AMENDED Exhibit 225

PLAINTIFFS' OMNIBUS OPPOSITION TO DEFENDANTS' MOTIONS FOR SUMMARY JUDGMENT

Facebook "Addiction"

A response to the public narrative
based on clinical and neuroscience research

Elena Davis
Well-Being Research
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Content

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TL;DR

There is **no evidence that Facebook use meets the clinical definition of "addiction."** The way the media portrays Facebook "addiction" can be **exaggerated and inaccurate.**

However, **Facebook may be rewarding and habit-forming.** Therefore some people may experience **genuine problems** related to their Facebook use.

We should reduce cases where **rewards are unpredictable or lacking in value**, and reduce **unintentional behavior**, for example:

- notifications with little or no relevance
- continuous content without breaks
- constant updates including Like counts
- lack of feedback about amount of use
- signals of availability that lead to expectations of quick responses

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What is the issue?

There is growing concern in the public that technology companies are deliberately manipulating users by designing **addictive** products that can harm well-being and subvert self-control.

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Headlines frequently reference the concept of addiction with respect to Facebook and social media

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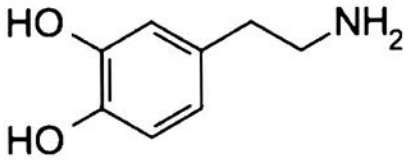
To understand and respond to these claims, we need to clarify how Facebook is implicated in:

CLINICAL ADDICTION

REWARD LEARNING



HABIT FORMATION

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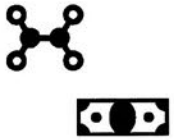
Definition of clinical addiction

- **Addiction is a primary, chronic disease where a substance or behavior is pursued pathologically.**
- It is life-impairing and causes significant psychological distress.

- **Addiction involves a broad set of long-lasting changes to brain circuitry underlying reward, stress, and self-control.**
- The major brain change is that the **dopamine** system becomes less sensitive.



- **Current medical diagnoses apply only to substances or gambling. However, medial diagnoses change definitions over time based on new evidence.**
- There are 9 defined categories of abusable substances (e.g., stimulants, opioids), each with unique criteria as a "substance use disorder."
- Gambling disorder is the only non-substance (i.e., behavioral) addiction.
- Internet gaming disorder is a diagnosis "for future study," meaning there is some supporting evidence but it is not currently sufficient to define a unique disorder.

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ADDICTION

Diagnoses of mental disorders, like addiction, require that specific criteria are met

Multiple symptoms +

When viewed collectively, these could support a diagnosis

Substance use disorder has 11 symptoms; 2 minimum must be met

Gambling disorder has 9 symptoms; 4 minimum must be met

Persistence over time +

Symptoms must be recurrent; temporary symptoms do not constitute a disorder

Negative life impacts

The impact on an individual's quality of life must be significant and rise to the level of medical concern

Impairment can be in social, occupational, or other life domains

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ADDICTION

If Facebook "addiction" were a diagnosis, criteria might include:

Multiple symptoms +

Examples:

Preoccupying thoughts: thoughts about Facebook use are excessive, absorbing, and irresistible

Overwhelming behavior: drive to use Facebook is extremely strong, despite desire and/or attempts to stop

"Tolerance": more and more use is needed to achieve desired feelings

Persistence over time +

Use **continues** despite significant negative life impacts

Problematic symptoms are not limited to unique or temporary circumstances

Negative life impacts

Facebook use has caused **significant negative impacts on important areas of life functioning**, e.g., loss of job or relationships

Other important interests are neglected in favor of Facebook use

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ADDICTION

Facebook itself seems unlikely to be capable of producing a true addiction

Facebook is not a substance that acts directly on the brain.
It does not create brain changes at the level of intoxication or impairment.
The rewards that Facebook produces are naturalistic (i.e. social), not chemical.

There is no evidence of dopamine system *abnormalities* related to Facebook use. However, Facebook does likely activate dopamine.
The degree of dopamine release from behaviors is not as extreme as from substances.

Gambling, the only defined behavioral addiction, involves feelings of "excitement" and **evidence of tolerance** (need to gamble more and more to get the same excitement).
These symptoms are not typically reported with Facebook use.

Repetitive, excessive behaviors can create problems for people, but there is currently not enough evidence to define any as an addictive disorder, except for gambling.
Behaviors known colloquially as "addictive" include sex, exercise, shopping, internet use, and eating; all activate the dopamine system.

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ADDICTION

Common Facebook-related problems alone would not constitute symptoms of addiction

Excessive use

- **Using Facebook a lot does not constitute a problem in of itself** - this needs to be considered along with other symptoms, the context of use, and what **negative impacts** have occurred.

Using more than you want to / feeling guilty about use

- This is a **personal judgment call and not a sign of a disorder**, unless the negative feelings are causing **significant distress** and **use cannot be controlled**.

Feeling "out of control"

- Unless these are persistent and distressing feelings *plus* **having failed attempts to stop**.

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ADDICTION

A Facebook "addiction" diagnosis would require a fairly **high threshold of severity** and **inability to control use** despite **serious negative life impacts**.

It is **unlikely that most people would meet this threshold** when it comes to Facebook.

Because Facebook is not "addictive" in the same way as substances or gambling, **it may not be possible to cause a true addiction**. This does not mean that new evidence will not emerge, but **the available clinical evidence is insufficient.**

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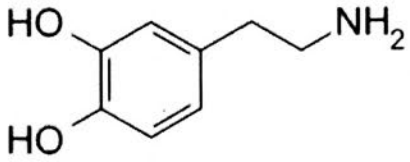
Though there is no clinical diagnosis of Facebook addiction, there are parts of the addictive process that may be at play and contributing to common issues for people:

REWARD LEARNING



HABIT FORMATION

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What is a "reward"?

In neuroscience, a reward is something that results in motivated behavior to seek it out.

- Rewards therefore have "incentive salience" - meaning they are treated as important and wanted.
- Animals (including humans) are motivated to get rewards.

Some rewards are experienced as inherently pleasurable and are related to survival - like food, sex, and social approval.

- Other rewards like money are pleasurable only by learned association.
- Addictive substances directly activate the reward system in the brain in a specific extreme way.

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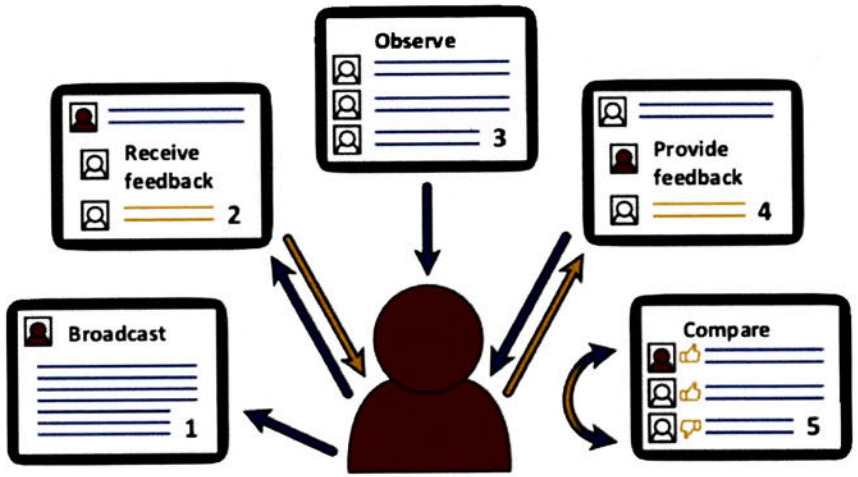
REWARD

Social behavior online can be rewarding - similar as social behavior offline

Specific social media behaviors that activate the brain's reward system (i.e., the ventral striatum; VS)

1. Sharing information with others
2. Receiving positive feedback (cues that people understand, agree, or like you)
3. Reading others' posts (related to satisfying curiosity)
4. Giving positive feedback
5. Learning about social standing



Meshi et al., 2015

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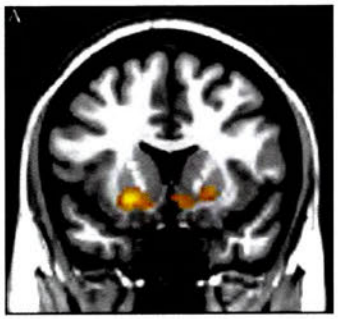
REWARD

Neuroscience research has shown that **Facebook does activate the brain's reward system**



1. **Instagram pictures with more vs. fewer "Likes" activate the ventral striatum (VS) to a greater extent**
   This means Like counts provide meaningful information for whether something is important and potentially rewarding.

2. **Images of Facebook symbols (e.g., the "F") activate the VS more for frequent users**
   If you use Facebook often, common symbols produce reward system activation; also those symbols will be more familiar to you and therefore more salient.

3. **People who have stronger VS responses to reputation gains as compared to monetary gains are more likely to use Facebook more**
   People who are particularly sensitive to social rewards might find Facebook use more rewarding and therefore use it more.

1. Sherman et al., 2016; 2018
2. Turel et al., 2014
3. Meshi et al., 2013

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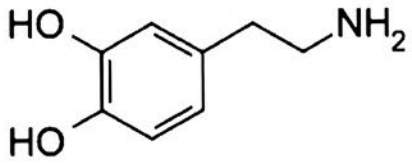
REWARD

Because aspects of Facebook are rewarding and activate the VS, we can presume that dopamine is released.

This does not mean that people are "hooked", "high", or "addicted", as the media headlines claim.



Social Media Triggers a Dopamine High

Dopamine Is The Addictive Little Secret Of Social Media

Has dopamine got us hooked on tech?

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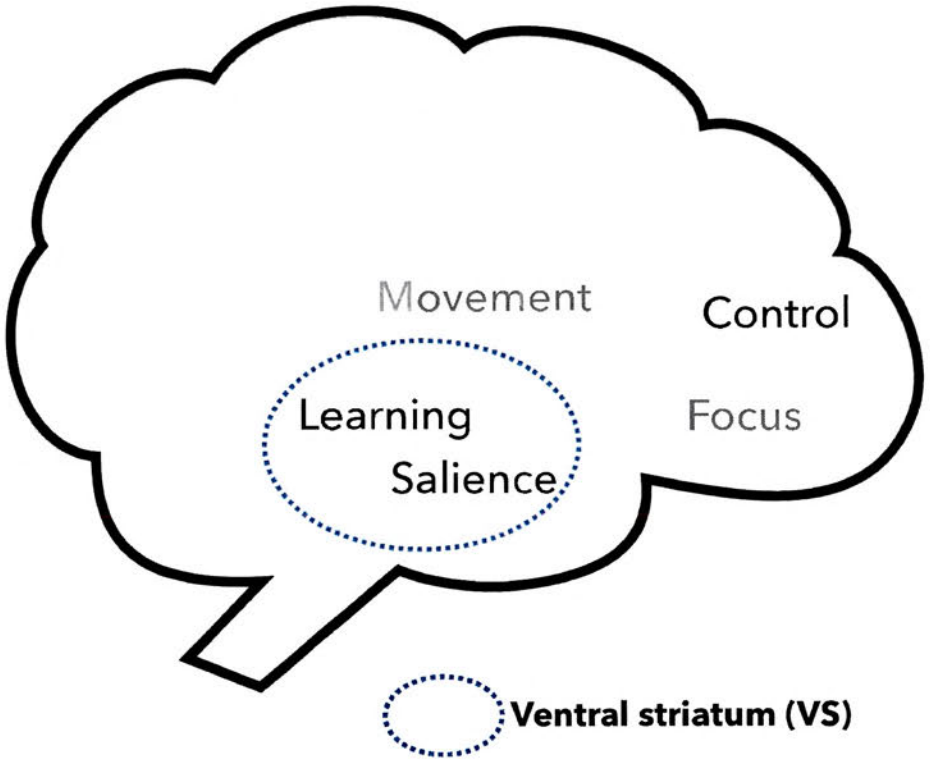
REWARD

Dopamine is a major chemical in the brain that has several important functions, including reward processing



- Dopamine is released in the ventral striatum (VS) after you experience a reward, which triggers **learning** that the reward is important or **salient**.
- Dopamine also facilitates **control** over behavior to go get the reward (or not), which is related to motivation.
- When rewards are unpredictable, dopamine release is increased: there is more **learning** needed.

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Dopamine release **is not tantamount to "addiction"** and instead underlies **normal learning about things that are positive, salient, and wanted.**

However, some aspects of the rewards available through Facebook may contribute to problems for some people.

It may be a problem if Facebook seems rewarding based on the principle of **unpredictability**, while the inherent **value of the reward is lacking**

- Notifications with little or no relevance, and that come at unpredictable times
- Prominent novel content that creates unwanted distractions
- News Feed stories with seemingly "random" content and unpredictable order
- Other use of unpredictable rewards, such as delays to load

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REWARD

Facebook's rewards are **easily accessible**, **available all the time**, **limitless**, and **don't include built-in controls**.

For people who tend to have difficulty regulating their consumption of rewards, it may be easy to use Facebook "too much."

- Continuous content without breaks
- Signals of availability that lead to expectations of quick responses (read receipts, green dots signaling online presence)
- Constant updates including Like counts
- Lack of feedback about amount of use
- Log in info (username and password) automatically saved leading to easy, immediate access

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Part of the "addiction" narrative seems to be about people feeling like it is easy to "overindulge" on easily-accessible rewards.

There are also other motivations for Facebook use that could feel unhealthy.

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Facebook use may be positively reinforcing (providing something desired) or negatively reinforcing (removing something aversive).

Negative reinforcement may be particularly problematic.

- If someone's primary **way of coping** with difficult emotional experiences is to go on Facebook, they may **become reliant on Facebook** and have trouble cutting back on use
- The **negative emotion itself could become a trigger for use** - so there would be constant real life (non-Facebook) cues that could drive someone to use "too much"

General mental health support and psychological resources may be helpful in these cases, e.g., information to promote emotional awareness and alternative coping skills

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REWARD

Experiencing a reward (or reinforcement) can increase learning and motivation. This contributes to repeated, potentially habitual behaviors.

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HABITS

In addition to Facebook being rewarding/reinforcing, some people feel like their Facebook use is difficult to control, or has become a **habit.**

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Habits are automatic behavioral tendencies

Repeated behaviors in the same situation can lead to habit formation ***especially if rewarded***

Situation → Behavior
Situation → Behavior
Situation → Behavior
Situation → Behavior
Situation → Behavior
Situation → Behavior

The situation serves as a cue for an **automatic** behavioral response

Cue → Response

(Situation) → (Behavior)

Exerting control over automaticity is effortful; habits are hard to break

Cue ~~→~~ Response

\+

EFFORT

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HABITS

Having a habit **does not mean you have no agency**.

It does mean that **effortful control** is needed to inhibit your automatic behavior, and this can be **difficult**.

Note: **Addiction goes beyond habit.** In addiction, use becomes compulsive, meaning it is not only difficult to control, but there are powerful neurological and psychological forces compelling you to continue using, despite serious negative consequences.

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HABITS

Facebook may meet criteria of "habit-forming" for some people

Things that are habit-forming are:	Facebook
Consumed frequently	✓
Found to be gratifying	✓
Done automatically	✓

Vishwanath, 2014 32

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HABITS

There are many Facebook cues that signal particular behaviors, which can become habits

Facebook Cue	→	Response
Notification pops up	→	Read it
Land on News Feed	→	Start scrolling
App icon with a red badge	→	Open it

People engage in these behaviors repeatedly and often do them without thinking

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HABITS

There are also cues in life outside of Facebook that can signal Facebook-related behaviors

Non-Facebook Cue	→	Response
Wake up in morning	→	Reach for phone
Finish checking email	→	Open Facebook
Feel bored	→	Check for any notifications

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Habits can be changed by behavior regulation, but aspects of Facebook can make regulation difficult[1]

Low awareness

People don't realize how often or for how long they are using Facebook[2]

Low attentiveness

Use of Facebook feels "mindless"
Logging on is unconscious or automatic[3, 4]

Low intentionality

Default options are kept in place
Choices are not deliberate

Low control

It is difficult to limit one's use
It is easy to keep scrolling and go on frequently[2, 3]

1. Vishwanath, 2014 2. FB UX Research: [redacted] 2018 3. FB UX Research: Davis, 2018 4. FB UX Research: [redacted] 2018

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HABITS

It may be a problem if there are **cues for Facebook use** that influence people's behavior based on **automatic tendencies**, when they actually **don't want to be using Facebook**.

- Unwanted push notifications and badges, especially ones that are on by default
- Stories or videos that autoplay
- Immediacy of seeing News Feed

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HABITS

It is a problem if there aren't **options for people to regulate their use** or reduce their use when they want to.

Many people report using **"all or nothing" strategies** to regulate use - such as temporarily **deactivating or uninstalling the app** from their phone.

We have an opportunity to provide alternative strategies for regulation.

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HABITS

We can make changes so Facebook has less potential to be habit-forming and provide support for people to "break" Facebook habits they don't want.

Things that are habit-forming are:	Area of potential change:
Consumed frequently	Reduce frequent unwanted or unintentional consumption
Found to be gratifying	Ensure that rewards are meaningful and valued, not superficial
Done automatically	Make automatic behavior more difficult

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HABITS

Facebook could provide people support to regulate habitual use by making changes in these four areas:

Awareness

Increase awareness by **getting feedback** on behavior, receiving **alerts**, and **tracking behavior** over time

Attentiveness

Increase attentiveness by adding **new salient stimuli** or "speed bumps" to **add friction to automatic behaviors, such as making it harder to find unwanted distractions**

Intentionality

Increase intentionality by **prompting more choices**, **reconsidering defaults**, and providing **support for setting and pursuing goals**

Control

Increase control over behavior with **tools to set limits**, **prompts for alternative behaviors**, and **reduced barriers for exercising control** (e.g., make it easy to flexibly change settings)

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SUMMARY

In response to the "addiction" narrative, we can:

Dispute that Facebook is like an addictive drug

Acknowledge that Facebook may be rewarding and habit-forming

Change aspects of the platform that may contribute to use that people find unwanted or difficult-to-regulate, specifically in the areas of reward learning and habits

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SUMMARY

Next steps

- **Conduct additional qualitative and quantitative research with people reporting negative impacts from Facebook or problems controlling their use**
  - Follow up on problematic use survey
  - Research Facebook "habits" specifically
- **Audit the platform for uses of unnecessary unpredictable rewards; consider design changes to make rewards more predictable**
- **Continue research in the "Agency and Control" space of well-being**
  - Improvements already in areas of awareness and control
  - Investigate opportunities to improve attentiveness and intentionality
- **Form research and comms team collaborations to hone media response in this space**
- **Consider international implications and research the broader perception of "addiction"**

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SUMMARY

In response to the "addiction" narrative, we can:

Dispute that Facebook is like an addictive drug

- There is no evidence that Facebook functions like an addictive substance.
- There is no evidence that Facebook creates abnormalities in the brain's dopamine system. It does likely activate dopamine - this is normal and expected.
- There is currently insufficient evidence that Facebook can create a behavioral addiction (like gambling). More research is needed.
- Most people in the public and media colloquially use "addiction" in inaccurate, exaggerated ways - this misuse should be corrected.

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SUMMARY

In response to the "addiction" narrative, we can:

Acknowledge that Facebook may be rewarding and habit-forming

Several themes within the "addiction" narrative are linked to the concepts of reward/reinforcement and habits. The problems that people tend to report with their Facebook use also fit in these categories:

Use that produces **feelings of guilt** or a sense that **time spent was not valuable**	→	Reward/lack of positive reinforcement
Use that people feel they "can't live without" or are **dependent** on	→	Negative reinforcement
Use that feels **inconsistent with one's intentions**, **distracting** from other important things, or **more than one wants**	→	Reward and habits

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SUMMARY

In response to the "addiction" narrative, we can:

Change aspects of the platform that may contribute to use that people find unwanted or difficult-to-regulate

REWARD

- Facebook provides unpredictable, easily accessible rewards that can be consumed excessively. We can help people **set limits around reward consumption**, **improve reward value**, and **reduce unpredictability where possible**:
  - **Audit the platform for examples of unnecessary use of frequent, unpredictable rewards**
  - Provide options to **receive updates only at certain times** or intervals.
  - Continue to optimize notification content, notification settings and News Feed algorithms to:
    - **allow people streamlined access to valued content**
    - **minimize unnecessary distractions** (e.g., filter content, change homepage, stop autoplay, have different categories of notifications, etc.)

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SUMMARY

In response to the "addiction" narrative, we can:

Change aspects of the platform that may contribute to use that people find unwanted or difficult-to-regulate

HABITS

- By improving the four areas related to **helping people regulate their behavior** (**Awareness, Attentiveness, Intentionality, and Control**), we can support people **making choices to use Facebook in ways they want** vs. ways that are habitual but unwanted - even if it means they choose to use Facebook less.

- It is important that habitual use is not creating negative impacts on people's lives, and that **people feel able to stop the habit if they want to**. We can examine the sources and types of negative impacts and **provide tools to help break habits**.

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SUMMARY

Specific next steps for research

- **Conduct additional qualitative and quantitative research with people reporting negative impacts from Facebook or problems controlling their use**, in order to:
  - Identify specific problematic aspects of the platform to prioritize changing
  - Refine our understanding of what people mean when they say they are "addicted" and identify who is most vulnerable
  - Create our own definition of and way to measure "problematic Facebook use" - this will likely encompass problems with both reward/reinforcement and habits
- **Continue research in the "Agency and Control" space of well-being.**
  (Note that some of these features may only be necessary/useful for certain people at certain times, specifically if they are having trouble regulating their use)
  - Follow up on well-being impacts from Do Not Disturb, "Your Time on Facebook" and Daily Reminder features to reduce interruptions, improve awareness of time spent, and control use
  - Explore other features to reduce automaticity or pressure to log on frequently: add friction to log in, create a visible "offline" setting, remove Like counts, change "homepage," prompt people to set intentions for use, audit our default settings, etc.

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Citations

Clinical diagnostic manual:

American Psychiatric Association: *Diagnostic and Statistical Manual of Mental Disorders*, Fifth Edition. Arlington, VA, American Psychiatric Association, 2013.

Academic papers:

1. Meshi, D., Morawetz, C., & Heekeren, H. R. (2013). Nucleus accumbens response to gains in reputation for the self relative to gains for others predicts social media use. *Frontiers in Human Neuroscience, 7*, 439.
2. Meshi, D., Tamir, D. I., & Heekeren, H. R. (2015). The emerging neuroscience of social media. *Trends in Cognitive Sciences, 19*, 771-782.
3. Sherman, L. E., Greenfield, P. M., Hernandez, L. M., & Dapretto, M. (2018). Peer influence via instagram: Effects on brain and behavior in adolescence and young adulthood. *Child Development, 89*, 37-47.
4. Sherman, L. E., Payton, A. A., Hernandez, L. M., Greenfield, P. M., & Dapretto, M. (2016). The power of the like in adolescence: effects of peer influence on neural and behavioral responses to social media. *Psychological Science, 27*, 1027-1035.
5. Turel, O., He, Q., Xue, G., Xiao, L., & Bechara, A. (2014). Examination of neural systems sub-serving Facebook "addiction". *Psychological Reports, 115*, 675-695.
6. Vishwanath, A. (2014). Habitual Facebook use and its impact on getting deceived on social media. *Journal of Computer-Mediated Communication, 20*, 83-98.

Facebook research:

1. Davis, 2018: Semi-Structured Interviews about Time Spent
2. [redacted] 2018: Control Your Time: Time Monitoring Explorations
3. [redacted]2018: Life Without Facebook

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Clinical Diagnostic Criteria

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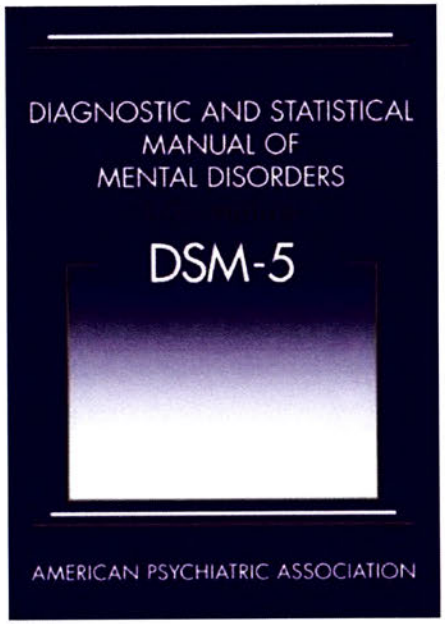
"The essential feature of a substance use disorder is a **cluster** of cognitive, behavioral, and physiological **symptoms** indicating that the individual **continues using** the substance **despite significant substance-related problems**."



From Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), pg. 483

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Clinical criteria for *substance use disorders* do not clearly apply to Facebook

Addictive substances act directly on the brain when ingested; Facebook itself is not a substance

- Clinical criteria include **physiological impacts** of the substance
  - e.g., physical tolerance and withdrawal symptoms (these have had to be redefined to fit non-substance addiction)
- Criteria **depend on how the substance affects the brain**
  - Substances are *intoxicating*, meaning they alter or impair the function of the central nervous system

Clinical symptoms for *non-substance use disorders* are proposed as being applicable to Facebook use.

However, there are currently no medically accepted criteria.

Clinical symptom criteria for non-substance addiction disorders

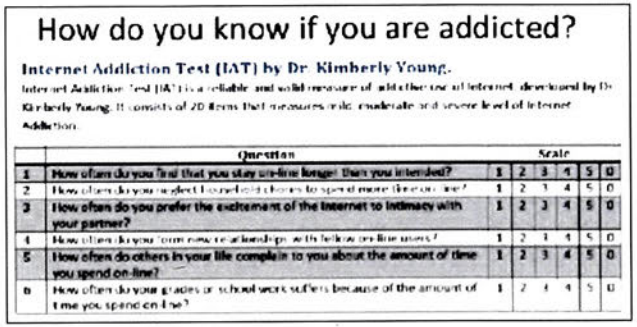
Gambling Disorder

The only medically established addiction to a behavior, not a drug

Internet Gaming Disorder

Not an official disorder, but included in the psychiatric diagnostic manual (DSM-5) as a proposed diagnosis

Self-report scales



How do you know if you are addicted?

Internet Addiction Test (IAT) by Dr. Kimberly Young.

Internet Addiction Test (IAT) is a reliable and valid measure of addictive use of Internet, developed by Dr. Kimberly Young. It consists of 20 items that measures mild, moderate and severe level of Internet Addiction.

	Question	Scale				
1	How often do you find that you stay on-line longer than you intended?	1	2	3	4	5	0
2	How often do you neglect household chores to spend more time on-line?	1	2	3	4	5	0
3	How often do you prefer the excitement of the Internet to intimacy with your partner?	1	2	3	4	5	0
4	How often do you form new relationships with fellow on-line users?	1	2	3	4	5	0
5	How often do others in your life complain to you about the amount of time you spend on-line?	1	2	3	4	5	0
6	How often do your grades or school work suffers because of the amount of time you spend on-line?	1	2	3	4	5	0

Academics and clinicians have measured "Internet dependency", "problematic use", and "Internet / Facebook addiction"

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Clinical Criteria for Stimulant* Use Disorder

DSM-5 diagnoses 305.70, 305.60, 304.40, 304.20

A pattern of amphetamine-type substance, cocaine, or other stimulant use leading to clinically significant impairment or distress, as manifested by at least two of the following, occurring within a 12-month period:

1. The stimulant is often taken in larger amounts or over a longer period than was intended.
2. There is persistent desire or unsuccessful efforts to cut down or control stimulant use.
3. A great deal of time is spent in activities necessary to obtain the stimulant, use the stimulant, or recover from its effects.
4. Craving, or a strong desire to use the stimulant.
5. Recurrent stimulant use resulting in a failure to fulfill major role obligations at work, school, or home.
6. Continued stimulant use despite having persistent or recurrent social or interpersonal problems cause or exacerbated by the effects of the stimulant.
7. Important social, occupational, or recreational activities are given up or reduced because of stimulant use.
8. Recurrent stimulant use in situations in which it is physically hazardous.
9. Stimulant use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by the stimulant.
10. Tolerance, as defined by either of the following: a. A need for markedly increased amounts of the stimulant to achieve intoxication or desired effect. b. A markedly diminished effect with continued use of the same amount of the stimulant.
11. Withdrawal, as manifested by either of the following. a. The characteristic withdrawal syndrome for the stimulant. b. The stimulant (or a closely related substance) is taken to relieve or avoid withdrawal symptoms.

*There are different criteria for each abusable substance. Stimulants are used as an example.

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Clinical Criteria for Gambling Disorder

DSM-5 diagnosis 312.31

A. Persistent and recurrent problematic gambling behavior leading to clinically significant impairment or distress, as indicated by the individual exhibiting four (or more) of the following in a 12-month period:

1. Needs to gamble with increasing amount of money in order to achieve the desired excitement.
2. Is restless or irritable when attempting to cut down or stop gambling.
3. Has made repeated unsuccessful efforts to control, cut back, or stop gambling.
4. Is often preoccupied with gaming (e.g., having persistent thoughts of reliving past gambling experiences, handicapping or planning the next venture, thinking of ways to get money with which to gamble)
5. Often gambles when feeling distressed (e.g., helpless, guilty, anxious, depressed).
6. After losing money gambling, often returns another day to get even ("chasing" one's losses).
7. Lies to conceal the extent of involvement with gambling.
8. Has jeopardized or lost a significant relationship, job, or educational or career opportunity because of gambling.
9. Relies on other to provide money to relieve desperate financial situations caused by gambling.

B. The gambling behavior is not better explained by a manic episode

Specify if:
Episodic or Persistent
Mild (4-5 criteria met)
Moderate (6-7 criteria met)
Severe (8-9 criteria met)

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Proposed Clinical Criteria for Internet Gaming Disorder* DSM-5 pg. 795

**Not an official diagnosis. Included in the DSM as a "condition for future study"*

Persistent and recurrent use of the Internet to engage in games, often with the players, leading to clinically significant impairment or distress as indicated by five (or more) of the following in a 12-month period:

1. Preoccupation with Internet games. (The individuals thinks about previous gaming activity or anticipates playing the next game; Internet gaming becomes the dominant activity in daily life.) Note: This disorder is distinct from Internet gambling, which is included under gambling disorder.
2. Withdrawal symptoms when Internet gaming is taken away. (These symptoms are typically described as irritability, anxiety, or sadness, but there are no physical signs of pharmacological withdrawal.)
3. Tolerance -- the need to spend increasing amounts of time engaged in Internet games.
4. Unsuccessful attempts to control the participation in Internet games.
5. Loss of interests in previous hobbies and entertainment as a result of, and with the exception of, Internet games.
6. Continued excessive use of Internet games despite knowledge of psychosocial problems.
7. Has deceived family members, therapists, or others regarding the amount of Internet gaming.
8. Use of Internet games to escape or relieve a negative mood (e.g., feelings of helplessness, guilt, anxiety).
9. Has jeopardized or lost a significant relationship, job, or educational or career opportunity because of participation in Internet games.

Note: Only nongambling Internet games are included in this disorder. Use of the Internet for required activities in a business or profession is not included; nor is the disorder intended to include other recreational or social Internet use. Similarly, sexual Internet sites are excluded.

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Example Self-Report Scales of Problematic Facebook Use

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META3047MDL-020-00563170
METATNAG-005-00693322

Bergen Facebook Addiction Scale

How often during the past year have you:

1. Spent a lot of time thinking about Facebook or planned use of Facebook?
2. Felt an urge to use Facebook more and more?
3. Used Facebook in order to forget about personal problems?
4. Tried to cut down on the use of Facebook without success?
5. Became restless or troubled if you have been prohibited from using Facebook?
6. Used Facebook so much that it has had a negative impact on your job/studies?

Andreassen, C. S., Torsheim, T., Brunborg, G. S., & Pallesen, S. (2012). Development of a Facebook addiction scale. *Psychological Reports, 110,* 501-517.

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Modified Generalized Problematic Internet Use Scale

1. I want to, or have made unsuccessful efforts to, cut down or control my Facebook use.
2. I have attempted to spend less time on Facebook but have not been able to.
3. I have tried to stop using Facebook for long periods of time.
4. I am preoccupied with Facebook if I cannot log on for some time.
5. When not on Facebook, I wonder what is happening on there.
6. I feel lost if I can't go on Facebook.
7. I have used Facebook to talk with others when I was feeling isolated.

Lee, Z. W., Cheung, C. M., & Thadani, D. R. (2012). An investigation into the problematic use of Facebook. In System Science (HICSS), 45th Hawaii International Conference, pp. 1768-1776.

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Case Examples and Media Misrepresentation

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Clinical Case Example of Possible "Internet Addiction"[1]

Jamie is a 16 year old male who spends approximately **70 hours a week** on his computer including 40 hours on the Internet. This includes two 12-hour sessions at the weekend. Only 3 hours a week is spent on work-related activities. Jamie claims **the Internet is the most important thing in his life**, and that **he thinks about it even when he is not using it**. He claims the **Internet can change his mood**–either calming him or exciting him. He gets **withdrawal symptoms** if he cannot get Internet access. When trying to cut down or quit, he finds the **lure of cyberspace too strong to resist** ("I get very irritable and I start to shake").

Jamie says he has **difficulty limiting or controlling the time both on and offline**. Over a 2-year period he has **upgraded his computer 11 times [tolerance]**. He says "I log on literally until I am physically unplugged by someone else . . . **I can't work or live without it**–my social and intellectual life are linked directly to it"... Jamie's use of the Internet causes **irregular sleeping patterns**...He has **no friends** outside of those he meets on Internet Relay Chat and has no desire to make any.

This resembles addiction because:

- Internet use predominates his life and thoughts; he is unable to control use
- Significant negative impacts on sleep and social functioning are likely directly caused by Internet use
- Evidence of tolerance, withdrawal, and mood alteration with use

1. Griffiths, M. (2000). Does Internet and computer" addiction" exist? Some case study evidence. *CyberPsychology and Behavior, 3*(2), 211-218.

Colloquial claims of Facebook "addiction" do not rise to a severe level, and could be due to other primary problems such as anxiety

Emily is between 24-35 years old and is a mother and business owner who **uses Facebook for both personal and business reasons**, and finds a lot of **enjoyment and value** in her FB use. She **struggles with anxiety** particularly about leaving things unfinished or missing out on things, and thus tends to watch videos or scroll News Feed until she feels like she has gotten to the end of the content. She also **likens FB to an addiction in that it is regularly on her mind, due to anxiety about missing out on things, though she is able to control her use** by putting the phone down during important times like dinner. If she has time, she finds herself watching videos for longer than intended (e.g., 30 minutes instead of 15), and then she can **feel guilt and regret** if there is somewhere she needs to be or something she needs to be doing. When asked about negative impacts from use, she said **"I don't see too many bad things [personally] besides the amount of time it consumes for me, because it's addicting and enjoyable."**

FB UX Research: Davis, 2018

This is NOT addiction because:

- Anxiety is the primary driver of behavior
- Negative impacts are limited to feelings of guilt
- Ability to control use is intact
- Thoughts about FB are frequent but not excessive or interfering

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Example of inaccurate media claims that contribute to public misunderstanding about what addiction really is

CNN Health »

Five clues that you are addicted to Facebook

You know you're a Facebook addict when ...

1. **You lose sleep over Facebook**

"If you're staying up late at night because you're on Facebook, and you're tired the next day, Facebook may be a compulsion for you."

2. **You spend more than an hour a day on Facebook**

"I can't imagine that anyone would need more than an hour a day on Facebook, and probably no one needs more than 30 minutes."

3. **You become obsessed with old loves**

Pile warns that it can get out of hand very quickly.

4. **You ignore work in favor of Facebook**

"If you're not doing your job in order to sneak time on Facebook, you could have a real problem," Lipari said.

5. **The thought of getting off Facebook leaves you in a cold sweat**

Pile has her own quick test: "Try going a day without Facebook. If you find it causes you a lot of stress and anxiety, you really need to get some help."

This is NOT addiction because:

- Symptoms are not described as chronic or severe; significant negative impact is unclear
- Spending >1 hour or looking up "old loves" are not bad in of themselves - context of use and impact need to be considered
- Mild anxiety is not the same as withdrawal

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Dopamine: More Detail

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DOPAMINE: FACT VS. FICTION

The claim	The truth
Dopamine gives you pleasure	Dopamine is not responsible for feelings of pleasure or "liking" an experience. Instead it is related to learning that an experience is desirable and "wanting" it, i.e. being motivated to seek it out. This is called "incentive salience."
Dopamine gets you high	Excessive dopamine that is released in response to a drug that directly acts on the brain (e.g., cocaine) is associated with other brain changes that do produce a high. The amount of dopamine released by natural behaviors is not intoxicating.
Dopamine is elevated in addiction	Dopamine is blunted in addiction because the system works to get back into balance after excessive triggering by a drug.
Dopamine is addictive	Dopamine itself is not an addictive substance. It is an endogenous neurotransmitter with several important brain functions. Additive substances do increase dopamine in very specific ways (exaggerated, immediate, transient increases). General excess dopamine in the brain produces psychotic symptoms, not addiction.

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There are two principles about dopamine signaling that come up often in the addiction narrative.

Both are part of **normal learning processes**.

Dopamine has loops

- **Dopamine loops allow learned behavior to occur efficiently**.
- If a behavior is unwanted, control can be exerted to inhibit it.

Variable reinforcement drives dopamine

- "Variable reinforcement" means there is unpredictability as to when a reward will come.
- **Unpredictability enhances dopamine signaling** as the brain tries to learn.
- These relative increases in dopamine are *not* addictive but can promote learning and increase motivation.