Rethinking Addiction in a Digital World

Andre, Annabella, Di, Krishna

The Problem

We live in a world in which screens and the Internet are a necessity.
If we stop to think about its impacts on us, what would we discover?

Agenda

Part 1: The Definitions

Part 2: The Science

Part 3: The Effects

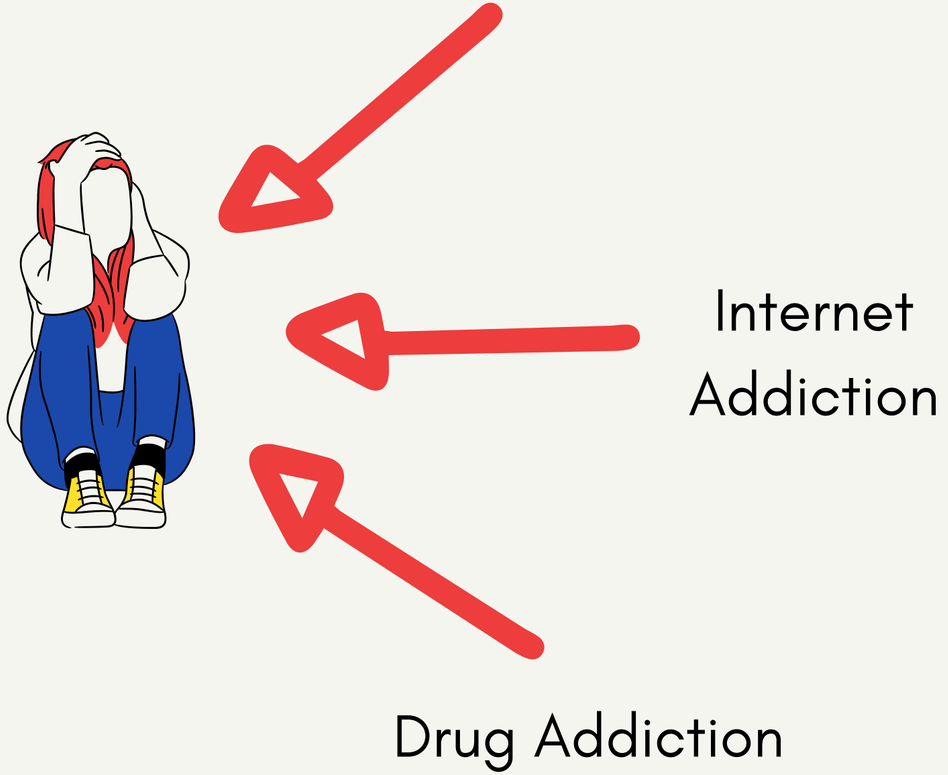
Part 4: The Applications

Part 5: Discussion

The Definitions

Part 01

Technology addiction is a real addiction. It exists in multiple forms.



Perceptions

"...you do still develop an addiction to the stuff [caffeine]. And it's a real physiological addiction, not a wimpy psychological addiction like people claim for video games or the Internet."

- **CGP Grey**, YouTuber w/ 4.8m followers on a video w/ 7.3m views

Technology addiction should be treated like any other addiction.

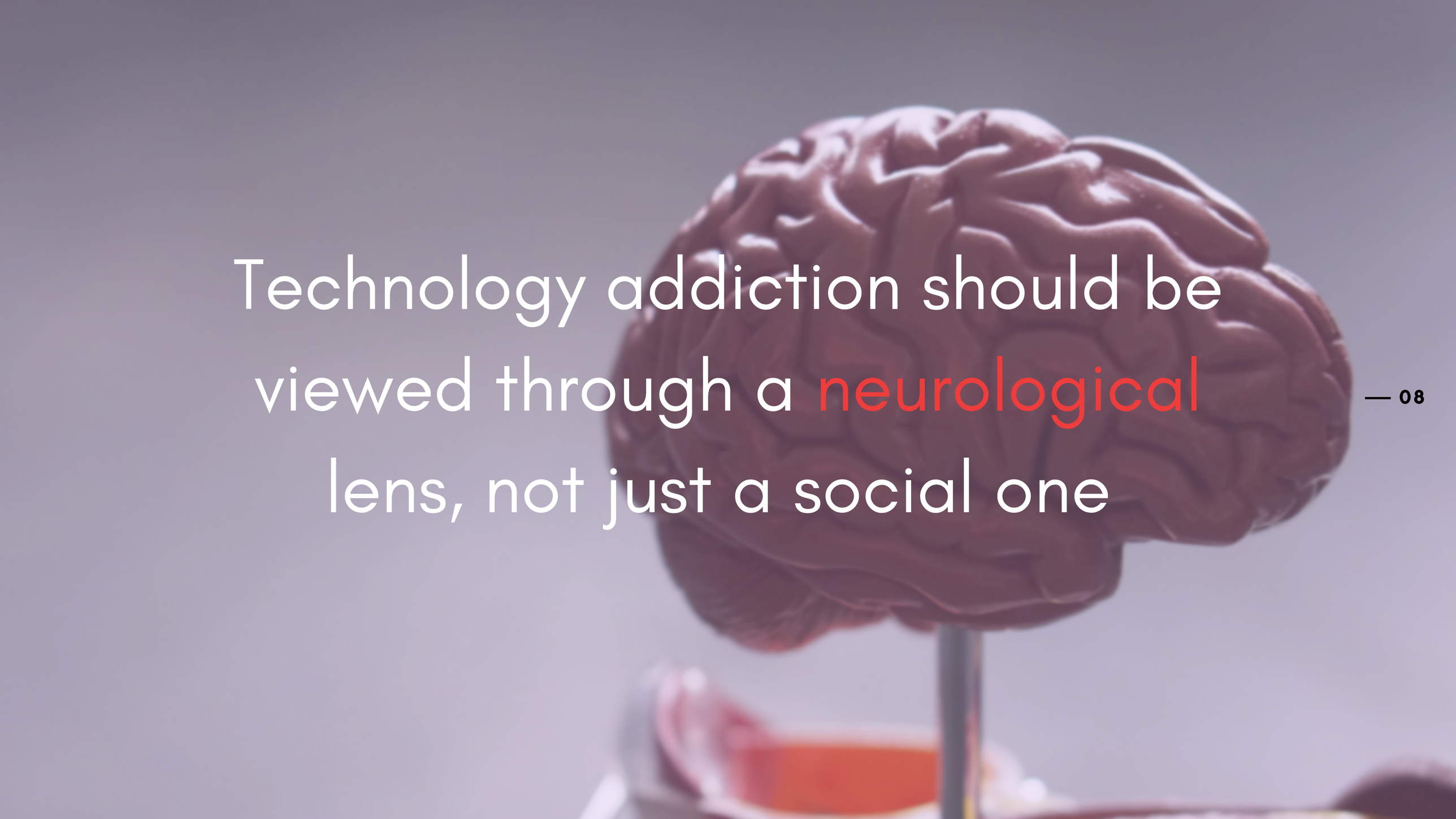
"We need to start tapering of your phone use"

"You are weak if you cannot stop yourself."

"No more screen use for a month. Get over it"

"Let us set up a plan to reduce your technology usage"

"How hard is it to just get over gaming?"



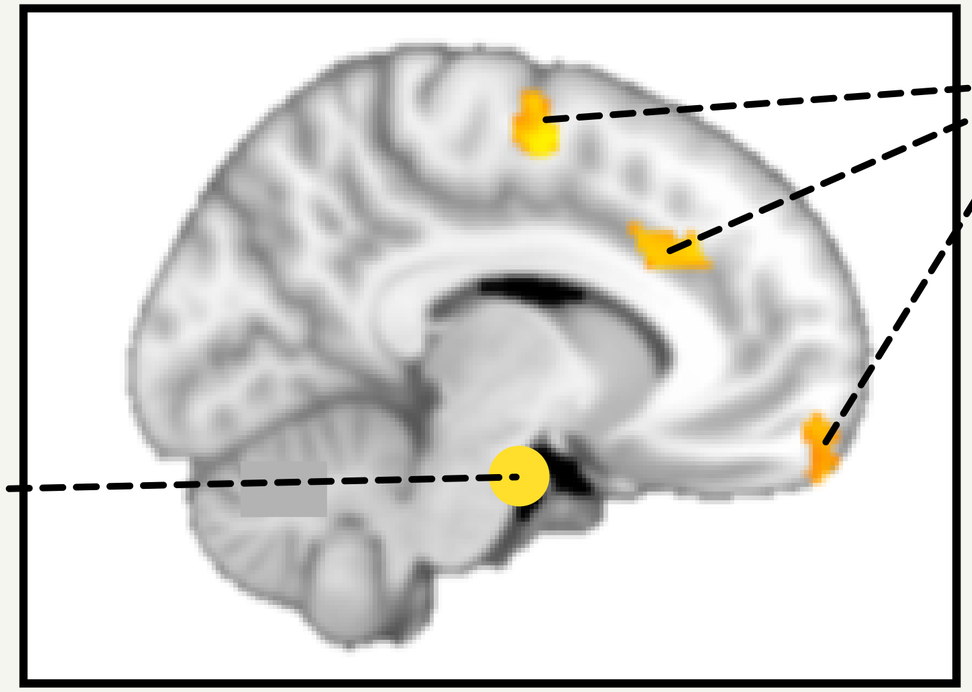
Technology addiction should be viewed through a neurological lens, not just a social one


In a world of hyper-connectivity,
how should society address
technology addiction?

The Science
Part 02

Internet addiction is correlated with physical restructuring in the brain.

Restructured Areas of the Brain



Action Selection

- inhibit inappropriate actions
- allow appropriate actions
- filter out irrelevant information
- assess motivational significance

Information Transfer

- connects brain regions
- sensory information transfer and processing
- executive and memory functions

Yuan K, Qin W, Wang G, Zeng F, Zhao L, et al. (2011) Microstructure Abnormalities in Adolescents with Internet Addiction Disorder. PLOS ONE 6(6): e20708. https://doi.org/10.1371/journal.pone.0020708
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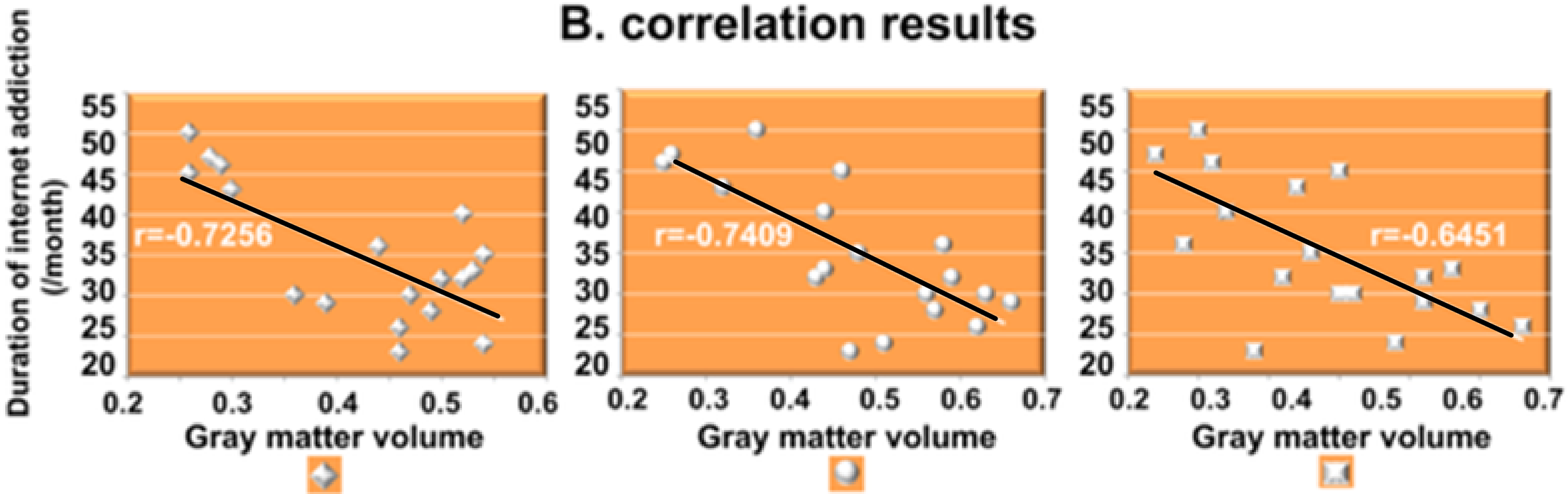
The volume of gray matter was negatively correlated with duration of internet addiction.



Brain areas involved in **action selection**

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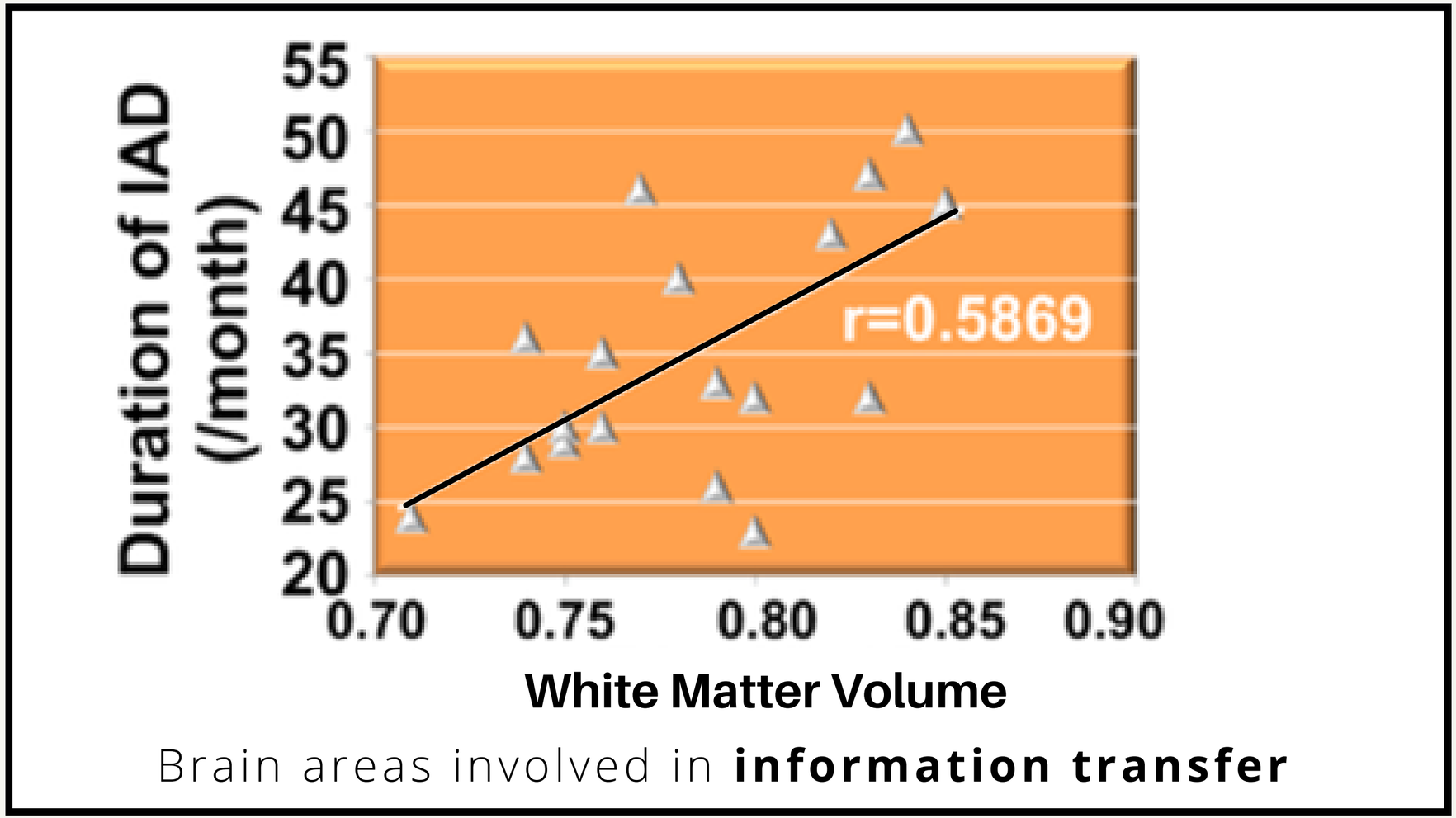
The volume of **white matter** was also positively correlated with internet addiction.



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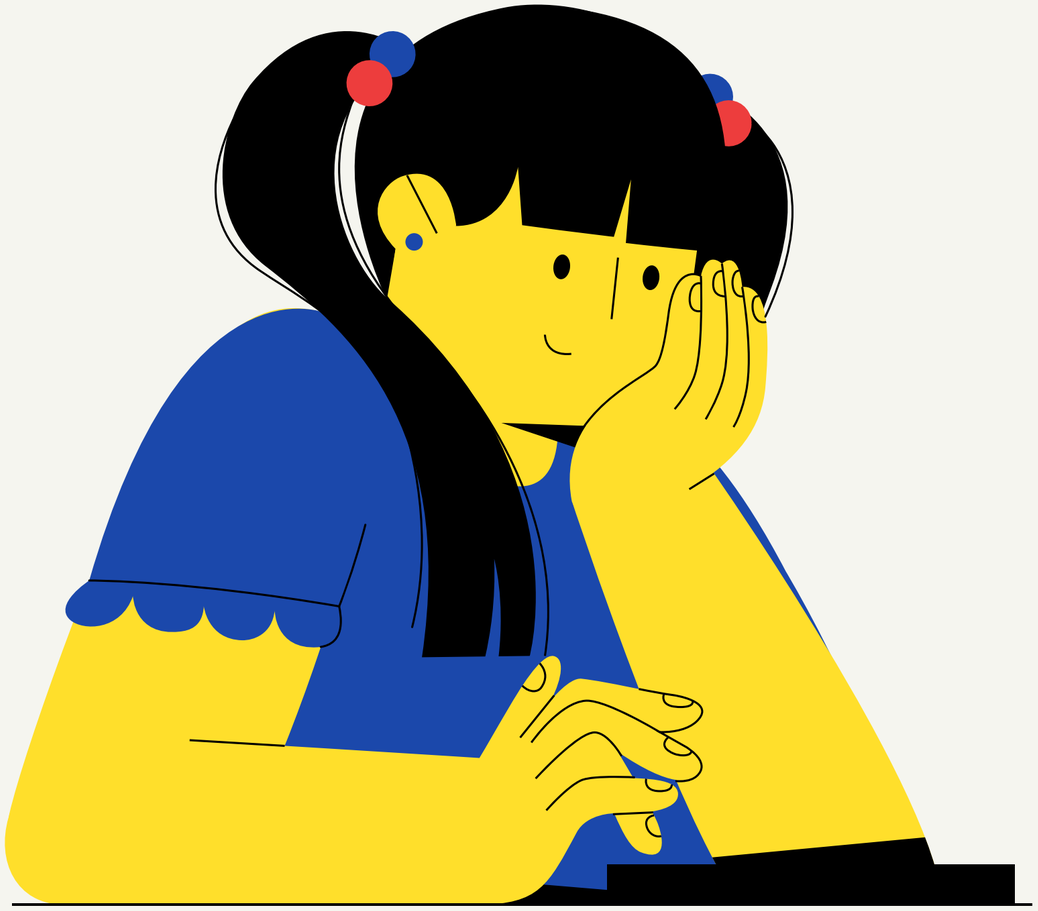
Physical restructuring may interfere with cognitive processes.

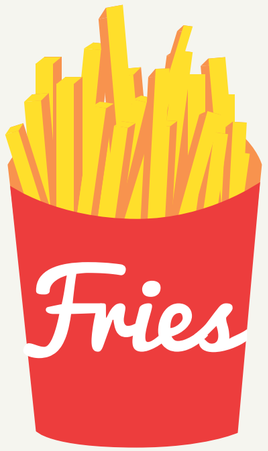


The Effects

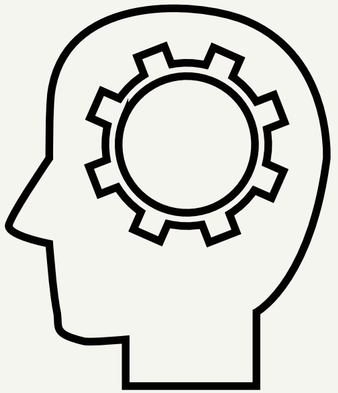
Part 03

What are the behavioral and cognitive effects of screen addiction, and why?

Behavioral impacts



Cognitive impacts



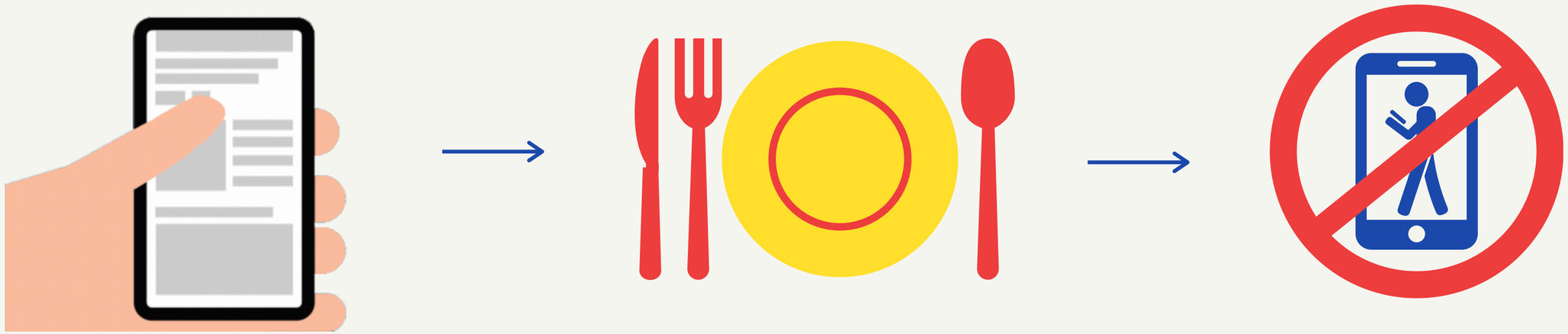
More time is spent on apps that make us less happy

• Relaxation • Exercise • Weather • Reading • Education • Health	• Dating • Social networking • Gaming • Entertainment • News • Web browsing
9 minutes per day	27 minutes per day

We spend more time on apps that induce negative emotions because they lack stopping cues

vs.

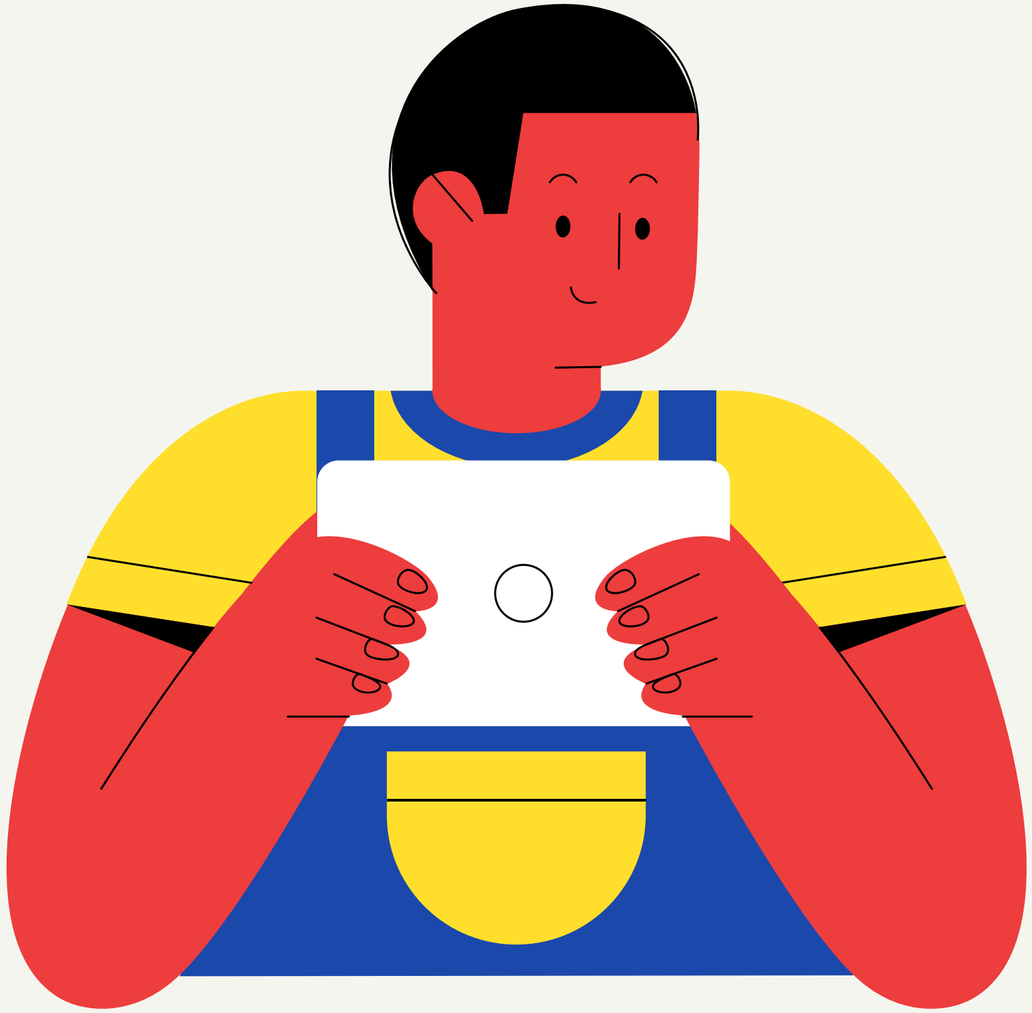
We add stopping cues into our daily lives



stopping cue

The Applications

Part 04



Two scientific findings

How do we navigate and use unclear research?

Article | Open Access | Published: 17 October 2019

Daily blue-light exposure shortens lifespan and causes brain neurodegeneration in *Drosophila*

Trevor R. Nash, Eileen S. Chow, Alexander D. Law, Samuel D. Fu, Elzbieta Fuszara, Aleksandra Bilska, Piotr Bebas, Doris Kretzschmar & Jadwiga M. Giebultowicz

npj Aging and Mechanisms of Disease **5**, Article number: 8 (2019) | Cite this article

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Science News *from research organizations*

Blue light may not be as disruptive to our sleep patterns as originally thought

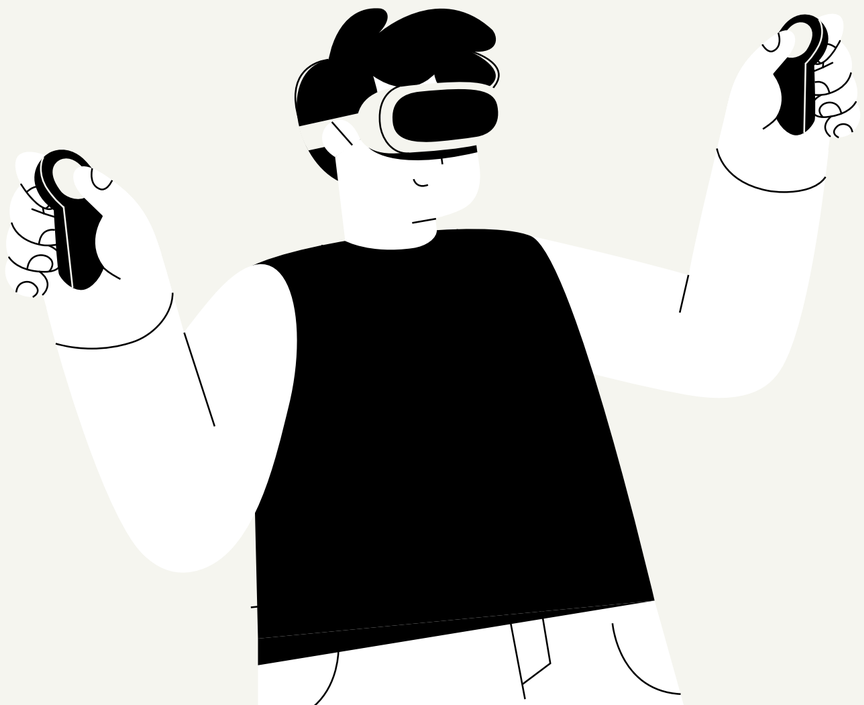
Date: December 16, 2019

Source: University of Manchester

Summary: Contrary to common belief, blue light may not be as disruptive to our sleep patterns as originally thought -- according to scientists. According to the team, using dim, cooler, lights in the evening and bright warmer lights in the day may be more beneficial to our health.

Two contradictory (?) scientific findings

Humans instinctively binarize.



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Blue light bad

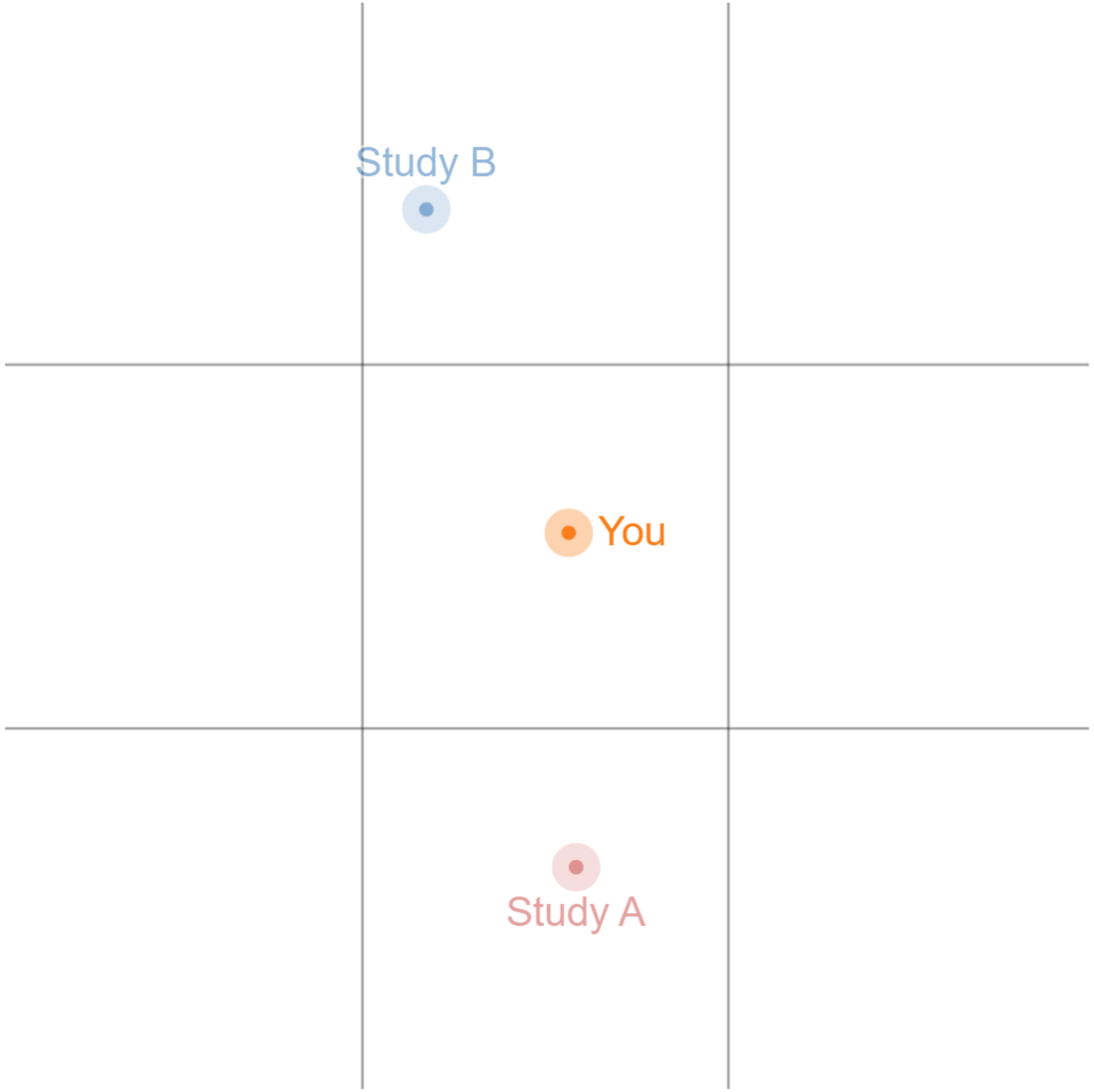
Science News

Blue light may not be as disruptive to our sleep patterns as originally thought

Blue light not bad

Scientific research lies on a plane.

Individual studies are "point-specific".



- Applied to an *animal* model (flies)
- *Immersive* conditions (all blue light / all darkness / all white light)
- Studies *brain neurodegeneration*

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- Applied to an *animal* model (mice)
- Compares cooler colors with warmer colors
- Studies *sleep pattern* impact

Science News *from research organizations*

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Date: December 16, 2019

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Summary: Contrary to common belief, blue light may not be as disruptive to our sleep patterns as originally thought -- according to scientists. According to the team, using dim, cooler, lights in the evening and bright warmer lights in the day may be more beneficial to our health.

These studies are very different. Do they apply to you? That's up for you to decide, as an informed citizen.

It's better to err on the side of caution.

Recap

Part 1: The Definitions
Screen addiction should not be thought of as an issue of willpower but should be treated the same way as chemical addictions.

Part 2: The Science
Screen addiction is not only neurologically based, but can physically restructure the human brain.

Part 3: The Effects
Screen addiction leads to many behavioral and cognitive effects, including impacts on happiness.

Part 4: The Applications
Scientific studies are point-specific. Be careful when extrapolating.

Discussion Questions

Part I: The Definitions

Should society address and treat internet addiction as one of a fundamentally neurological problem? Is technology addiction an inevitable reality of a world going online or is it an issue that should be addressed?

Part II: The Science

How severe/important do you think neurological changes from internet addiction are? Will knowing this change your internet usage in the future? Why or why not?

Part III: The Effects

How should the effects of internet addiction be addressed if the conditions of internet addiction cannot be solved?

Part IV: The Applications

How do or should individuals and societies navigate limited or “point-specific” scientific research amidst urgent phenomena? How does society balance the necessity of technology in a digital world with concrete impacts on its constituents?

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Citations

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