

Neurobiology of social networks in the context of smartphone usage

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Neurobiology of Social Media

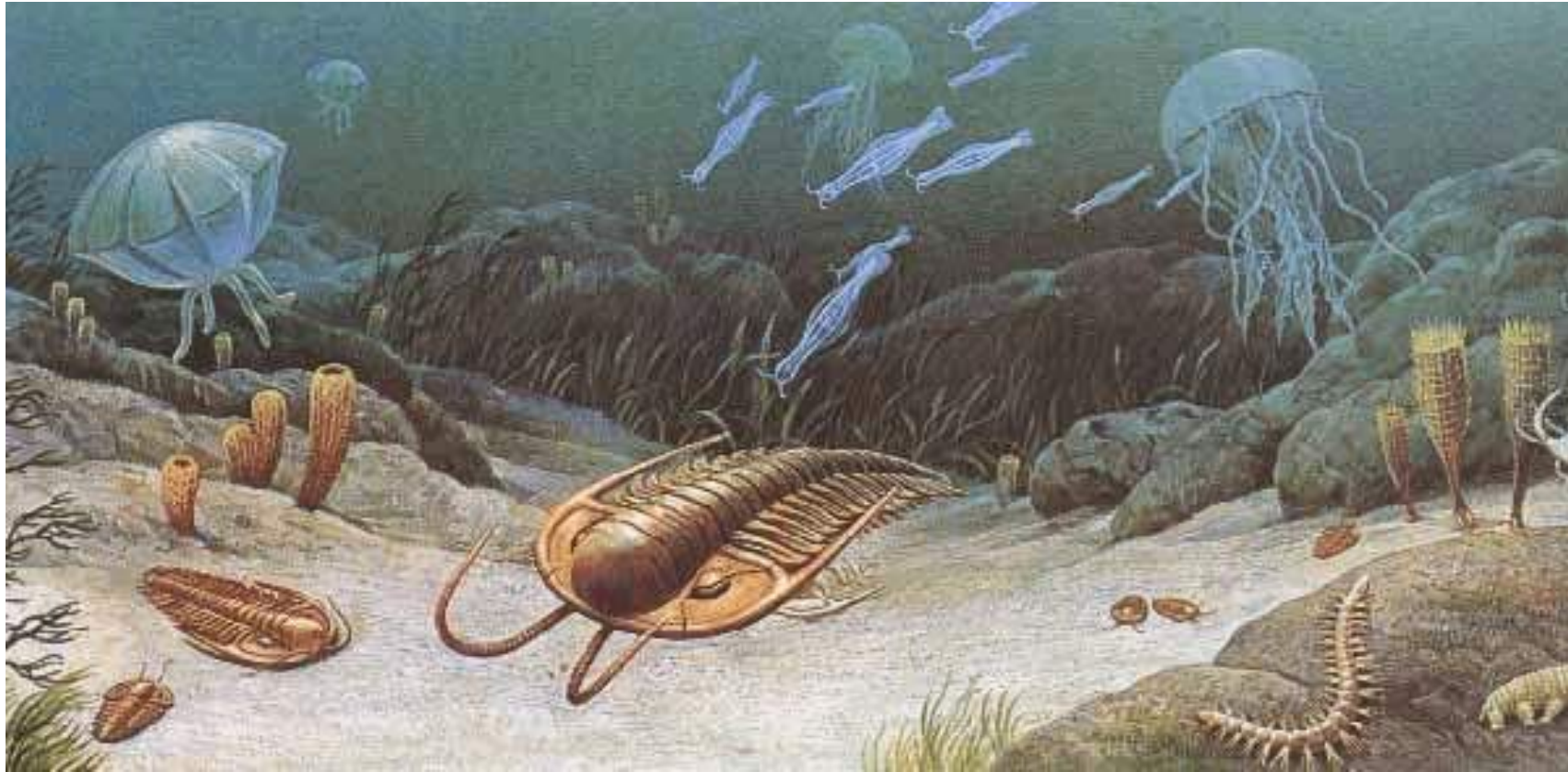
- Behavior control.

The rewards of the reward circuit.

The importance of social interactions as a stimulus.

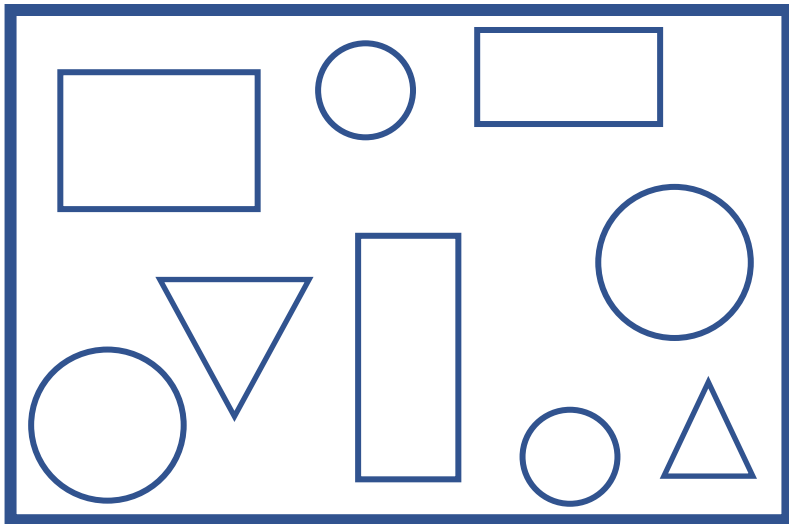


The Cambrian Explosion (570 million years ago)

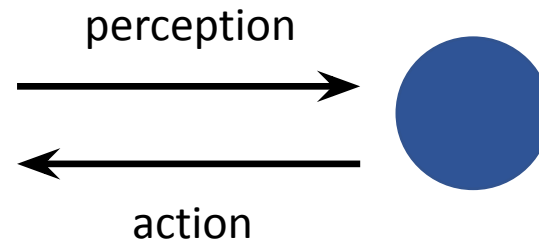


Behavior control

Context



Individual

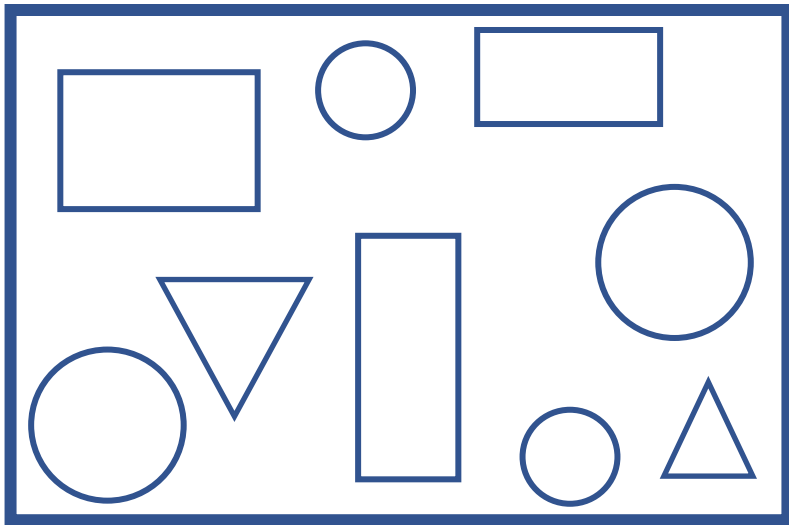


Control Systems

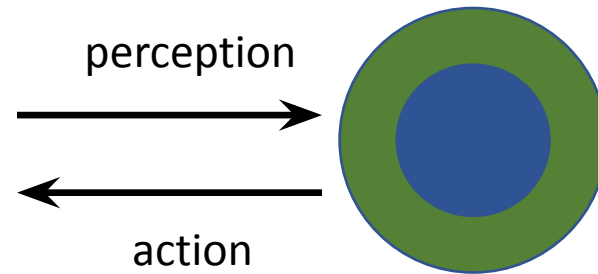
 Sensory & Motor

Behavior control



Context



Individual

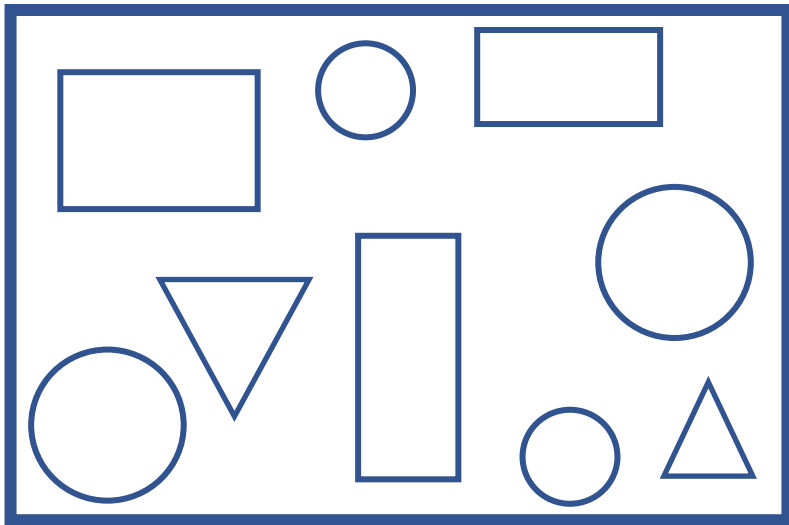


Control Systems

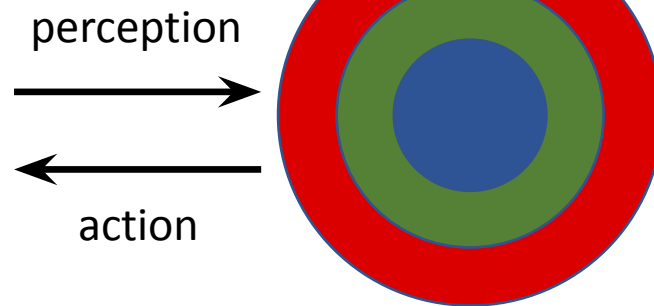
-  Sensory & Motor
-  reward

Behavior control




Context



Individual

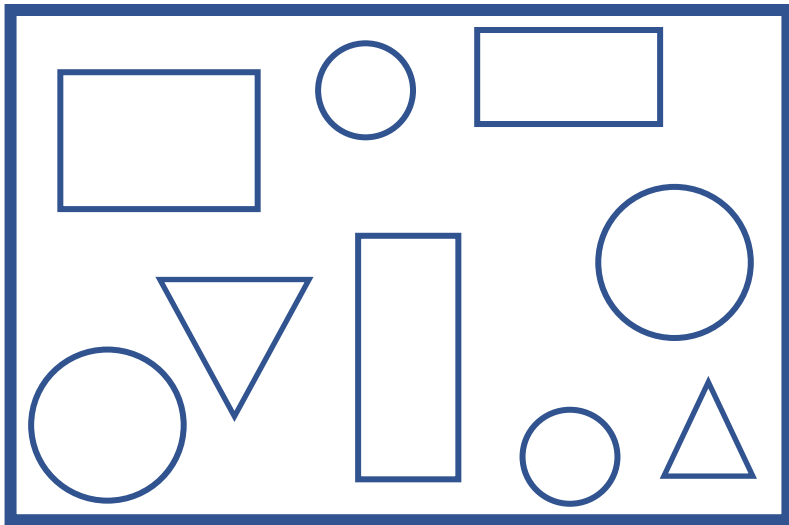


Control Systems

-  Sensory & Motor
-  reward
-  Learning/Memory

Behavior control

Context

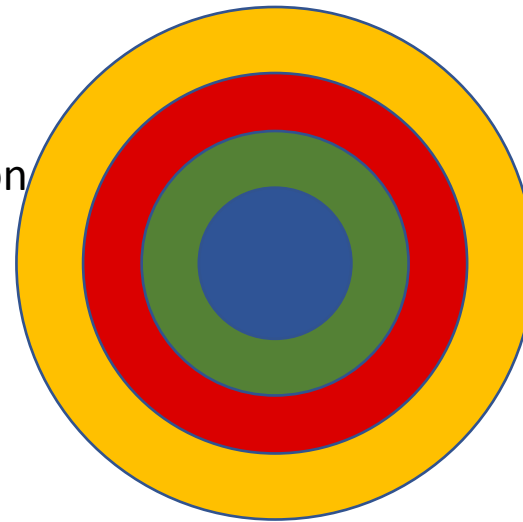


perception







action

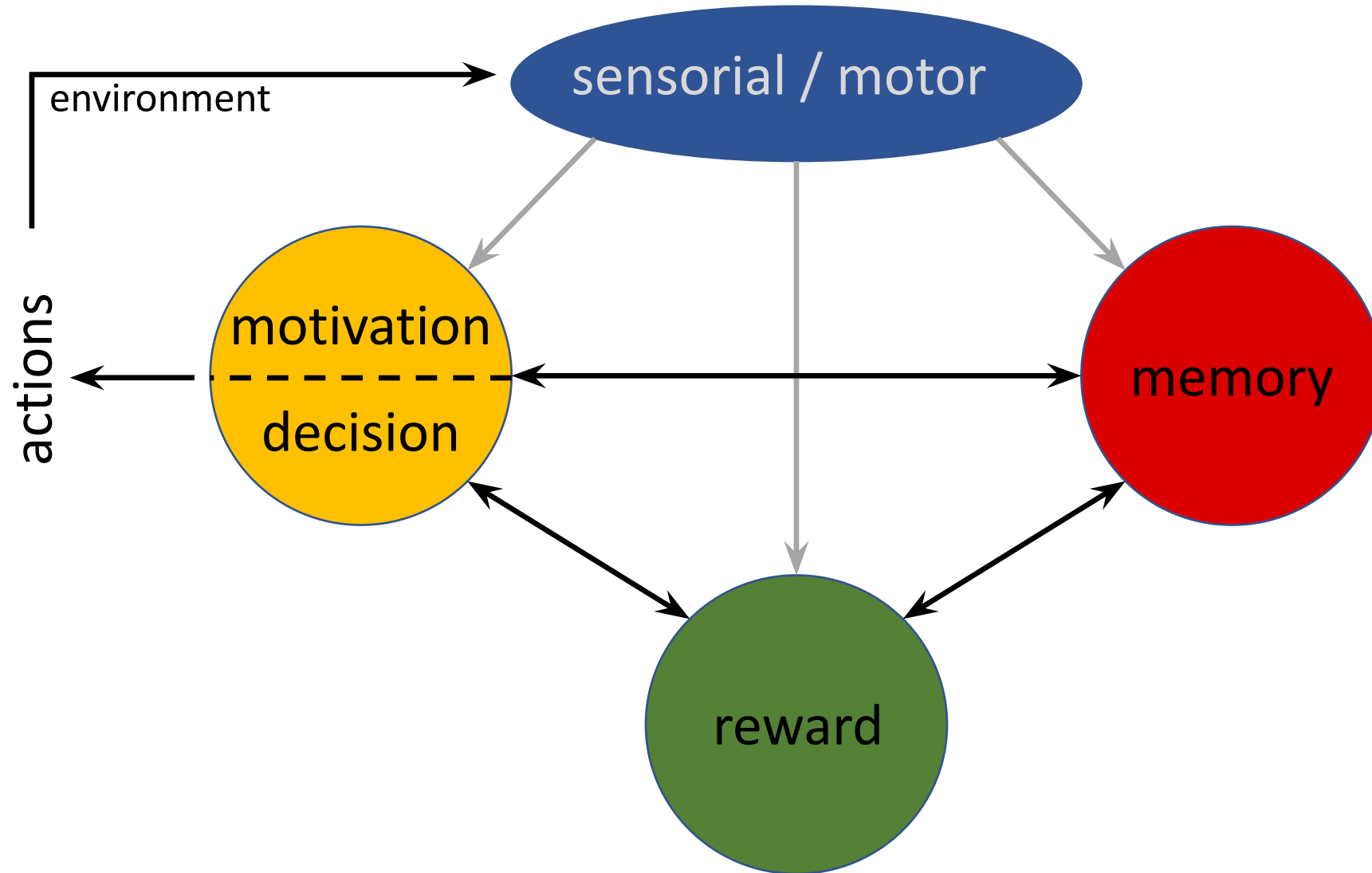
Individual



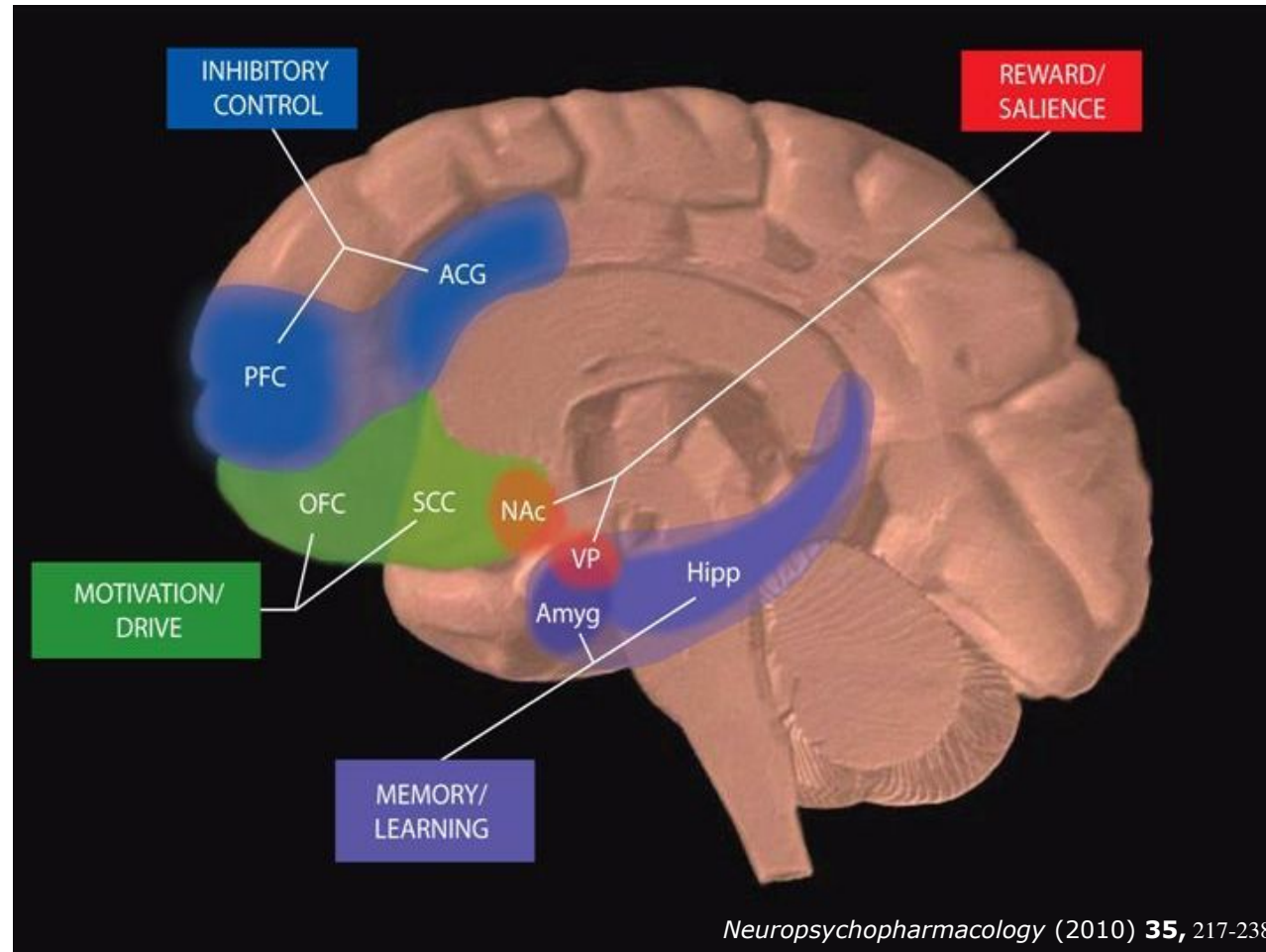
Control Systems

-  Sensory & Motor
-  reward
-  Learning/Memory
-  Motivation/Decision

Brain Circuits for Behavior Control

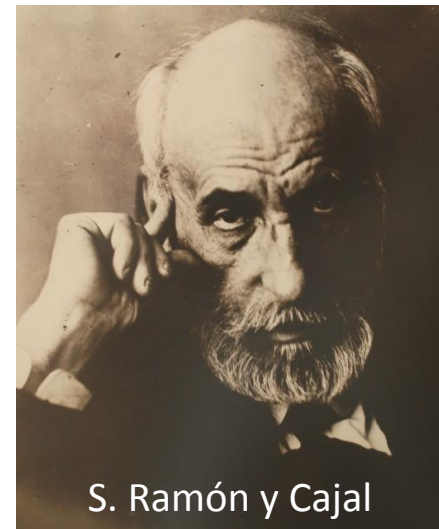
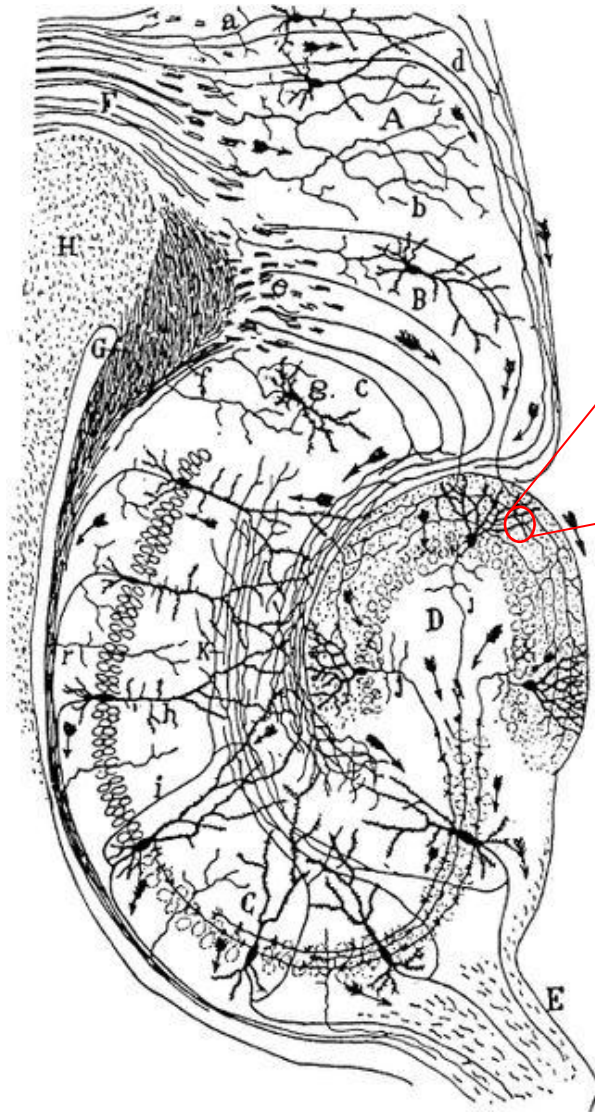


Brain Circuits for Behavior Control



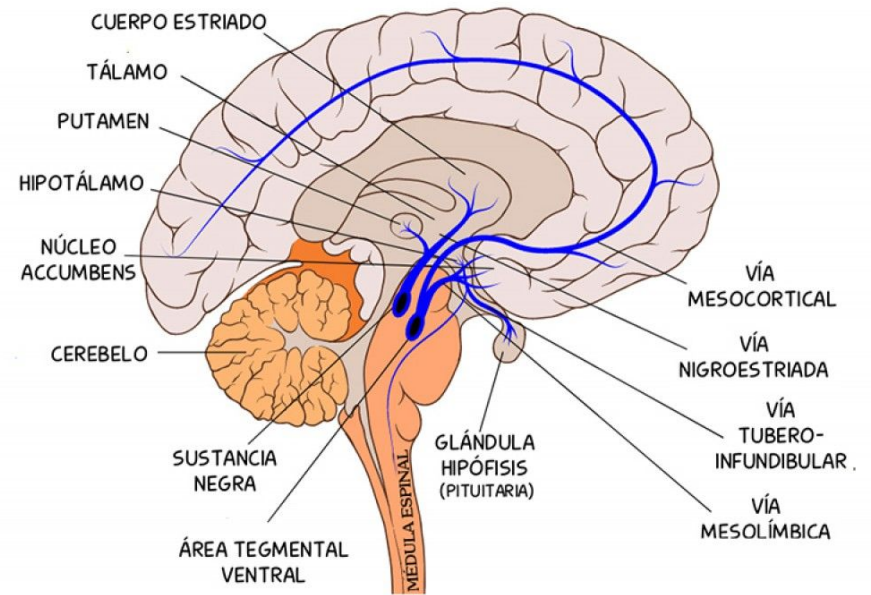
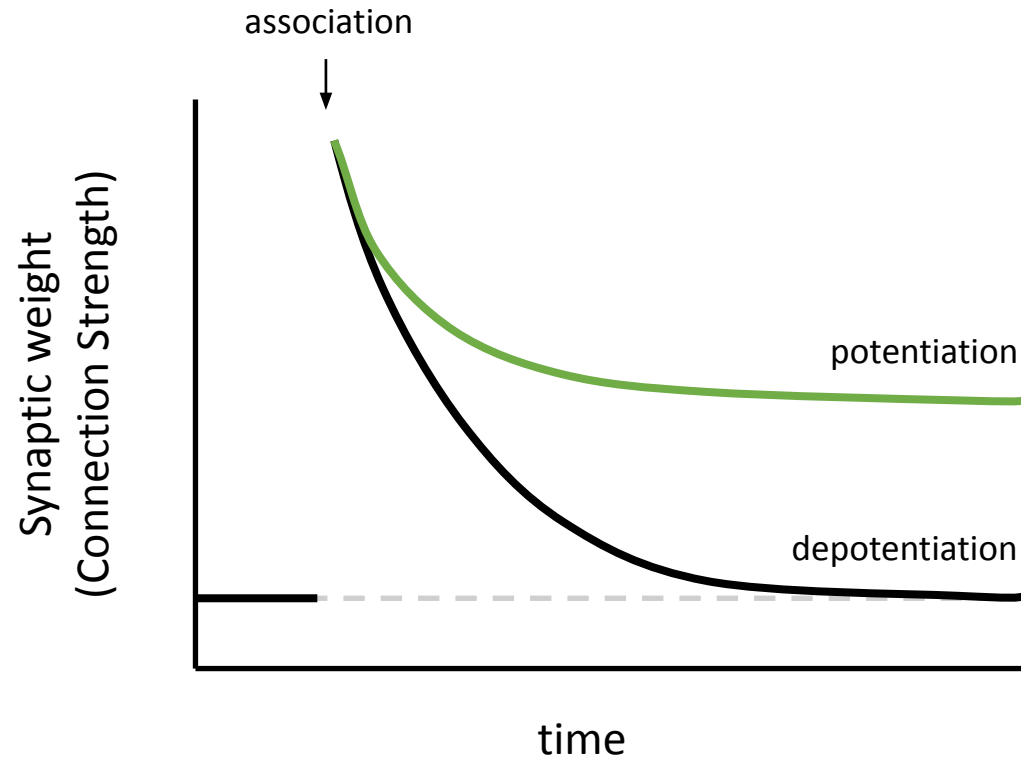
The Circuits of Memory, Reward, Motivation, and Decision-Making

Neural circuits and synapses

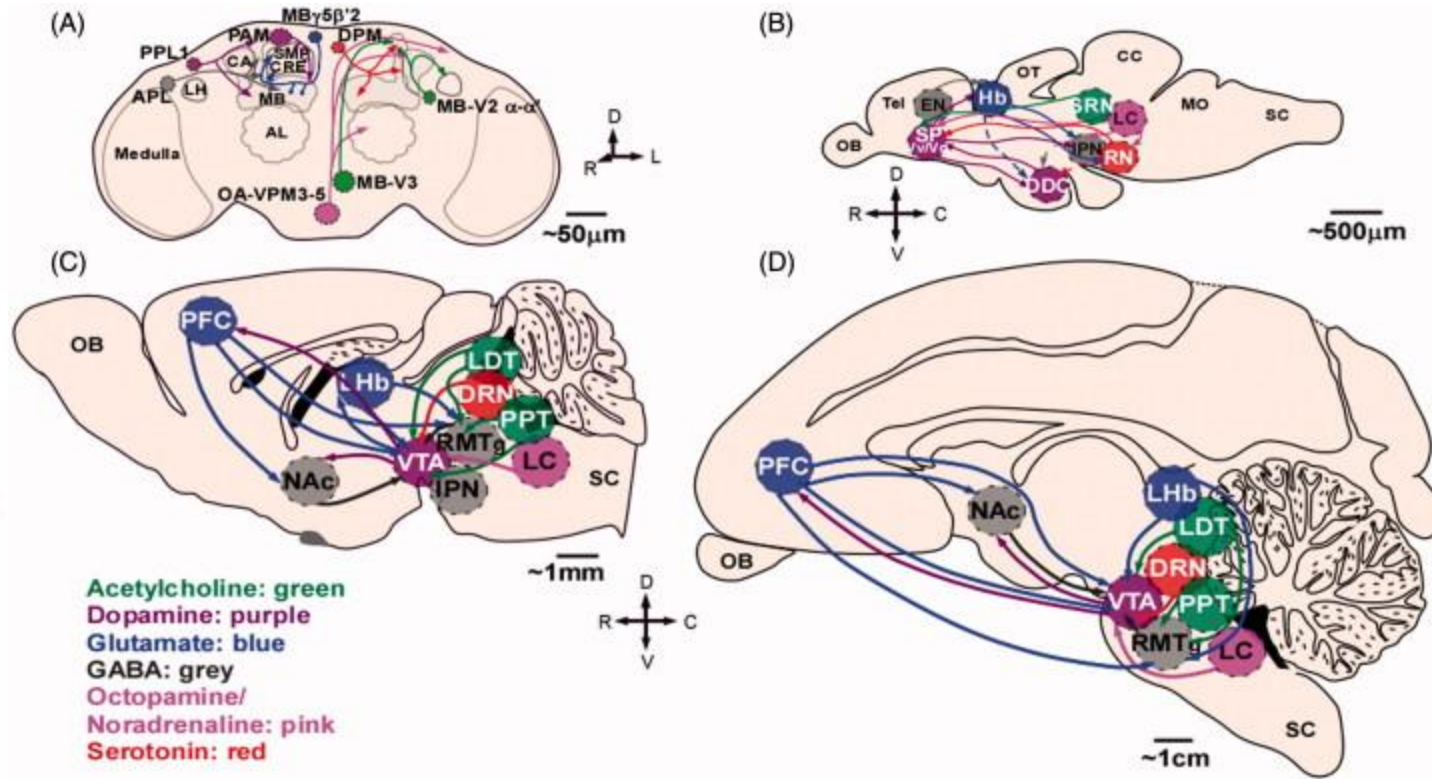


S. Ramón y Cajal

Neural circuits and synapses



Brain Circuits for Behavior Control



J Neurogenet. 2016; 30(2): 133–148.

The Circuits of Memory, Reward, Motivation, and Decision-Making



Neurobiology of Social Media

Behavior control

Conclusions (I):

Systems to guide behavior based on rewards, motivation, and predictions.

Very efficient (very conserved in evolution).

Dopamine and mesocorticolimbic circuits as protagonists.





Neurobiology of Social Media

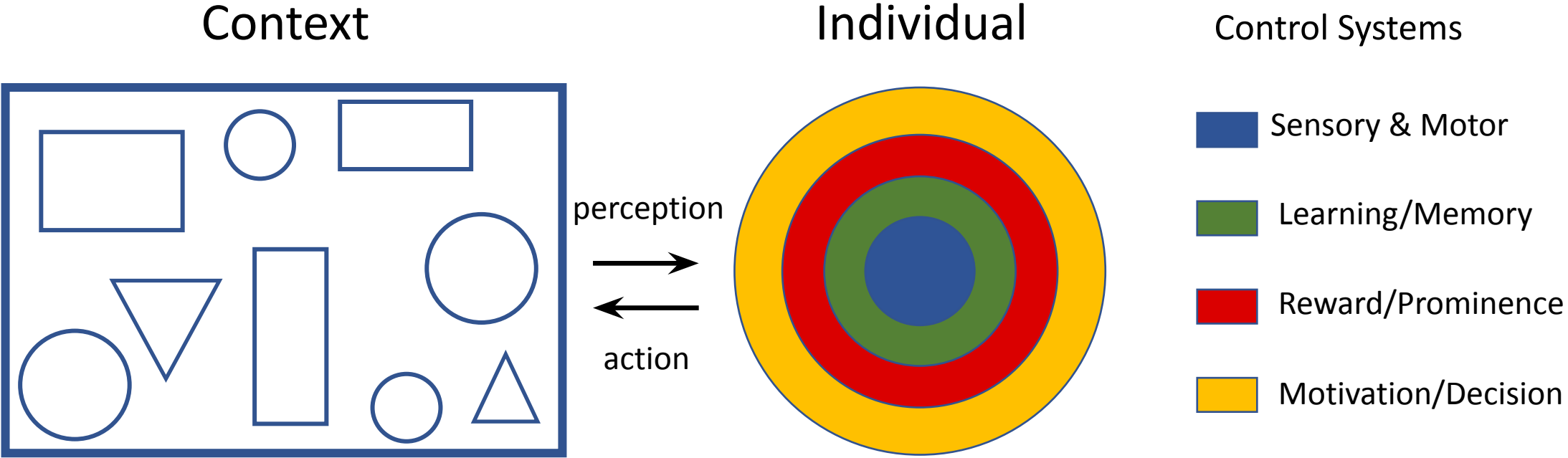
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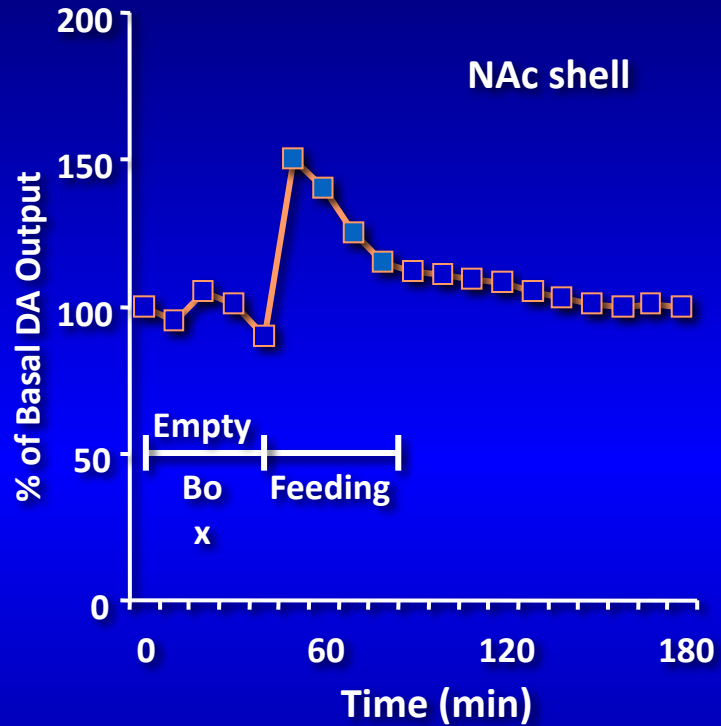


The Rewards of the Reward Circuit



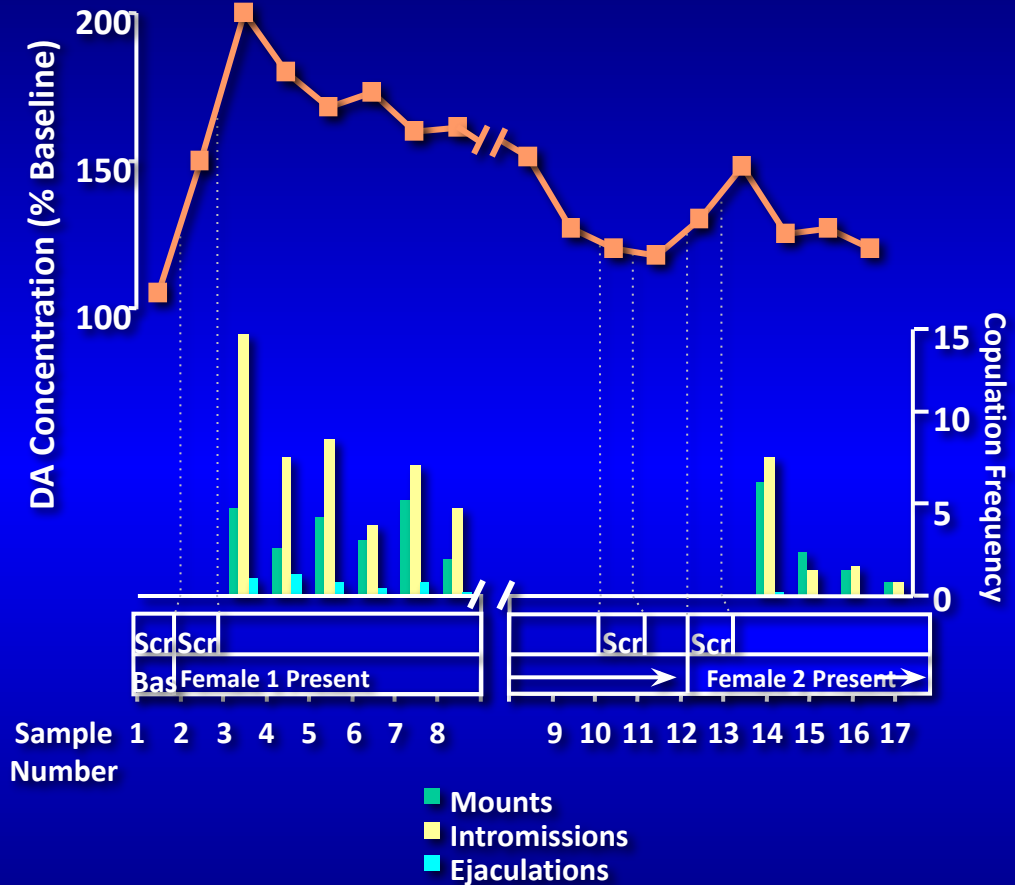
Natural Rewards Increase Dopamine Levels

FOOD



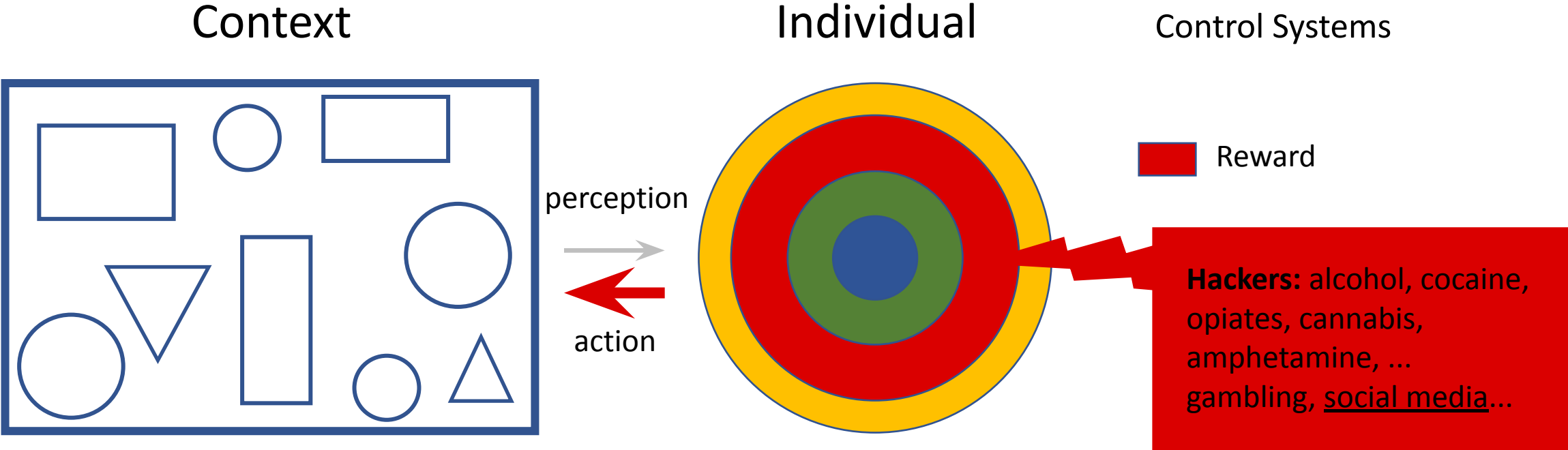
Source: Di Chiara et al.

SEX

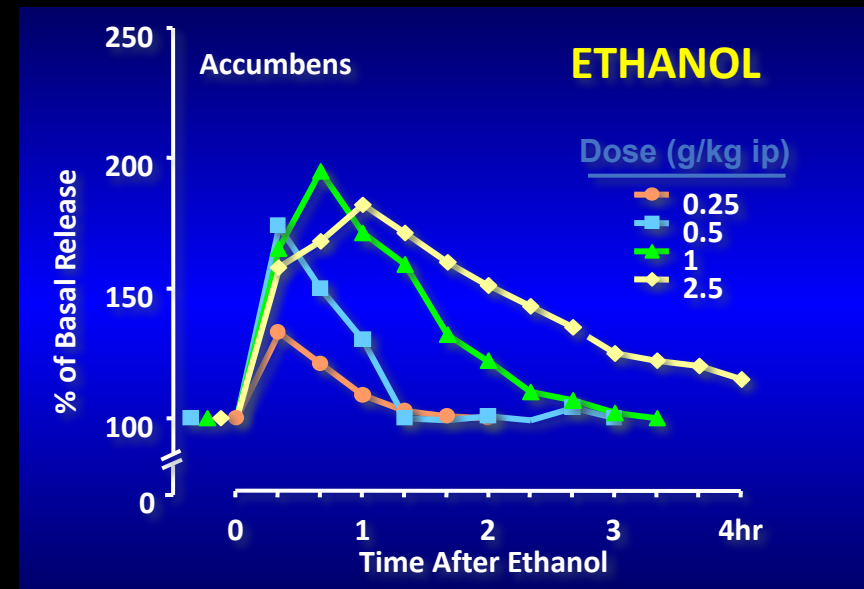
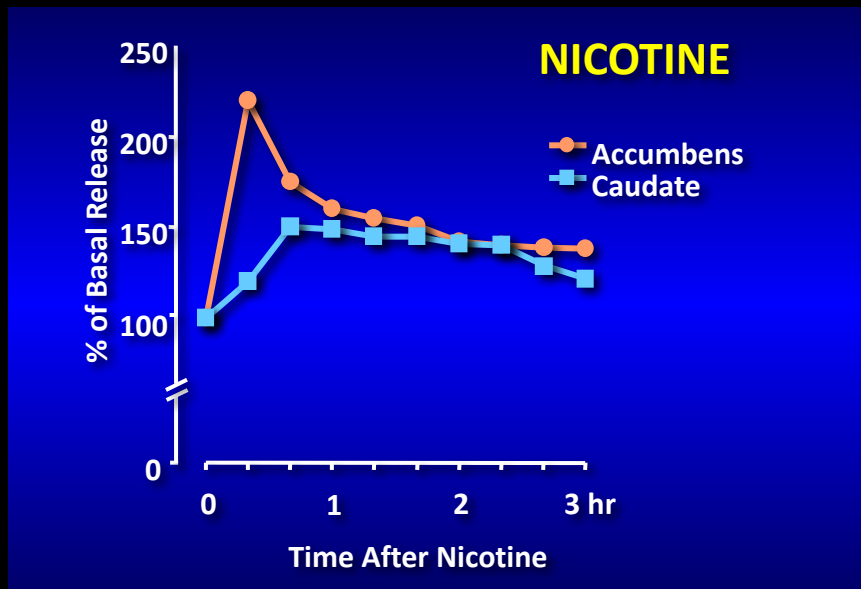
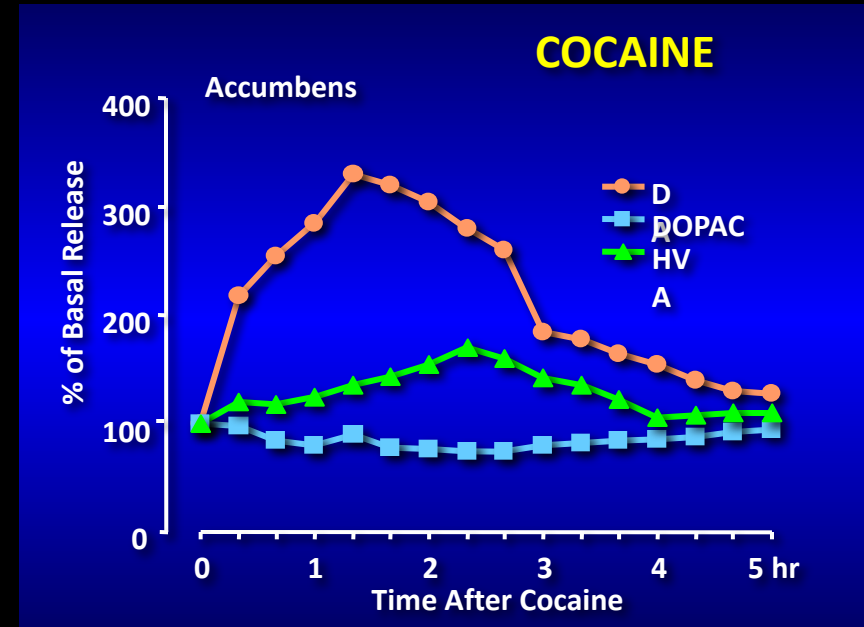
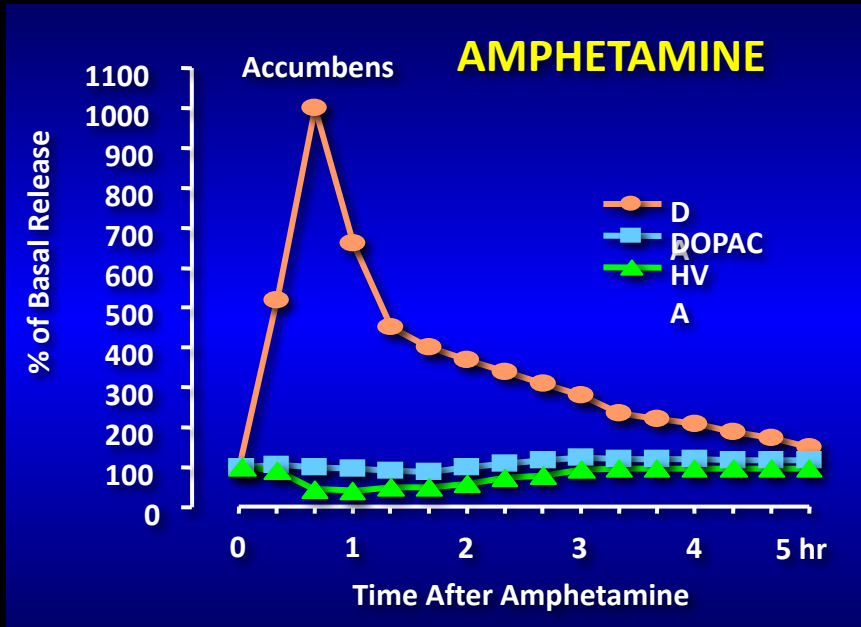


Source: Fiorino and Phillips

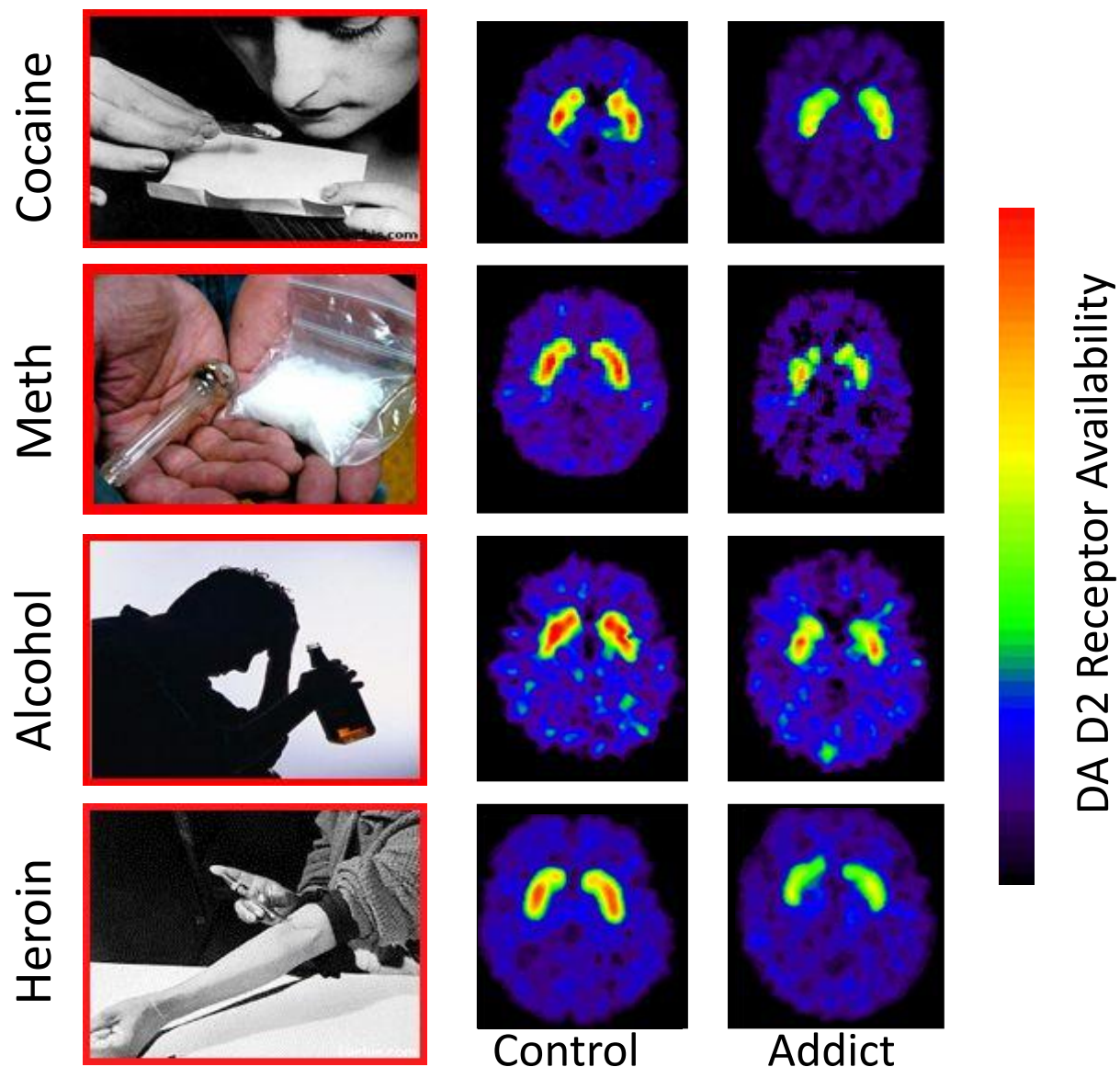
The Rewards of the Reward Circuit



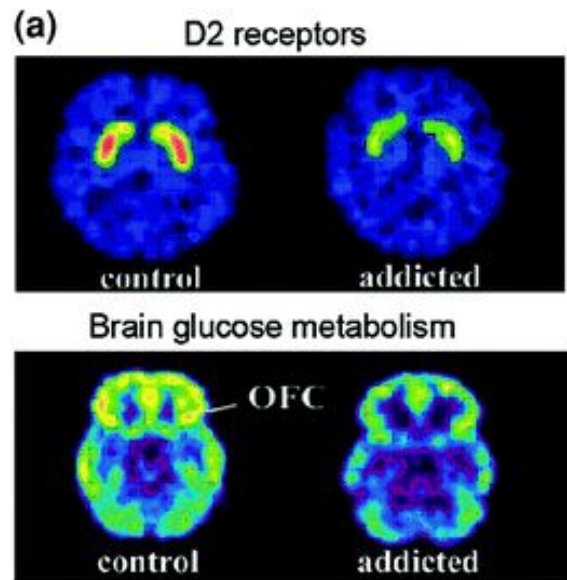
Effect of Drugs on Dopamine Release



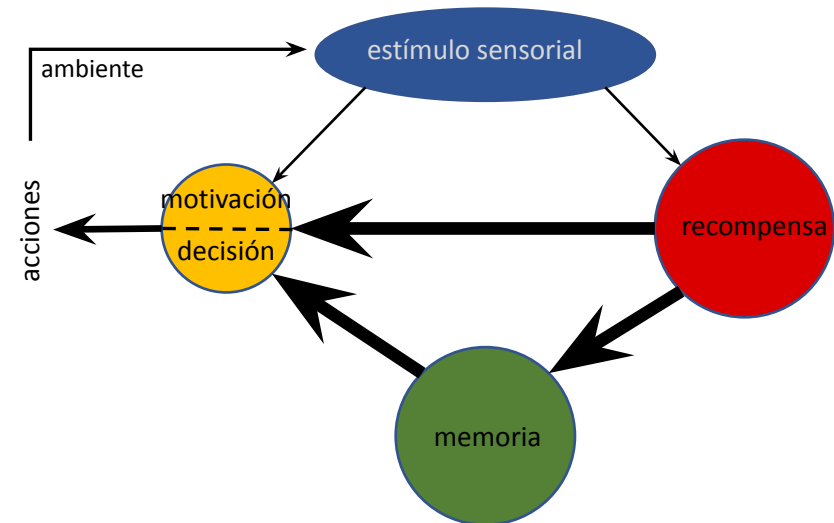
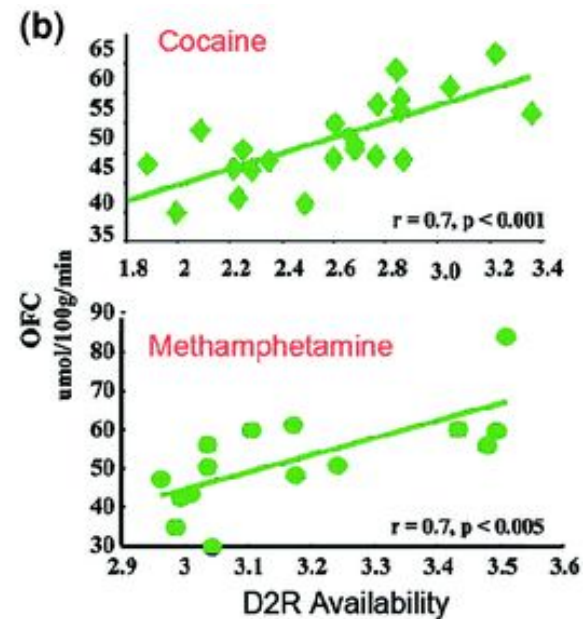
Addiction Decreases Dopamine D2 Receptors



Dopaminergic disruption is associated with loss of function in the "motivation and decision-making system"



Volkow et al., 2009





Neurobiology of Social Media

The rewards of the reward circuit.

Conclusions (II):

Drugs parasitize the natural reward system.

They modify control systems and guide behavior.

These modifications make the individual vulnerable (stress, ...).

Habit generation.





Neurobiology of Social Media

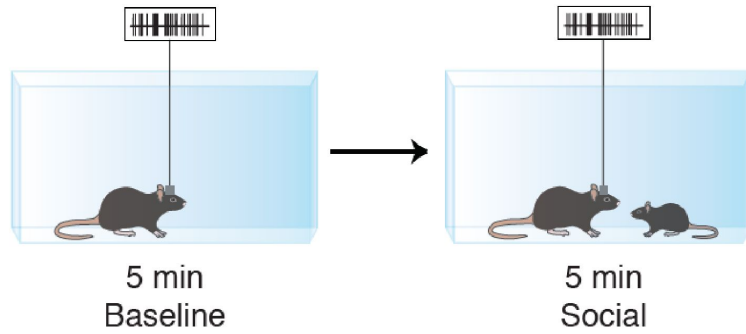
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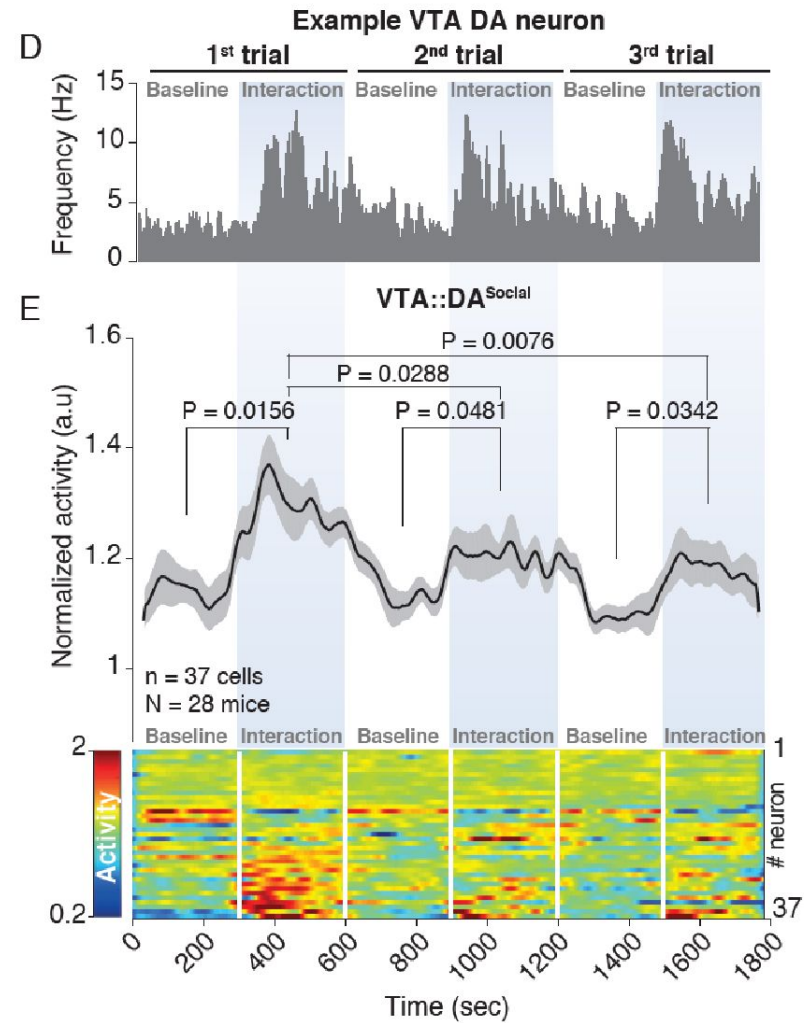
The importance of social interactions as a stimulus.



The Importance of Social Interactions as a Stimulus



Prévost-Solié et al. 2020 bioRxiv



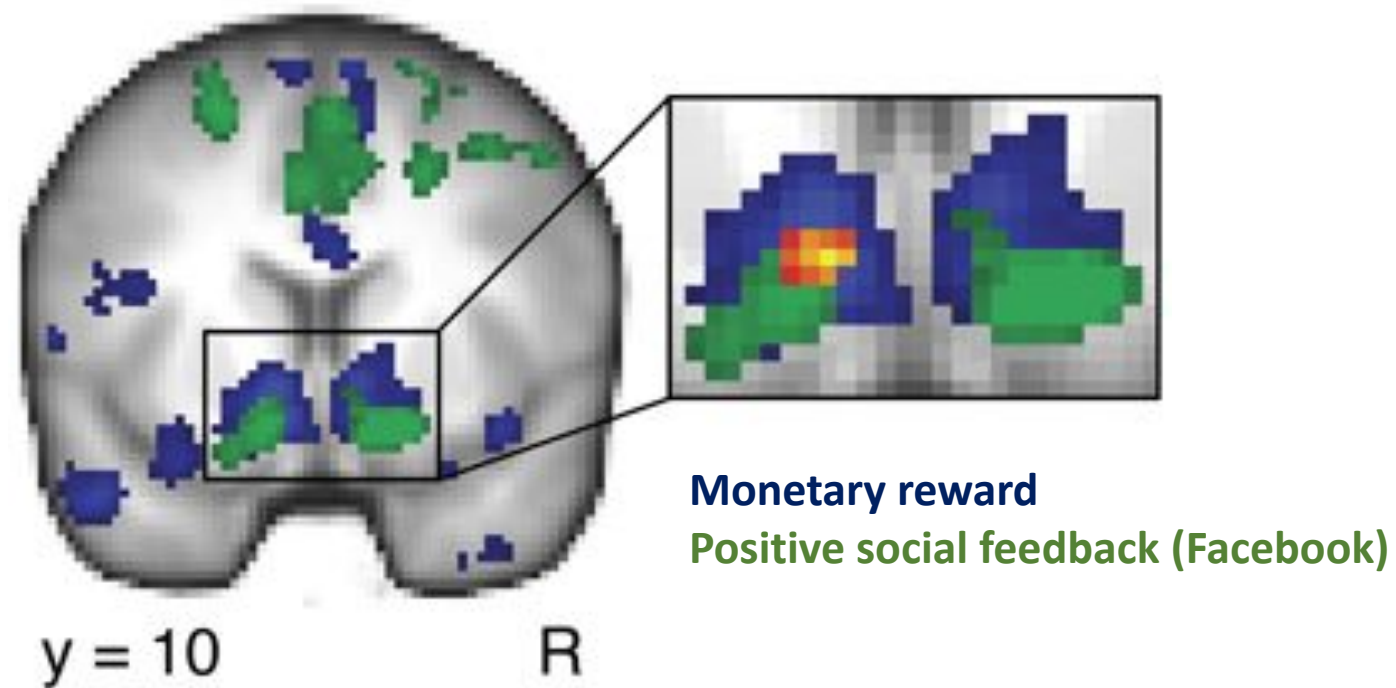
Social Interactions

570,000,000 years ago (Cambrian)
□ 1995 A.D. (SixDegrees)

1995 □ today

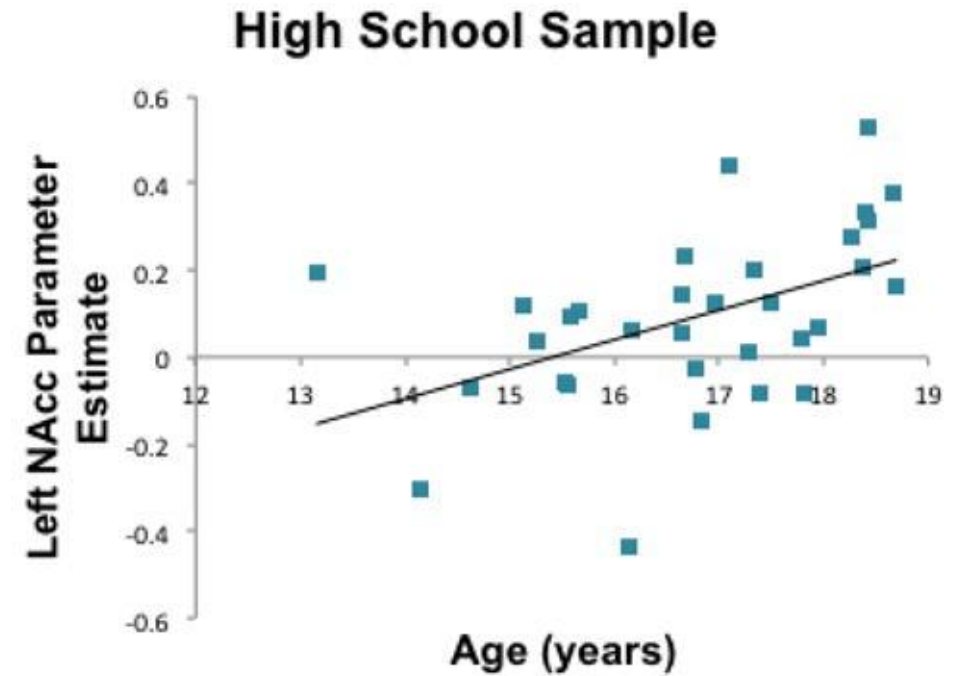
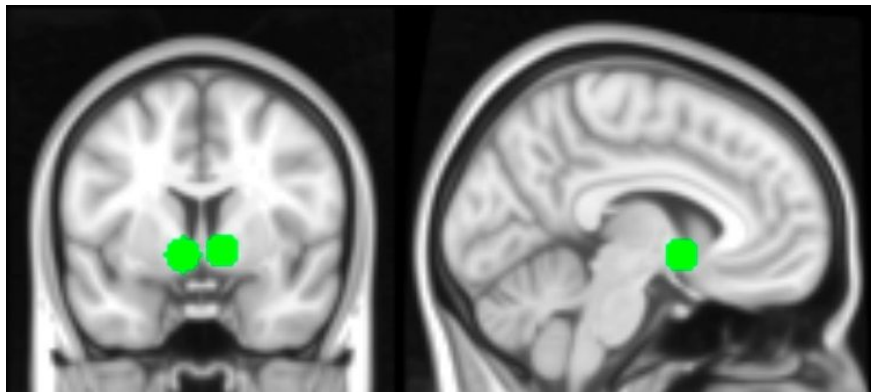
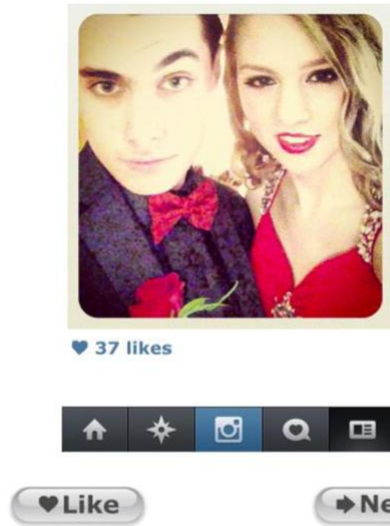


The importance of social interactions as a stimulus
The importance of social **media** as a stimulus



Reward-related activity in the left nucleus accumbens predicts Facebook use.

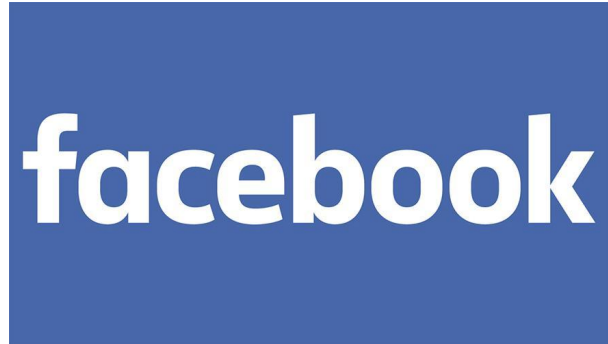
The importance of social media as a stimulus



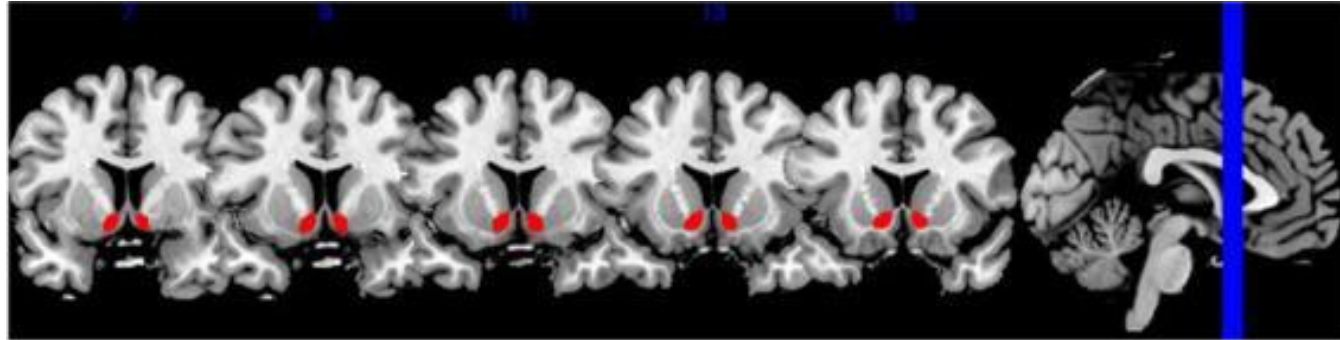
Sherman et al. Child Dev 2018

We can predict the number of likes based on activation in the accumbens!

Excessive "consumption of" social media



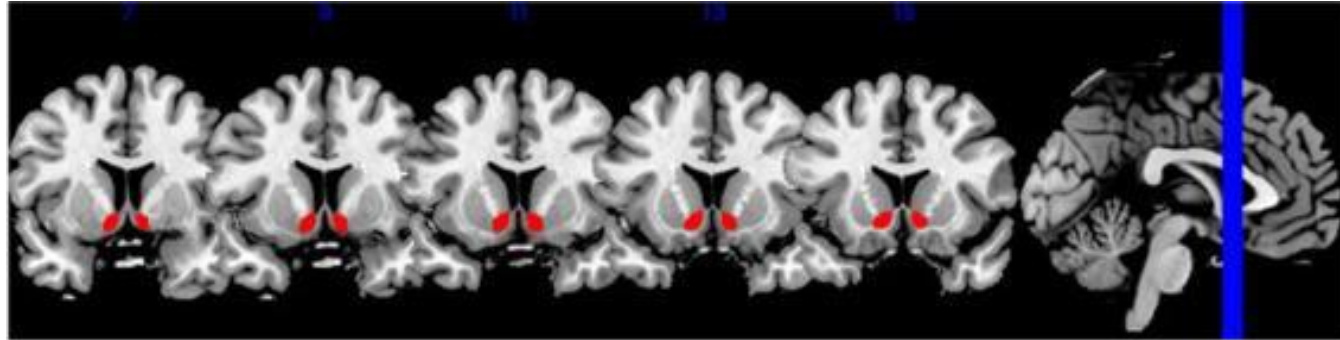
Montad et al. Behav Brain Res 2017



Excessive "consumption of" social media



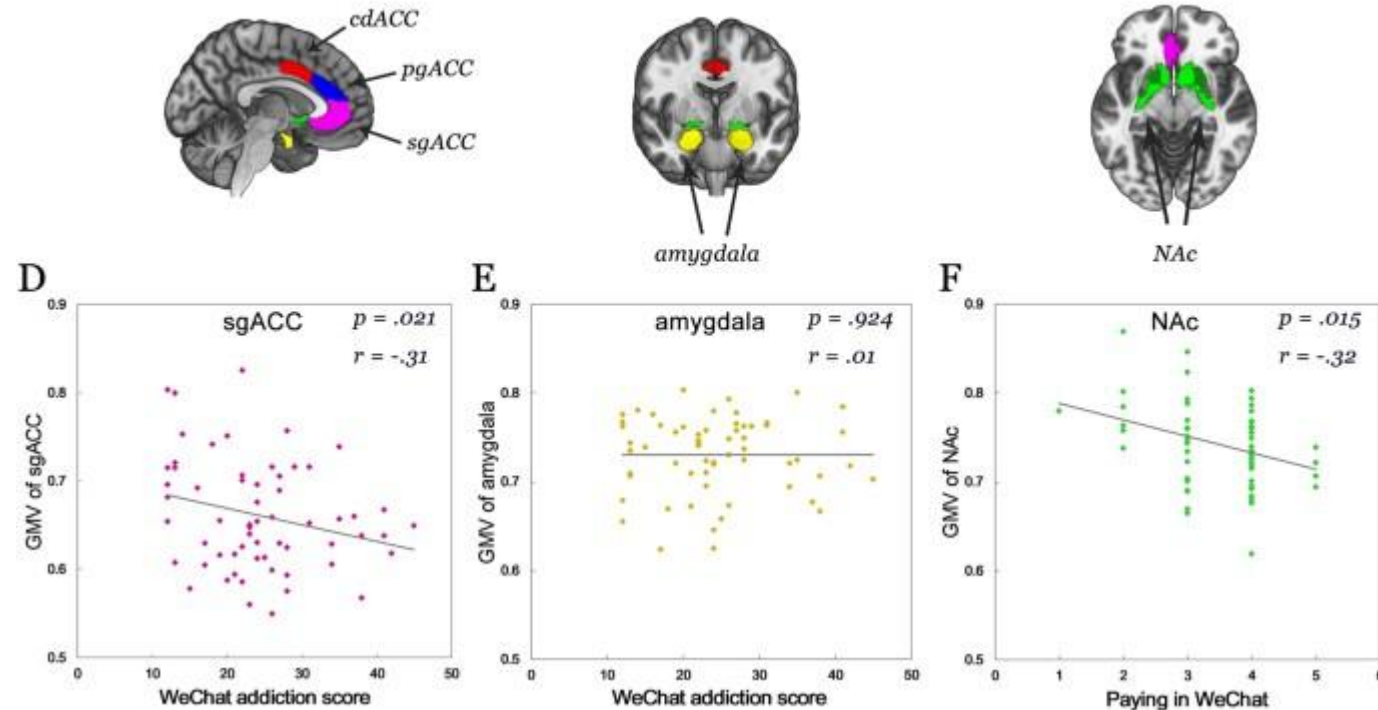
facebook



Montad et al. Behav Brain Res 2017

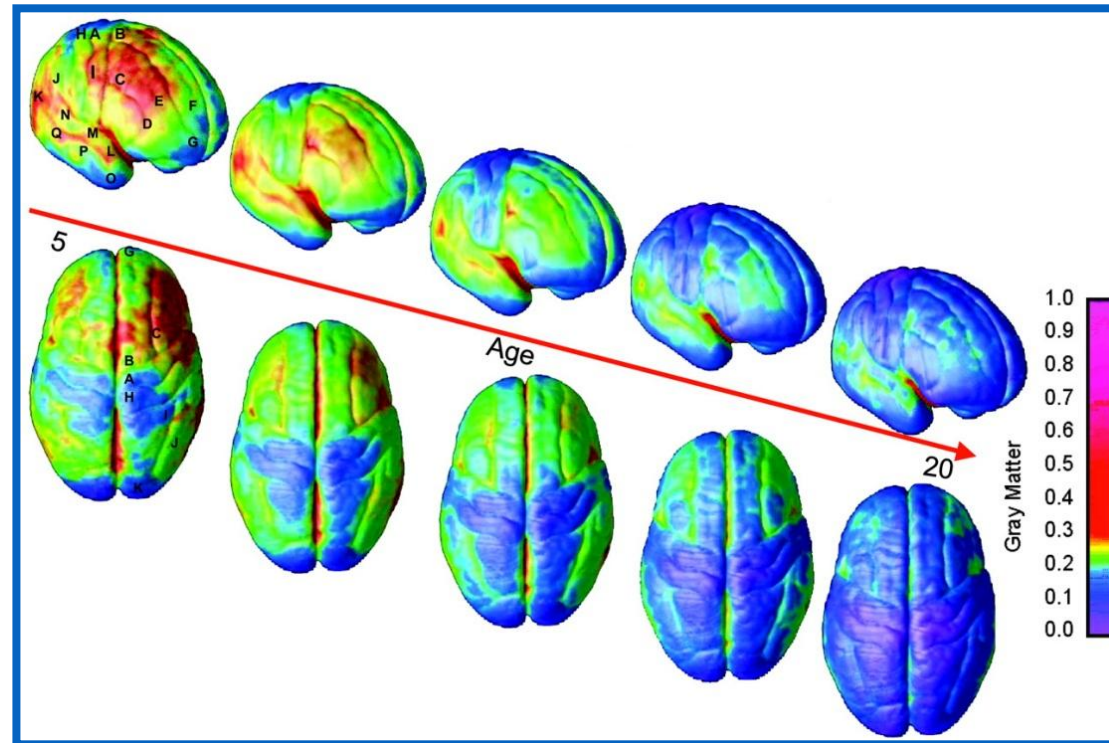


Montad et al. Sci Rep 2018



Addiction and adolescence

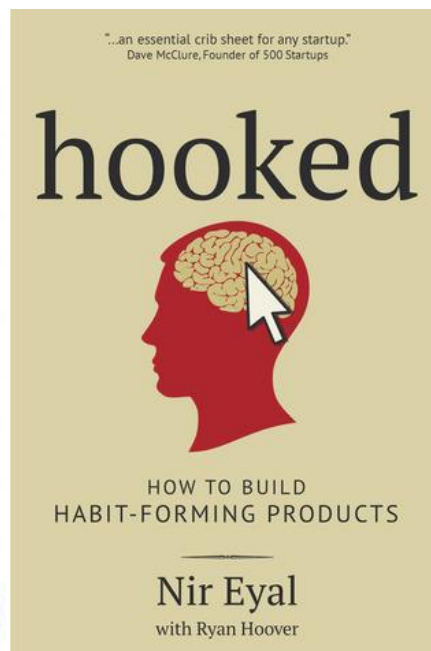
Gray Matter Matures from "Back to Front"



Gogtay et al (2004) PNAS, 101 (21)

The Driving Force

“Companies increasingly find that their economic value is a function of the strength of the habits they create”





Neurobiology of Social Media

The importance of social interactions as a stimulus.

Conclusions (III):

Social interactions activate reward circuits. Social media, too.

The same mechanisms of "hijacking" drugs and gambling act in the excessive use of social media.

Vulnerability in the development of the nervous system.





**THANK
YOU!**

