of needs :



Maslow's Hierarchy of Needs

- Need of Belonging
  - Friendship
  - Intimacy
  - Family
  - ...
- Self-Esteem
  - Prestige
  - feeling of accomplishment
  - confidence
  - self-worth
  - Mastery
  - ...
- Self-Actualization
  - Morality
  - Creativity
  - Problem solving
  - ...

Some of these needs can be naturally Intrinsic to the activity like "Problem-Solving", "Mastery", or "Creativity" whereas others might be a bit more complex...

A good example is online comunities. A lot of games have comunities behind them with players supporting each other. This feeds into the "Need to belong" or "caring" of the players and users. Some of it might be Intrinsic to the activity like helping newbies to get started in an MMO. Some of it might be extrinsic to the activity like when it becomes about prestige and status. Other games use Leaderboards to give players the feel that they are doing good compared to others. This might contribute to the players self-esteem but it might also damage it if their score drop since it's based on Extrinsic motivation to the activity. On the other hand if players have ways to establish their own judgment of their self-worth because the system allows them to establish their own goals like in Minecraft this falls into meaningful challenges with intrinsic motivation.

To conclude! We have seen Rewards (extrinsic or Intrinsic) , Challenges (skills vs Difficulty)+Meaningfulness and Anticipation which is basically "looking forward to the challenge and the reward that comes with it" (which can be the challenge itself if we are lucky or clever enough to find it ;). Just remember :

Dopamine = Anticipation

and this is how you use Compulsion loops to generate it! Go out and have fun!

Here are some more references on these theories

- Dopamine : Compulsion Loops used in games - John Hopson
- Ability, Motivation, Trigger : Behavior Threshold - Fogg Behavior Model
- Skills vs Difficulty : Flow - Csikszentmihalyi
- Rational Game Design : Player Skills - Ubisoft Studio
- Extrinsic vs Intrinsic Motivation : Self-Determination - Deci & Ryan
- What makes a project meaningful : Psychological needs - Maslow
- Don't make a fuss about achievements : Achievements considered harmful? -Chris Hecker
- More on rewards risks : Punished by Rewards - Alfie Kohn
- Low-Interest tasks : A SUMMARY OF THE EFFECTS OF REWARD CONTINGENCIES ON INTEREST AND PERFORMANCE - Cameron
- Fun facts as Rewards for boring tasks : Motivated by Meaning - Aubry L. Alvarez, Amy E. Booth

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