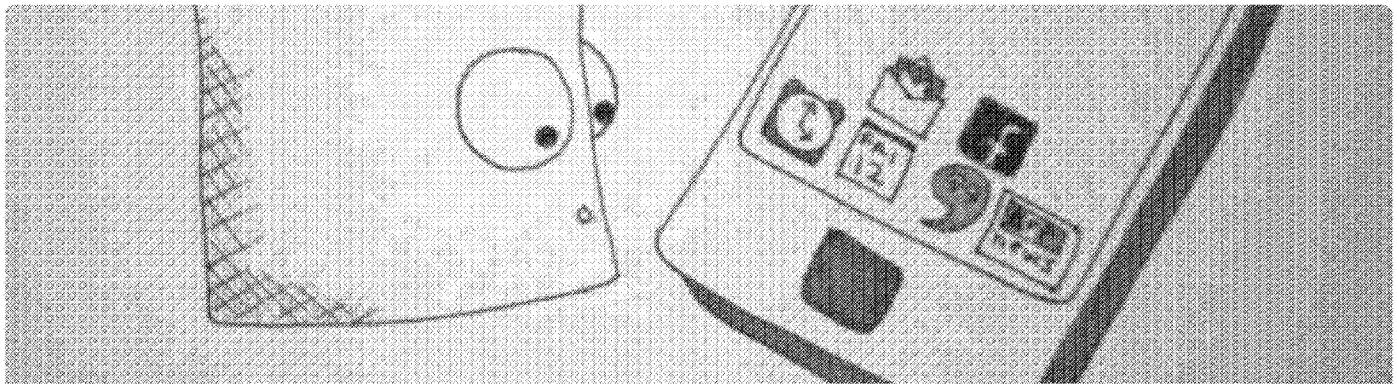
What do marshmallows have in common with notifications?

Kenzie Snyder · Last edited October 30, 2019 · 9 minute read

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What do marshmallows have in common with notifications?

Before you reach the end of this note you will have likely received an alert on Work Chat, an indication that a new post has been made on Workplace, or perhaps a notification about a recent "like" on a photo you posted. Will you stop reading this note to go view one of these attentional demands?

Notifications serve as reminders to engage in a particular behavior. What is considered a notification, however, is more wide-ranging than you might think. Which means more opportunities to be interrupted by new information and to interrupt *ourselves* to seek out new information.

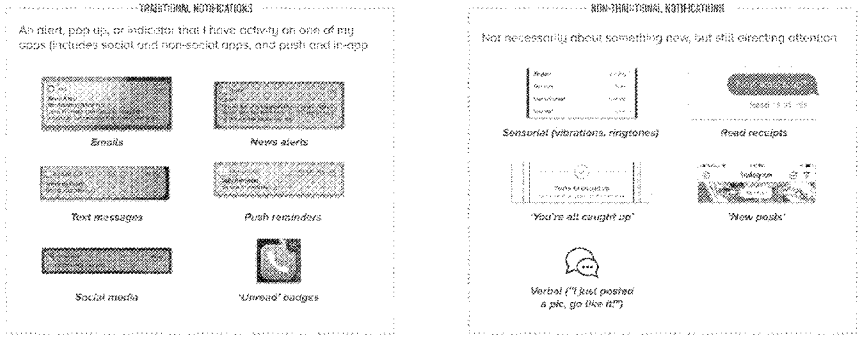
PX-01104, Page 1 of 12

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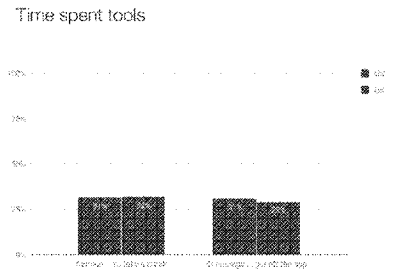
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All it takes is one Google search to confirm that notifications can sometimes make it difficult to do our best work, might diminish our productivity, and/or could contribute to feelings of distress or being overwhelmed. We know from recent research conducted by the Marketing Analytics team that **teens are looking for our help to better manage their time spent on IG**, recognizing that behaviors such as mindless scrolling or incessant checking is not a productive use of their time.

- Teens talk about the amount of time they spend on Instagram as one of the "worst" aspects of their relationship to the app.
- They have an addicts' narrative about their use -- it can make them feel good, feel bad. They wish they could spend less time caring about it, but they can't help themselves.
- Teens recognize the amount of time they spend online isn't good for them but at the same time know they lack the willpower to control the time spent themselves



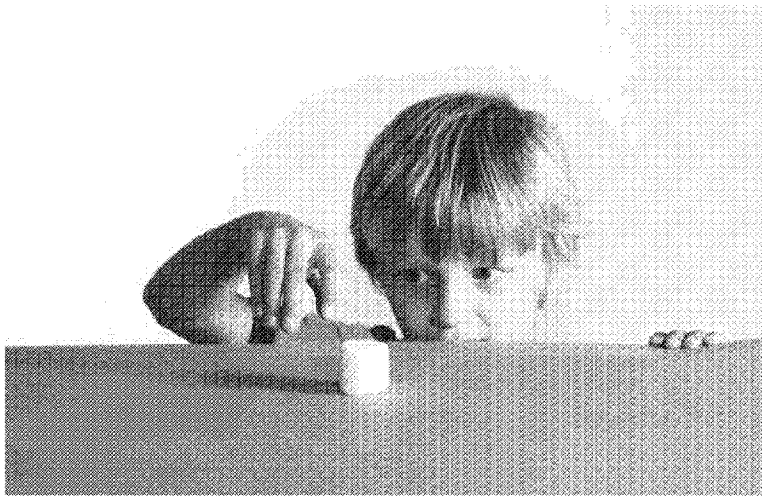
Q. Now you're going to see some things that Instagram could do to help teens. Please select your top 3 for what Instagram should do.

POC: Wendy Gross

Heading into H1 the **Notification Systems team** (formerly Product Communications Platform) **wants to better understand how to create a notification experience that provides delight to our users while mitigating problematic use and well-being concerns around app dependency.** As a first step to tackling this question, I've found it useful to consider what we know from academic literature about self-regulation and the importance of knowing when to react and when to resist temptation.

PX-01104, Page 2 of 12
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Walter Mischel's "marshmallow test" is a prototype for the study of willpower in the face of temptation: a toddler is given the choice to have one marshmallow now or wait and have two later, preschoolers try to postpone immediate gratification and temptation in order to attain a more valued outcome later (i.e., two marshmallows instead of just one) (Mischel *et al.*, 1972; Mischel *et al.*, 1989).



Over forty-years of empirical work on delaying gratification and self-control tells us that there are undoubtedly benefits to successfully resisting temptation, also described as being able to "cool" one's "hot"/reflexive system (Baumeister & Tierney, 2011). However, an excess of will can be as self-defeating as its absence. Not reacting can at times be an unwise and even stifling.

People need to develop the competency and capabilities to both sustain delay and to exercise their will (Ayduk & Mischel, 2002).

PX-01104, Page 3 of 12

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The same thinking can be applied to notifications - people need to be able to differentiate between which notifications to immediately react to (e.g. a message from a best friend) and which notifications might be an unnecessary distraction (e.g. a notification indicating your photo was "liked" by an acquaintance in the middle of a workday), and act accordingly. Developing the competency to know when to delay (or ignore) gratification and when to seize the moment (when either choice could be appropriate) and the skills to do so effectively, especially in moments of temptation, isn't easy!

As the Notification Systems team, **what can we do to help establish a default system that's sensitive to the demands, constraints and affordances of different situations and users' needs, and provide the additional control capabilities that we know users desire**?

We can look to academic research for inspiration on what we can implement and what we can offer to help users better manage their notification experience: when they choose to engage and when they exercise self-control.

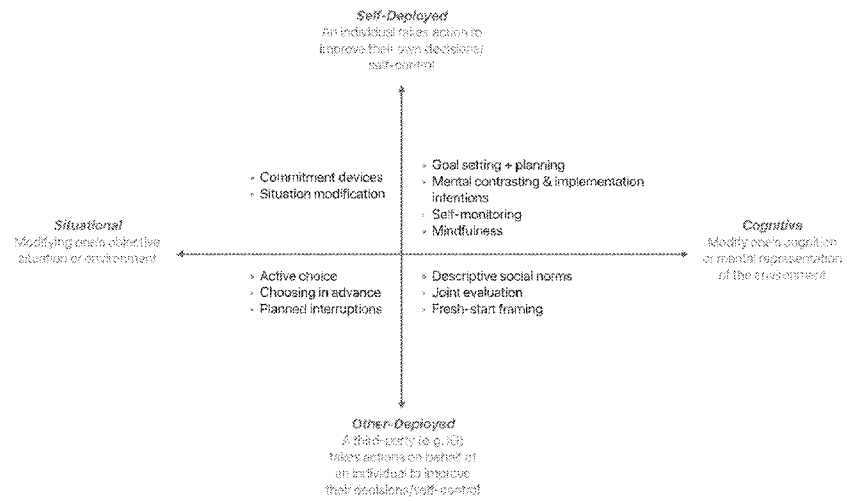
The research distinguishes between **self-deployed** (e.g. an IG user) and **other-deployed** (e.g. IG) strategies and, in addition, between **situational** (i.e. changing one's environment) and **cognitive** (i.e. changing one's thinking) intervention targets (Duckworth *et al.*, 2018). **The concepts below are not meant to be prescriptive, but rather to get us thinking both about what a default system could include and what additional control approaches we might offer.** The most optimal strategies depend not only on their likelihood of success but also on their ease of execution and how scalable they are.

PX-01104, Page 4 of 12

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Situational changes that are typically self-deployed (i.e. a individual's deliberate change of their environment in favor of long-term goals over short-term temptations)

Concepts to consider

- **Commitment devices**: People can improve their future happiness by preemptively eliminating options that would have been available in the future (e.g. downloading an app to constrain the amount of time spent on the internet in the future) (Duckworth *et al.*, 2018). ., 2018). `How might we help people set guardrails or take preventive measures so they're not distracted by notifications or sucked into a rabbit hole in the future?`
- **Situation modification**: By removing deleterious temptations from view people don't have to worry about resisting temptations (Duckworth *et al.*, 2016). , 2016). `How might we implement tools to help people control if and when they see notifications?`

Cognitive changes that are typically self-deployed (i.e. an individual is changing the way they think, making long-term choices more appealing and actionable and short-term temptations less so)

Concepts to consider

- **Goal setting + planning**: Goals are mental representations of what people hope to accomplish. By directing attention and energy towards a specific, desired behavior (e.g. spending 1 hour less time on IG) it becomes easier to measure success thus increasing

PX-01104, Page 5 of 12
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motivation (Heath *et al.*, 1999; P.M. Gollwitzer, 1999). ., 1999; P.M. Gollwitzer, 1999). How might we help people set goals and activate plans around app usage?

- **Mental contrasting & implementation intentions**: Research has found the following combination to be most effective in goal pursuit: After articulating a goal, an individual mentally contrasts the imagined positive outcome ("What would be the best result of accomplishing this goal?") with the obstacle that stands in the way ("What might prevent me from accomplishing this goal?"). The individual then makes a plan ("What's an effective way to tackle this obstacle?") (Adriaanse *et al.*, 2010; Kirk *et al.*, 2013). ., 2013). How might we help those wanting to modify their time on the app or relationship with notifications identify the advantages of achieving this goal and what might be standing in the way, and make a plan for tackling said obstacles?

- **Self-monitoring**: Through intentional and consistent observation of one's own behavior, an individual can become more aware of exactly how much time they're spending on IG (Baker & Kirschenbaum, 1993).: Through intentional and consistent observation of one's own behavior, an individual can become more aware of exactly how much time they're spending on IG (Baker & Kirschenbaum, 1993). *How might we continue to think of ways beyond 'you've spent x amount of time on app' to help users self-monitor their notification and time-spent behaviors?*

- **Mindfulness**: Non-judgmental awareness of a present experience has been shown to reduce stress, cravings, mind-wandering, and other forms of addictive behaviors (Bishop *et al.*, 2004). I., 2004). How might we introduce ways for users to reflect on their time spent on IG in a non self-deprecating way?

Cognitive changes that are typically other-deployed (i.e. a third party is initiating the change in an individual's thinking)

Concepts to consider

- **Descriptive social norms**: Research shows that when people learn that the majority of their peers are engaging in a certain behavior, they're more motivated to shift their behavior in the direction of that norm (Rivis & Sheeran, 2003). Research shows that when people learn that the majority of their peers are engaging in a certain behavior, they're more motivated to shift their behavior in the direction of that norm (Rivis & Sheeran, 2003). How might we communicate to users when friends or people they follow are making changes to decrease problematic use or are successfully managing how and when they engage with notifications?

- **Joint evaluation**: By presenting options for evaluation jointly, rather than one at a time, people are better able to thoughtfully evaluate the costs and benefits of each option and how they compare to each other - not completely unlike a card-sorting or ranking

PX-01104, Page 6 of 12

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exercise (Bazerman *et al.*, 1998; Hsee *et al.*, 2013). ., 2013). How might we help users think of notifications on a spectrum (rather than as all or nothing (one or off) experience), helping them identify which (type or source) are most important through prioritization?

- **Fresh-start framing**: Both laboratory and field research suggests that there are predictable moments when people are especially motivated to make self-controlled decisions (Dai *et al.*, 2014; Dai, Milkman, & Riis, 2015). ., 2014; Dai, Milkman, & Riis, 2015). How might we present opportunities to manage notifications at times of transition/fresh-starts (e.g. new users onboarding, transitioning from high school to college, creation of second account)

Situational changes that are typically other-deployed (i.e. a third party creates incentives, penalties, affordances, or constraints to help individuals reduce self-control failure)

Concepts to consider

- **Active choice**: Unlike defaults, active-choice strategies do not allow people to opt out of making a decision, individuals are forced to think, at least briefly, about which options that would prefer among a set of options. There is some evidence that actively making a choice, as opposed to being opted into a choice, enhances post-decisional goal commitment (Duckworth *et al.*, 2018; Cioffi & Garner, 1996). ., 2018; Cioffi & Garner, 1996). How might we build reasoned notification selection into the onboarding experience; for tenured users how might we make it possible for them to make affirmative decisions around notifications?

- **Choosing in advance**: Prompting choice selection before it will take effect has been shown to help encourage self-control. This is in part because people are more patient when choosing for their future rather than choosing for immediate consumption (Laibson, 1997; Loewenstein & Prelec, 1992). Prompting choice selection before it will take effect has been shown to help encourage self-control. This is in part because people are more patient when choosing for their future rather than choosing for immediate consumption (Laibson, 1997; Loewenstein & Prelec, 1992). How might we help people make decisions around how, when, or the type/source of notification they want to engage with in advance, rather than in the heat of receiving a notification moment?

- **Planned interruptions**: Building interruptions into choice environments can prevent mindless overindulgence and instead force more deliberate decision making. Just as planned interruptions can boost self-control decisions, scheduling time for rest may reduce self-control failure by preventing fatigue (Cheema & Soman, 2008; Vohs *et al.*, 2008). ., 2008). How might we implement different timeframes (e.g. daily, weekly, at night, during work/school) for notification time-outs?

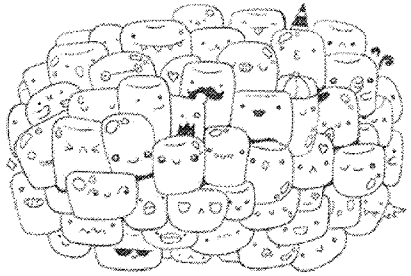
PX-01104, Page 7 of 12

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"The marshmallow task forces kids to find a way to make the situation work for them.... We can't control the world, but we can control how we think about it." - Walter Mischel, The Secret of Self-Control: The New Yorker, 2009.



How might we help our IG users control how they think of notifications? **How might we make it easier for them to make the notifications system "work for them"** -- resisting (or ignoring) what's distracting and reacting to what's important or timely?

I found this quote by one of our research participants particularly inspiring; participants were asked to envision the ideal notifications system on Instagram:

"If I was in charge of Instagram I'd want users to feel like the product was giving them something, not taking or expecting something from them. I feel like more intrusive notifications have that effect, of taking something away (time, attention, happiness), instead of just serving as a useful tool."

As we look towards H1 and consider notifications, we should think about marshmallows too. Sometimes people want things right away, sometimes not at all, and sometimes they'd rather wait so they can enjoy them more later. Let's do our best to know what users want upfront, but also

PX-01104, Page 8 of 12

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make it easier to put them in control so they can enjoy their own experience when and how they want to.

56 26 comments 10 shares

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Most relevant

[redacted] Lori [redacted]
yasss pulling in the social psych!
4y Like Reply 3

[redacted] Brandon [redacted]
here for all the social psych application
4y Like Reply

[redacted] Isaac [redacted]
Shalin [redacted] more notification based research!
4y Like Reply 2

[redacted] Isaac [redacted]
Kenzie sending you a big APA hug for all your citations.



4y Like Reply 2

[redacted] **Whitney** [redacted]
I, too, am here for citations and academic research. This is *super* interesting. Thank you!
4y Like Reply

[redacted] **Alex** [redacted]
This a really helpful framing! A challenge with designing for notifications is that more notifications almost always drive more engagement, but qualitatively we know that people's value from notifications often don't match up with the engagement metrics show.

I really like how the marshmallow analogy is a more visceral way of describing what a designer at Quora wrote about:

> metrics can reflect usage that comes from one part our brains, while the user's decision of what makes your product worth their time comes from another

PX-01104, Page 9 of 12

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4y Like Reply 2

[redacted] **Kenzie Snyder**
Alex[redacted] this is awesome, thank you for making the connection and sharing!
4y Like Reply

Write a reply ..

[redacted] **Peng**[redacted]
This is an awesome note for me to educate myself about the psychological impact that notifications might have on users perspective, and definitely point out many long term goals for optimizing the notifications platform. As a ranking engineer, my two take away here is: 1. We might need to optimize the notification filtering logic not only for some direct metric such as CTR but for more meaningful events associated to users' general satisfaction of the notification experience. 2. We may also start thinking how to improve the notification experience from the recipient perspective, such as personalized notification capping, prioritizing and send time optimization. 3. It is best to come up some measurement (such as a metric) reflecting the users' general satisfaction about the notif experience that the team could work for in the long term. Thanks for the great note again!
4y Like Reply 2

[redacted] Ajit[redacted]
Interesting read! Also, now I want s'mores!
4y Like Reply

[redacted] **Kenzie Snyder**
Ajit[redacted] perfect timing! Come! It's fall in NY!
4y Like Reply

[redacted] Write a reply...

[redacted] Caitlin[redacted]
Can't wait to work with you to bring this vision to life!
4y Like Reply 2

[redacted] **Kenzie Snyder**
Caitlin[redacted] me too!!
4y Like Reply

Write a reply...

[redacted] Jesse[redacted]
I'm obsessed with this, couldn't be more fired up about this direction for notifications!
4y Like Reply Edited 2

[redacted] **Kenzie Snyder**
Jesse[redacted] this comment makes me so happy!
4y Like Reply

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PX-01104, Page 10 of 12

Write a reply...

[redacted] Sebastian [redacted]
Cc **Helen**, **Derek**, **Lauren**
4y Like Reply 3

[redacted] Vlad [redacted]
Awesome article! **#thanks Kenzie**! Looking forward to implementing our vision
4y Like Reply

[redacted] **David** [redacted]
Wow, what a note!! Very impressive glad to see so much thoughtful application of psychological concepts to our app
4y Like Reply

[redacted] Rachel [redacted]
This is so inspiring for blue app notifications as well!!! Thanks for sharing!
4y Like Reply

[redacted] Jessica [redacted]
So good!! Thanks for this, **Kenzie**! It's super helpful as we start to dig into well-being themes and idea generation.
4y Like Reply

[redacted] **Shruti** [redacted]
Gayatri [redacted] A really good read on notifications..
4y Like Reply 2

[redacted] **Judy** [redacted]
Anneke Mariah [redacted]
4y Like Reply

[redacted] **Saf** [redacted]
Regarding reward systems **Shayli Jimenez**, **Amy** [redacted], **Ebo** [redacted]
3y Like Reply 4

[redacted] **Kenzie Snyder**
Darius Kilstein you might enjoy this read too!
3y Like Reply

Darius Kilstein
FWIW I have 0 notifications turned on in my phone
3y Like Reply

Darius Kilstein
I do wonder if it's the notification that drives the addiction, or the app itself. My gut is it's probably like 10:90, but we could probably do some data analysis to estimate
3y Like Reply

[redacted] **Kenzie Snyder**
Safaa [redacted]
2y Like Reply

[redacted] Write a comment...

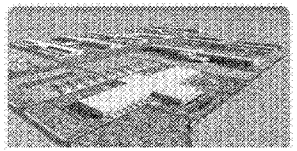
PX-01104, Page 11 of 12

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Recommended Reading



Project Cable (Type6)
Concept Design is Here!

[redacted] Sabrina[redacted]

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PX-01104, Page 12 of 12