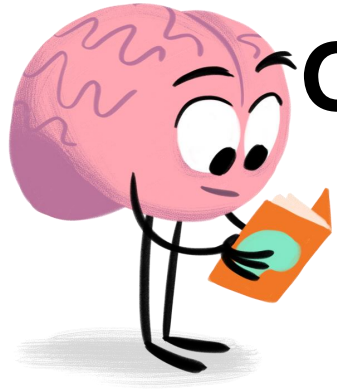




Practical Tools You Can Use to Talk About Gambling Addiction and the Brain



Training for Healthcare Providers Responsible Gaming Conference



Deirdre Querney

Registered Social Worker
&
Certified Problem
Gambling Counsellor



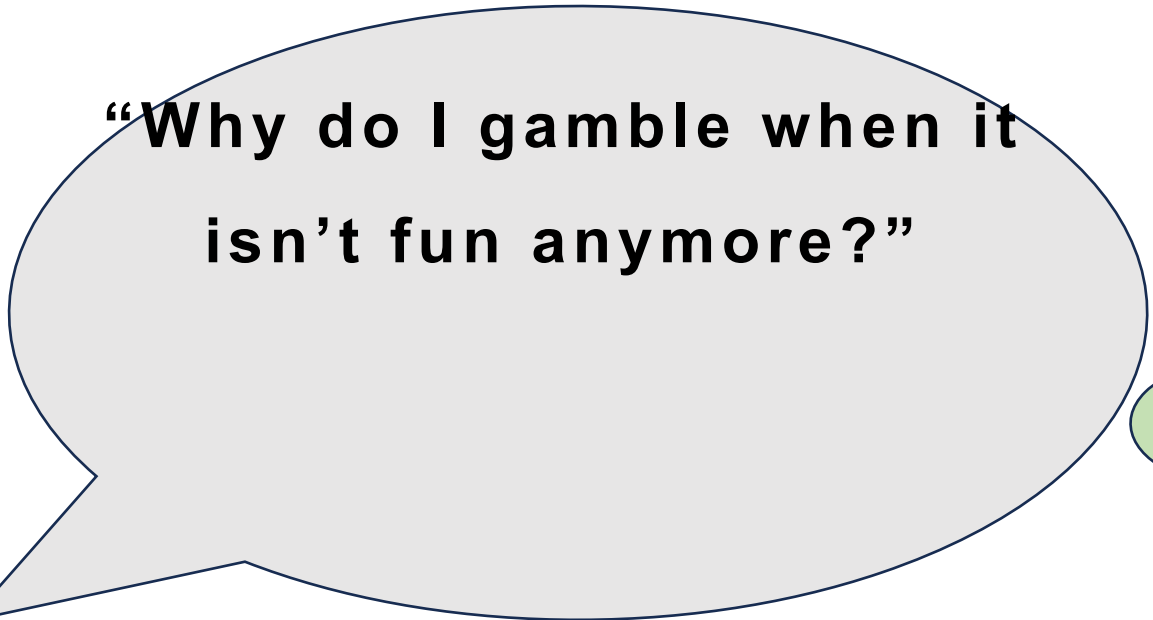
Dr. Iris Balodis

Associate Professor &
Associate Director
Peter Boris Centre for Addictions
Research

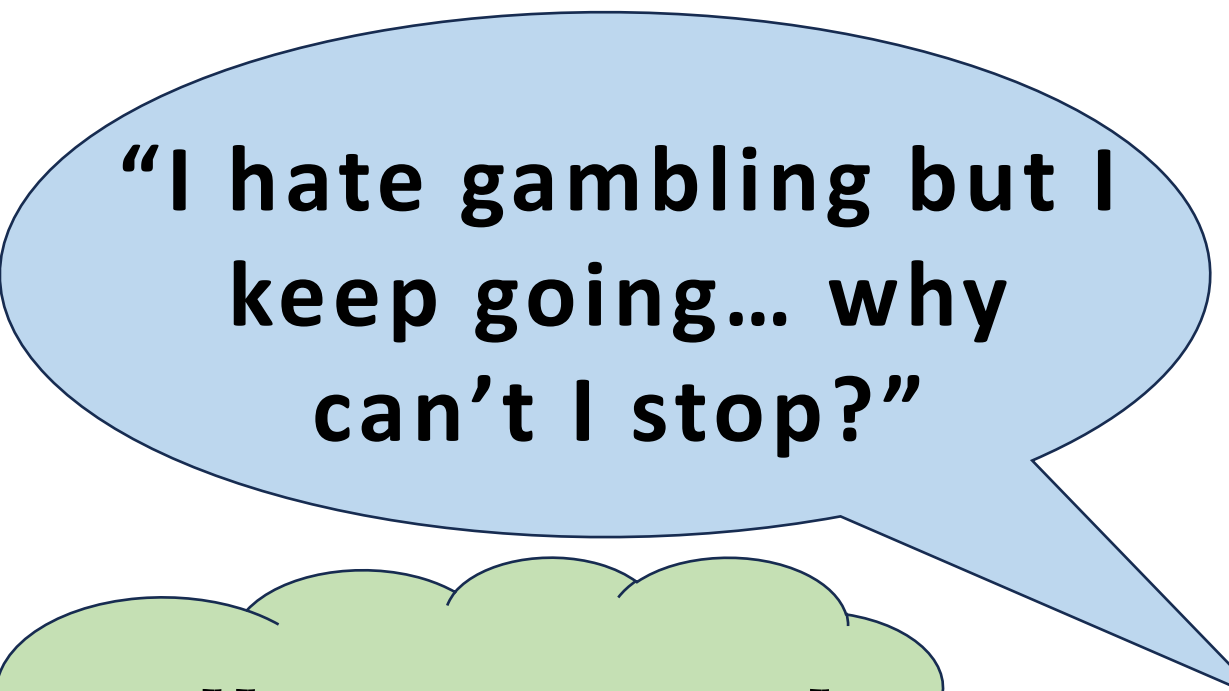
Learning Objectives

- Learn about the Brain Connections tools and how these apply to your setting
 - Key concepts and clinical handouts (Phase 1)
 - Video & website (Phase 2)
 - BE Brief pamphlets (Phase 3)
- Learn to accurately answer commonly-asked questions about gambling and the brain
 - Apply what you have learned to some clinical examples
- Increase your confidence and competence in talking about gambling neurobiology

Origins Story



“Why do I gamble when it isn't fun anymore?”



“I hate gambling but I keep going... why can't I stop?”



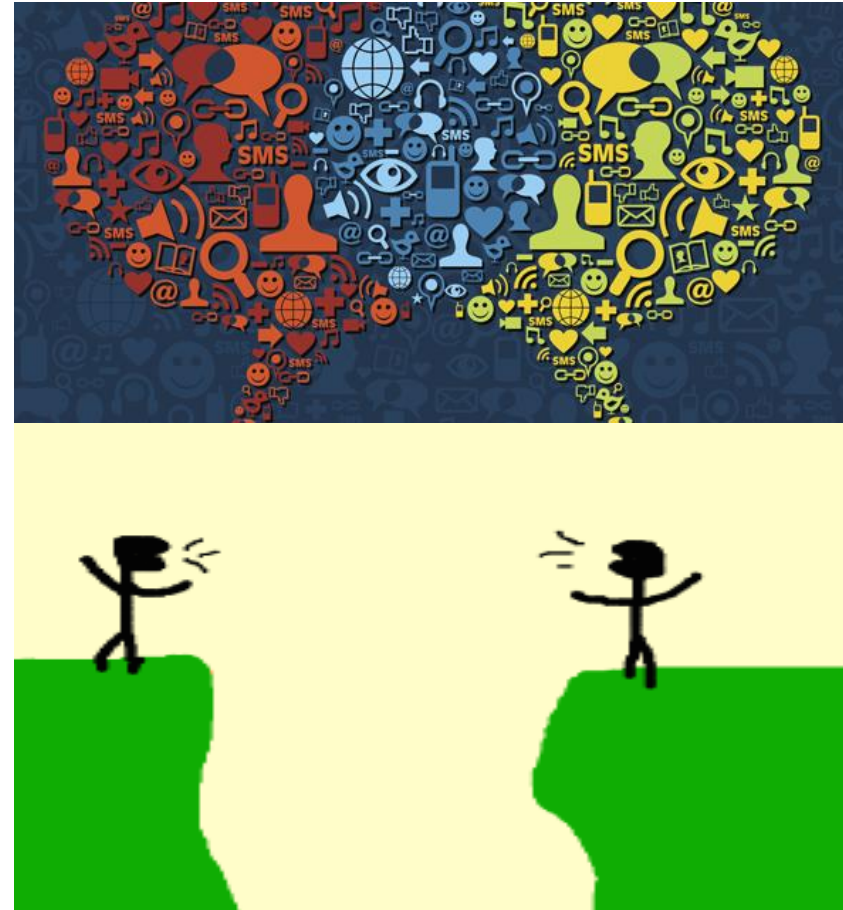
“Will I just switch addictions?”

- Are we answering these questions accurately? Consistently?
- Who has time to find out the answers?

Knowledge Translation

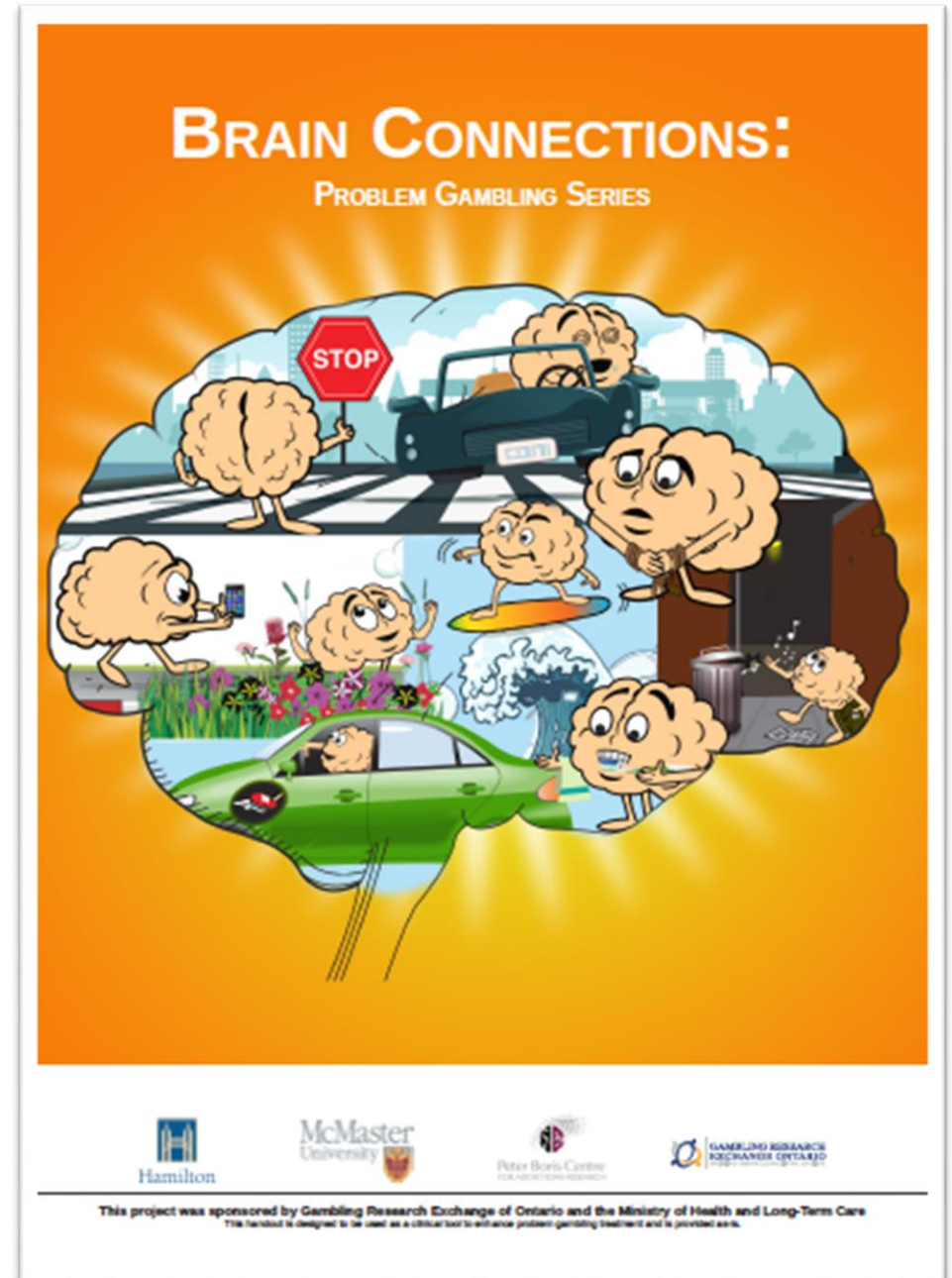
**Clinicians, Researchers & RG specialists
work together to make research
findings accessible:**

- Up-to-date
- Evidence-informed
- Person-centered
- Relevant



Bridging the Gap!

Phase 1: The Clinical Handouts

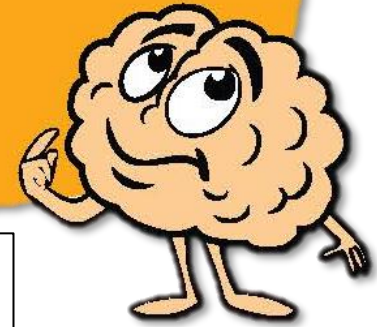


The Questions

1. How is problem gambling like an addiction to alcohol or drugs from my brain's point of view?
2. Why do people keep gambling even when it's not fun anymore?
3. Why is it hard to say 'no' to an urge?
4. Since I've stopped gambling, why does nothing else feel fun?
5. Why do people sometimes switch from gambling to another addiction?

The Answers

HOW IS PROBLEM GAMBLING LIKE AN ADDICTION TO ALCOHOL OR DRUGS, FROM MY BRAIN'S POINT OF VIEW?



THE REWARD HUB – 'GO!'



The Reward Network is made up of different brain regions than the others. The **Ventral Striatum**, also known as the '**Reward Hub**' (1), is an important part of this network. The Reward Hub's job is to act as our gauge when a reward might come our way. It recognizes

Activity

ACTIVITY:

Can you see at what point the Habit Hub overrides the Reward Hub?

1. "This is my first time gambling – that was a fun night out!"
2. "I've gambled a few times this month and I'm excited to go again, whenever that might be."
3. "I gamble every Friday night – it's my main fun for the weekend."
4. "I have been gambling every day for months... it's not really fun anymore and I'm not sure why I'm still going."
5. "I hate gambling but I feel like I can't stop. The urges are so strong."

Answer: The third statement is the beginning of the Habit Hub override because gambling is now a habit. As the person keeps gambling habitually, gambling becomes less fun but there are still strong urges to keep going. By statement 5, the Habit Hub is in control.

Going Further

GOING FURTHER:

Can you relate to wanting to gamble even if you don't like gambling anymore? Based on what you learned here, what can you tell yourself in order to get through an urge to gamble?

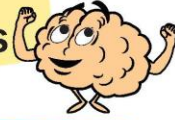
Why is it helpful to avoid gambling cues (e.g., seeing a gambling ad on TV) early on in treatment?

What good habits would you like to develop in your life?

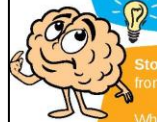
The Take Home Message



Take Home Messages



This series answers five questions about problem gambling and the brain that often come up in treatment. Below are the take home messages from each of these handouts. A take home message is a brief summary of the handout's content along with some ideas about changes you can make if you are concerned about your, or a loved one's, gambling. For more information on the five topics, please read the handouts in this series.



Stop and Go Networks: How is problem gambling like an addiction to alcohol or drugs, from my brain's point of view?

When anticipating rewards, the 'GO!' network can show less activity in people with addictions. This means that they might seek out unnatural rewards to activate the 'GO!' network and push the gas pedal to the extreme. This is why people with an addiction may not be as excited by natural rewards and they might also have trouble learning how new experiences could be enjoyable. In addition, people might not notice the need to stop an addictive behaviour and, even if they do, their 'brakes' may not work as well. Nonetheless, the 'GO!' and 'STOP!' networks can change how they respond to natural rewards. **The good news is that the brain is always changing. Keep rewarding yourself with natural, healthy activities in moderation. Repeat these activities because it will take time for your brain to find pleasure again. Avoid unnatural rewards that could wear out your pedal and brakes.**



'Liking' vs. 'Wanting': Why do people keep gambling even when it's not fun anymore?

When someone has an addiction problem, there may be a shift in activity from the 'Reward Hub' to the 'Habit Hub'. As the person becomes more addicted, there is a shift from *liking* to *wanting* the reward. A person may want to gamble and not even like it anymore. The brain is also overly aware of the gambling cues which can trigger powerful urges to gamble. But gambling won't feel as fun as it used to because gambling is now a habit and habits don't give us the same pleasure as new experiences. Instead, gambling might have become a way to ease the discomfort of strong urges. **The good news is that our brain learns quickly, so over time we can form new associations to help develop healthy behaviours that we find pleasurable.**

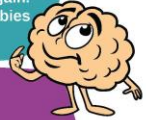
Urges: Why is it hard to say 'no' to a gambling urge?

Saying 'no' to an urge is not always easy. This is because of changes in the brain that occur once gambling has become a problem or a harmful habit. Many parts of the brain are involved, including: the Striatum (which makes you overly-sensitive to gambling cues), the dACC and the mPFC (involved in attention and 'braking'), and the Insula (signalling 'gut feelings'). This is why an urge can feel like a powerful, full-body experience and why willpower alone (without other strategies in place) may not be enough to stop you from acting on an urge. **The good news is that staying in treatment and abstaining from gambling can lead to fewer urges and less sensitivity to gambling cues. Talk to your counsellor about other strategies that might work best for you.**



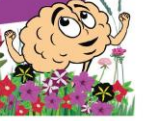
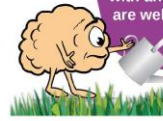
Setpoints: When I'm not gambling, why does it feel like nothing else – even activities I used to enjoy – will ever be fun again?

The early stages of recovery from problem gambling are associated with anhedonia, which is the reduced ability to experience pleasure. This is a sensitive time period when an individual may have a very low mood, high gambling urges, and experience little pleasure from natural rewards. **The good news is that the brain can also change again during recovery. You may start to enjoy natural rewards again. These improvements take time so it is important to keep practicing hobbies you enjoyed and trying out new activities.**



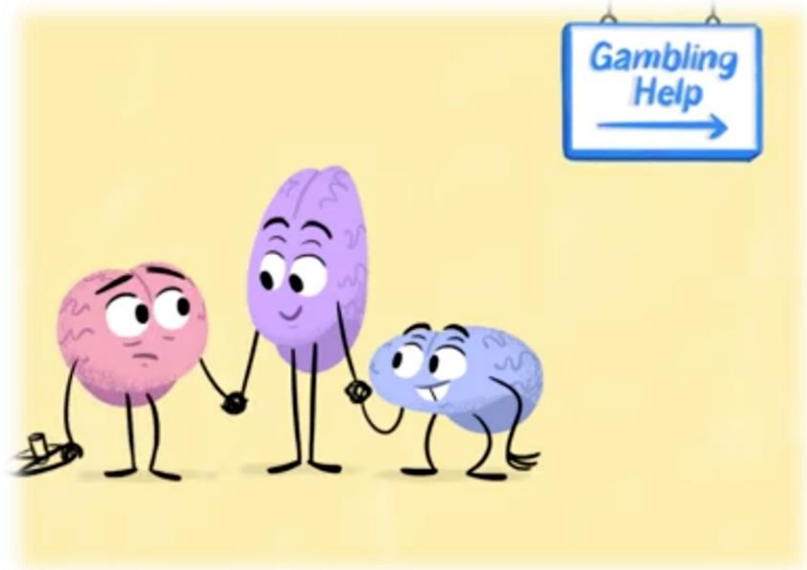
Substitution: Why do people sometimes switch from gambling to another addiction?

Sometimes people switch to another addiction when trying to cut back on problem gambling. This is because activity in the Reward Hub and the Top-down Control Network is reduced, which could lead you to pursue unhealthy behaviours and prefer small, immediate rewards over larger, delayed ones. **Be careful with these 'quick fix' rewards that can hijack your attention and cause you to substitute one damaging behaviour with another. The biggest and best rewards often take time but are well worth the effort.**



This project was sponsored by Gambling Research Exchange of Ontario and the Ministry of Health and Long-Term Care
This handout is designed to be used as a clinical tool to enhance problem gambling treatment and is provided as-is.

Integrating the handouts into your clinical practice



- Use in individual or group counselling sessions
- Guidance may be required
- Biggest impact when used in a session to enhance therapy



What do you think?

True or False?

**A surplus or
deficiency of
dopamine is
responsible for
problem gambling**

It's not all about dopamine!

frontiers in
BEHAVIORAL NEUROSCIENCE

How central is dopamine to pathological gambling or gambling disorder?

Marc N. Potenza *

Departments of Psychiatry, Neurobiology, and Child Study Center, Yale University School of Medicine, New Haven, CT, US
*Correspondence: marc.potenza@yale.edu

Edited by:

Bryan F. Singer, University of Michigan, USA

Reviewed by:

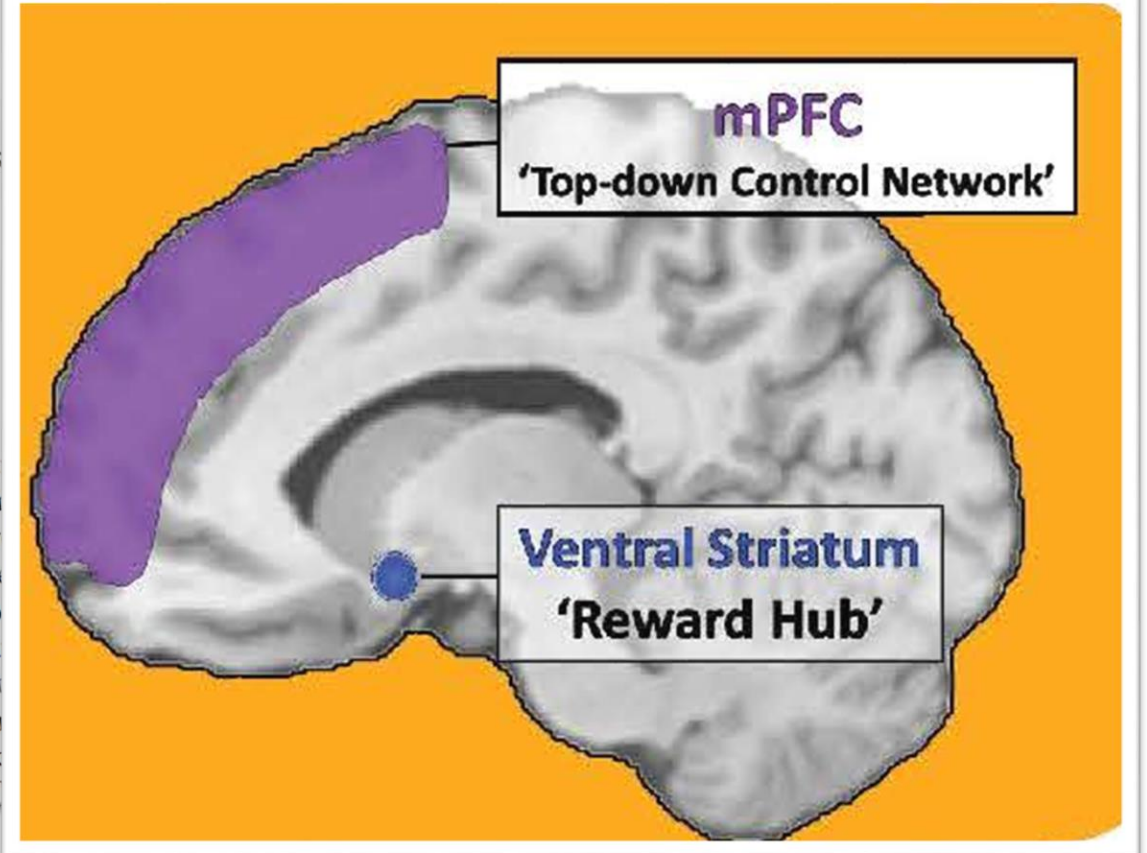
Luke Clark, University of Cambridge, UK

Keywords: dopamine, gambling, addiction, PET, serotonin, glutamate, opioids

Pathological gambling [PG—now termed “gambling disorder” in DSM-5 (APA, 2013; Petry et al., 2013)] is characterized by maladaptive patterns of gambling that are associated with significant impairments in functioning. Over the past decade, significant advances have been made in understanding the pathophysiology of PG (Potenza, 2013). Similarities

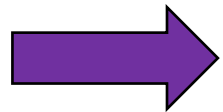
of psychotic disorders (haloperidol) was found to increase gambling-related motivations and behaviors in individuals with PG (Zack and Poulos, 2007). However, administration of the pro-dopaminergic (and pro-adrenergic) drug amphetamine also led to increased gambling-related thoughts and behaviors in PG (Zack and Poulos, 2004).

OPINION ARTICLE
published: 23 December 2013
doi: 10.3389/fnbeh.2013.00206



Similarities between Gambling Disorder and Substance Use Disorders

- Escalation in use/activity
- Urges
- Repeated failures to reduce use/activity
- Persistence despite negative consequences
- Frequent relapse following abstinence

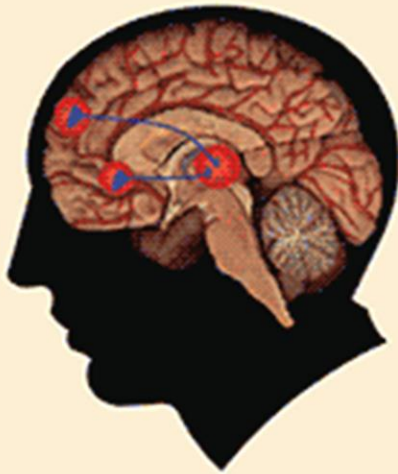


GD can separate pre-existing vulnerability from consequences of drug use

Where does the dopamine story come from?

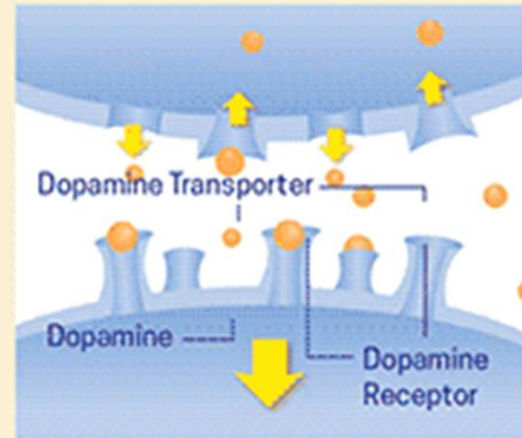
Some drugs target the brain's pleasure center

Brain reward (dopamine pathways)



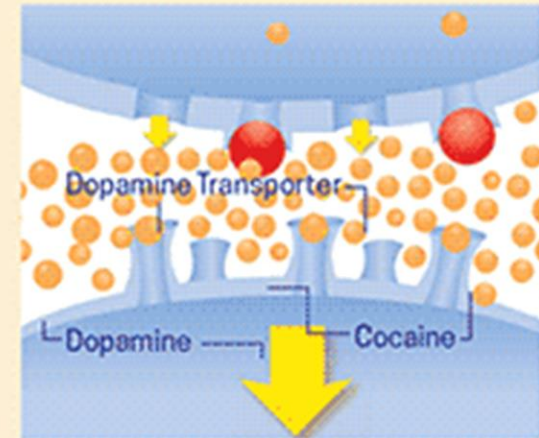
These brain circuits are important for natural rewards such as food, music, and sex.

How drugs can increase dopamine



While eating food

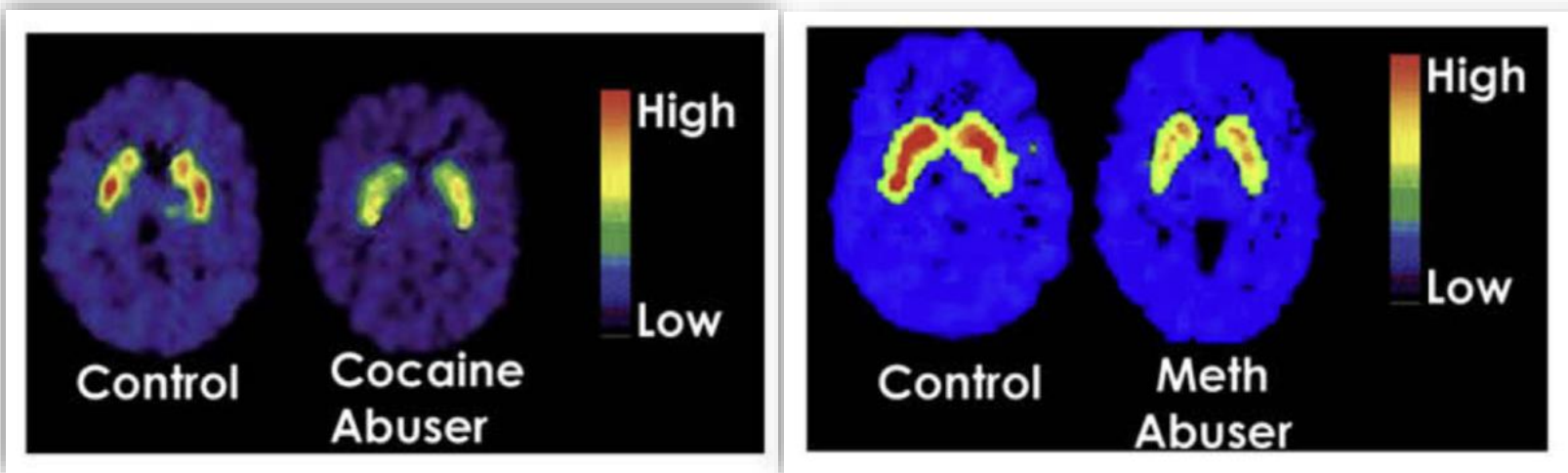
Typically, dopamine increases in response to natural rewards such as food. When cocaine is taken, dopamine increases are exaggerated, and communication is denied.



While using cocaine

Where does the dopamine story come from?

D2 DA Receptor Availability



Volkow et al., 2009 *Neuropsychopharmacology*

↓ Dopamine

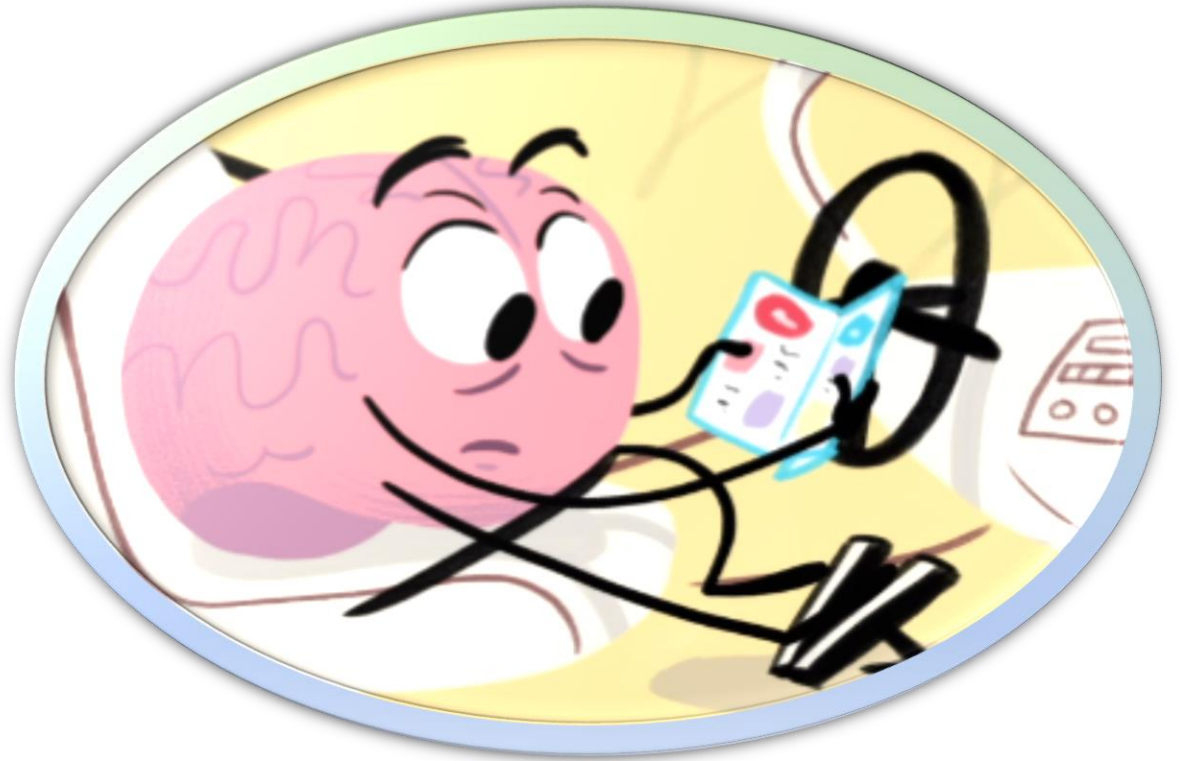
- Cocaine
- Methamphetamine
- Alcohol
- Cannabis
- Opiates

Here's what we know:

- Dopamine dysregulation is involved in Substance Use Disorders
- Dopamine is involved in decision-making (e.g. risky choices)
- There is some evidence for changes in the dopamine system in GD...

(Clark et al., 2012; Joutsa et al., 2012; Boileau et al., 2013;2014; van Holst et al., 2018)

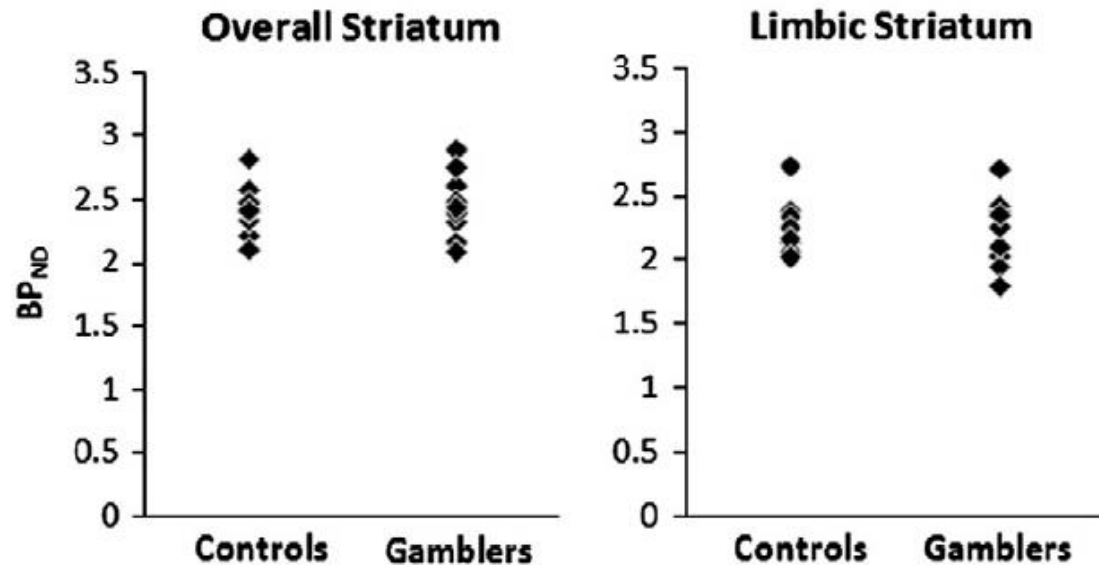
**What do we
know about
dopamine in
gambling
disorder?**



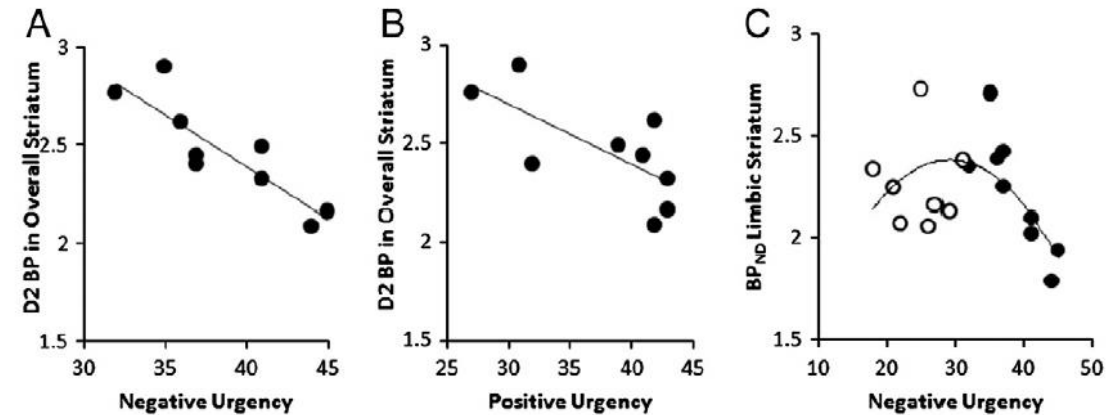
Striatal dopamine D₂/D₃ receptor binding in pathological gambling is correlated with mood-related impulsivity

Luke Clark ^{a,*}, Paul R. Stokes ^b, Kit Wu ^c, Rosanna Michalczuk ^a, Aaf Benecke ^b, Ben J. Watson ^d, Alice Egerton ^e, Paola Piccini ^c, David J. Nutt ^b, Henrietta Bowden-Jones ^{g,f}, Anne R. Lingford-Hughes ^{b,f}

No dopamine differences between GD and control groups



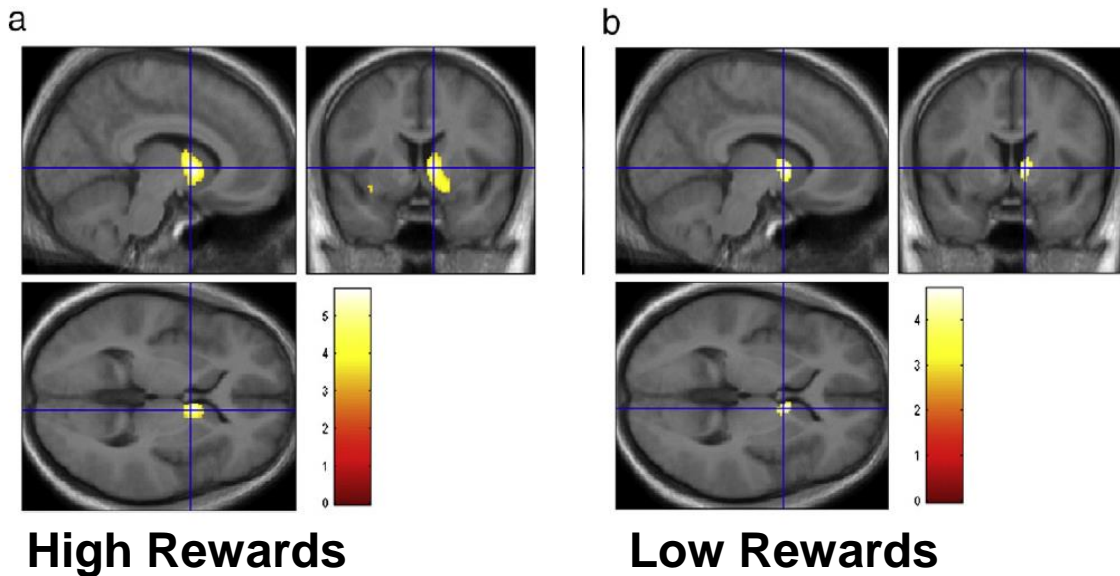
But low dopamine levels were linked to higher impulsivity



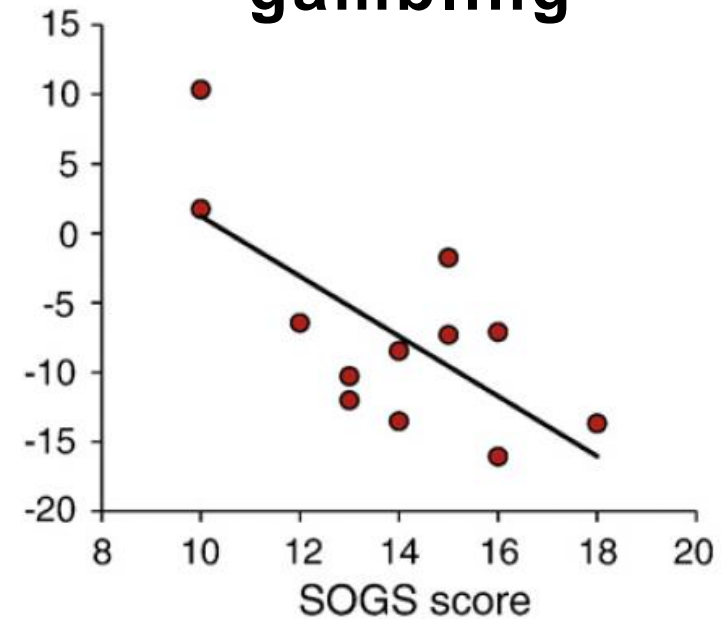
Mesolimbic dopamine release is linked to symptom severity in pathological gambling

Juho Joutsa ^{a,b,c,*}, Jarkko Johansson ^b, Solja Niemelä ^d, Antti Ollikainen ^e, Mika M. Hirvonen ^{b,f},
Petteri Piepponen ^g, Eveliina Arponen ^b, Hannu Alho ^{h,i}, Valerie Voon ^j, Juha O. Rinne ^b,
Jarmo Hietala ^d, Valtteri Kaasinen ^{a,b}

**No dopamine differences
between GD and control groups**



**But low dopamine levels were
linked to more severe
gambling**

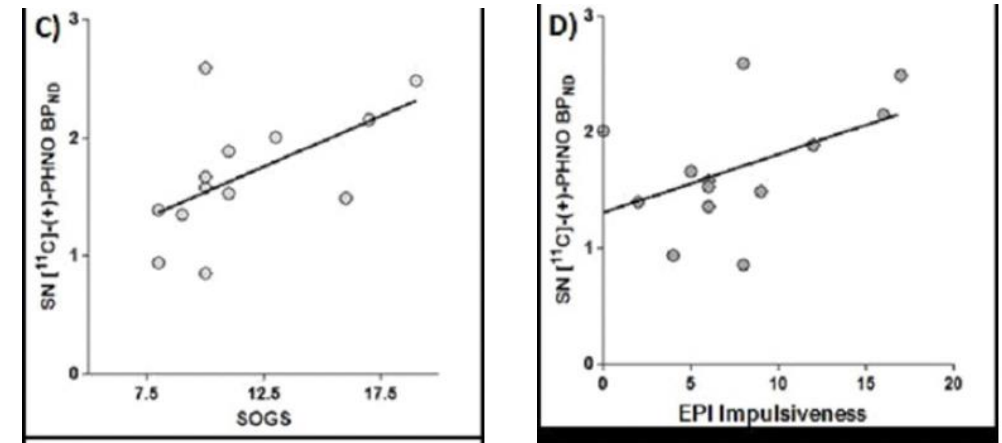
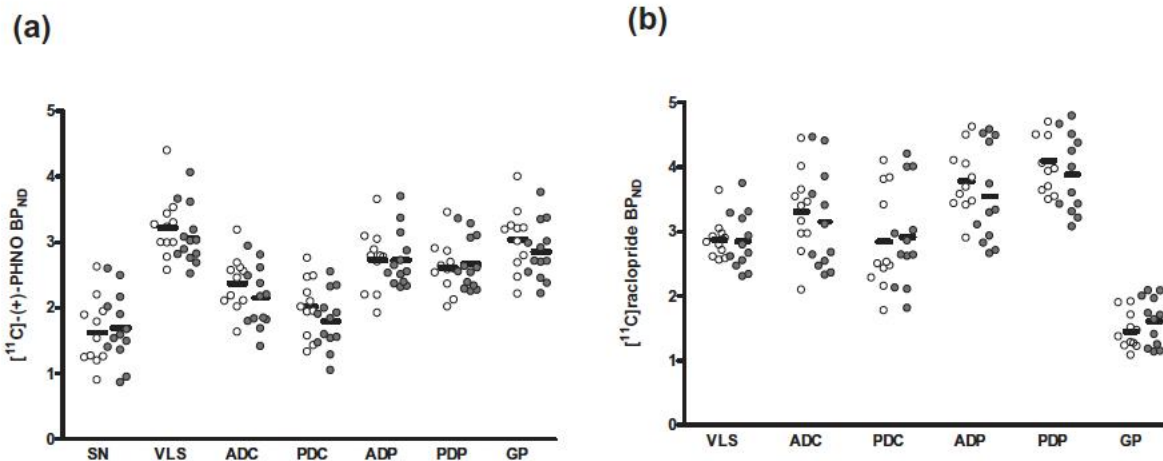


The D_{2/3} dopamine receptor in pathological gambling: a positron emission tomography study with [¹¹C]-(+)-propyl-hexahydro-naphtho-oxazin and [¹¹C]raclopride

Isabelle Boileau^{1,2,4,5,7,10}, Doris Payer^{1,2,7,10}, Bindiya Chugani⁸, Daniela Lobo^{6,7,8,10},
Arian Behzadi^{1,2,7}, Pablo M. Rusjan², Sylvain Houle^{2,10}, Alan A. Wilson², Jerry Warsh^{6,7},
Stephen J. Kish^{1,2,3,7,8,10} & Martin Zack^{6,8,9,10}

**No dopamine differences
between GD and control groups**

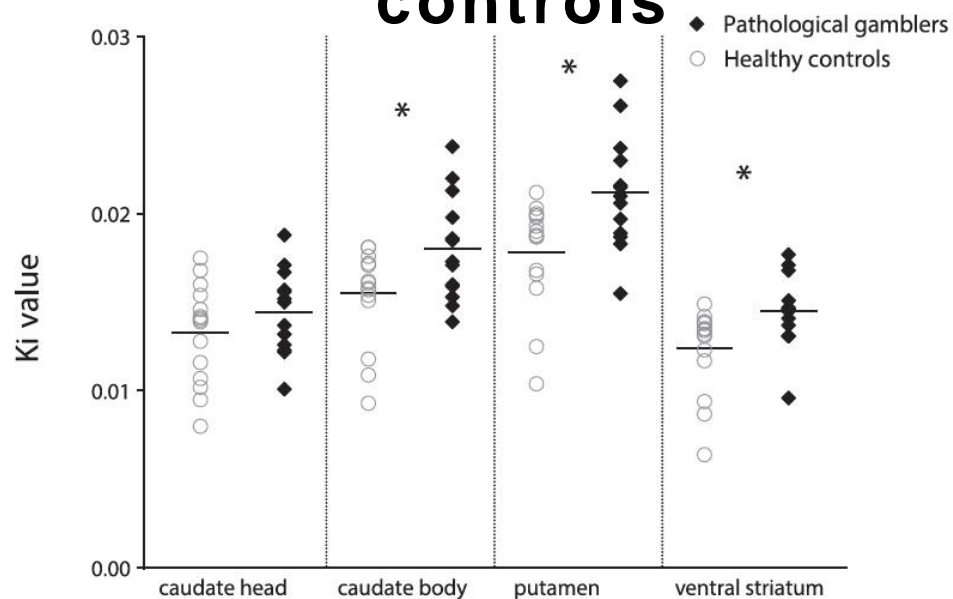
**But increased dopamine release was
linked to more severe gambling and
increased impulsivity**



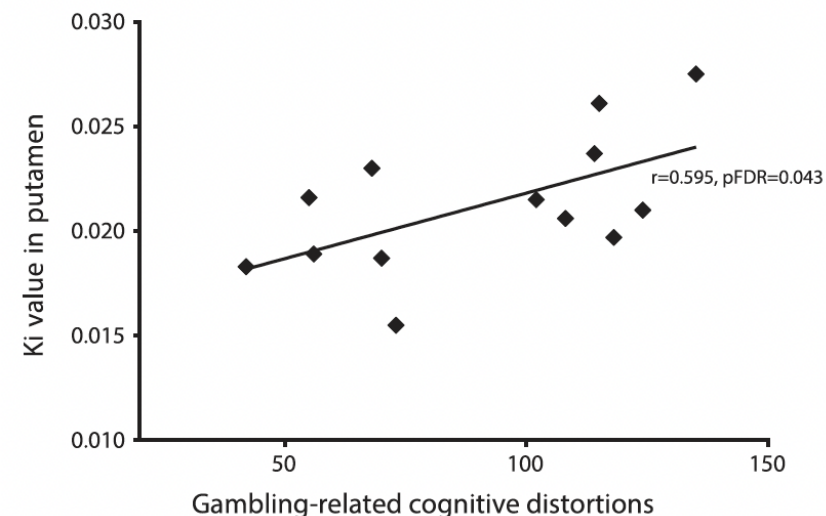
Increased Striatal Dopamine Synthesis Capacity in Gambling Addiction

Ruth J. van Holst, Guillaume Sescousse, Lieneke K. Janssen, Marcel Janssen, Anne S. Berry, William J. Jagust, and Roshan Cools

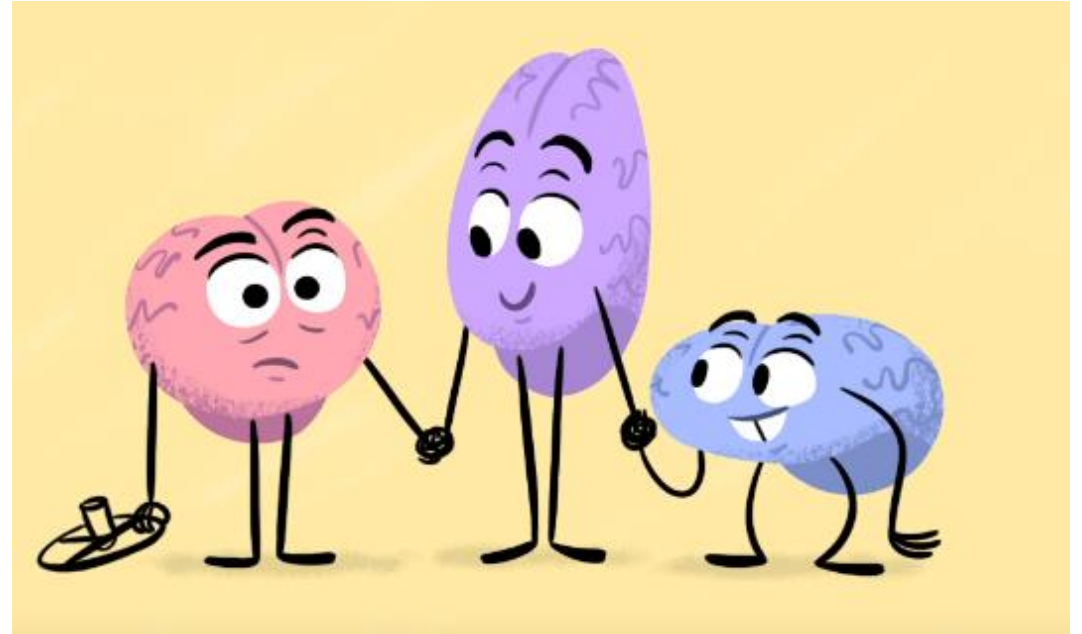
Increased dopamine synthesis capacity in GD relative to controls



But increased dopamine synthesis was linked to more gambling cognitive distortions



**What sense
can we make
of this?**



Dopamine's role in gambling addiction is complex

- Phasic vs. Tonic dopamine signalling
- Multiple dopamine receptor subtypes in different brain areas
- Different phases of reward (anticipatory vs. outcome)
- Different neuroimaging methods (fMRI vs. PET)
- Different populations (few studies comparing GD and SUD populations; few studies in GD in general)
- Type of task (what are subjects asked to do?)
- Phases of addiction (active, treatment-seeking, recovered, length of abstinence)
- Comorbidities



Dopamine in GD: Current Research Directions

The anticipatory dopamine response in addiction: A common neurobiological underpinning of gambling disorder and substance use disorder?

Jakob Linnet

Dopaminergic signaling of uncertainty and the aetiology of gambling addiction

Martin Zack^{a,b,*}, Ross St. George^c, Luke Clark^d

 **Uncertainty/Anticipation/Unexpectedness** =  **Dopamine**



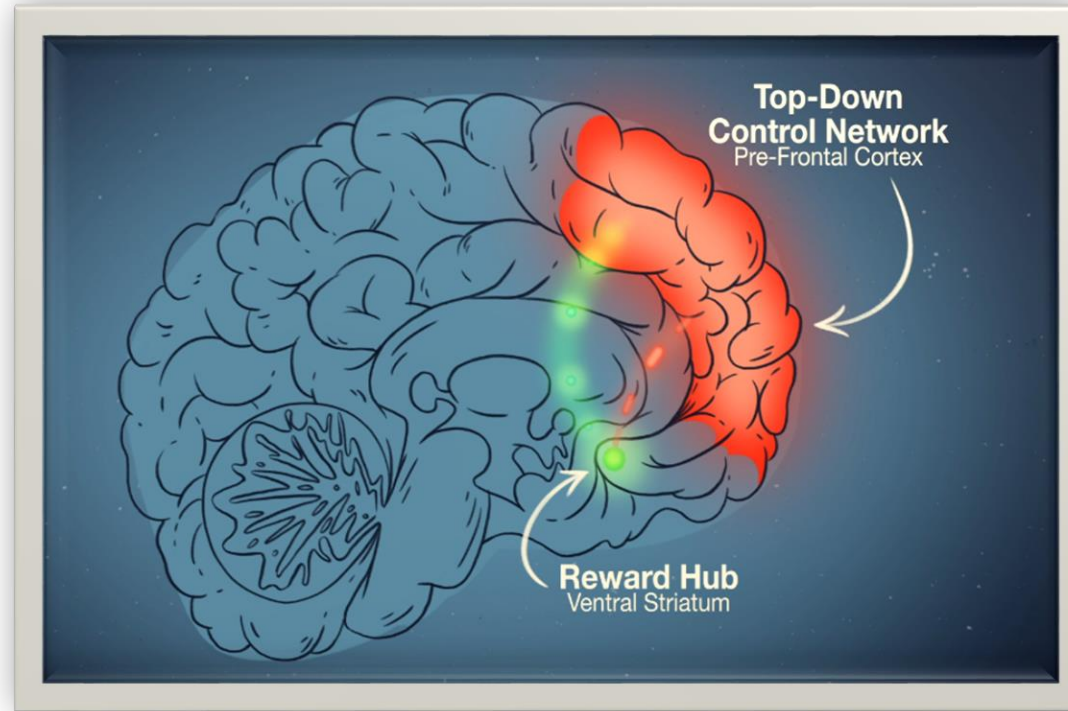
Key Concepts

KEY CONCEPT #1:

Gas and Brake Pedal



NEUROBIOLOGICAL CONCEPT: **Top-Down & Bottom-Up Processes**

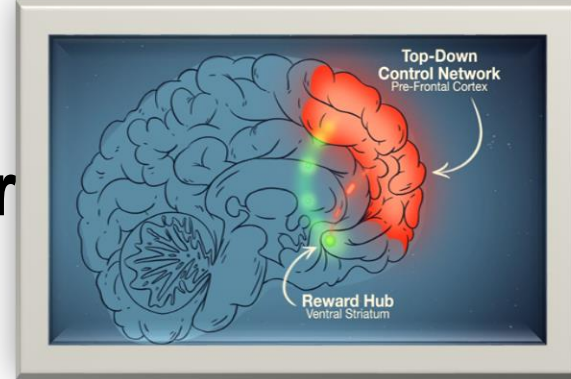


KEY CONCEPT #1:

Gas and Brake Pedal



NEUROBIOLOGICAL CONCEPT: **Top-Down & Bottom-Up Pr**



In addiction:

- Press the 'gas pedal' (reward hub) too much to feel pleasure
- The brakes (top-down control network) are inconsistent

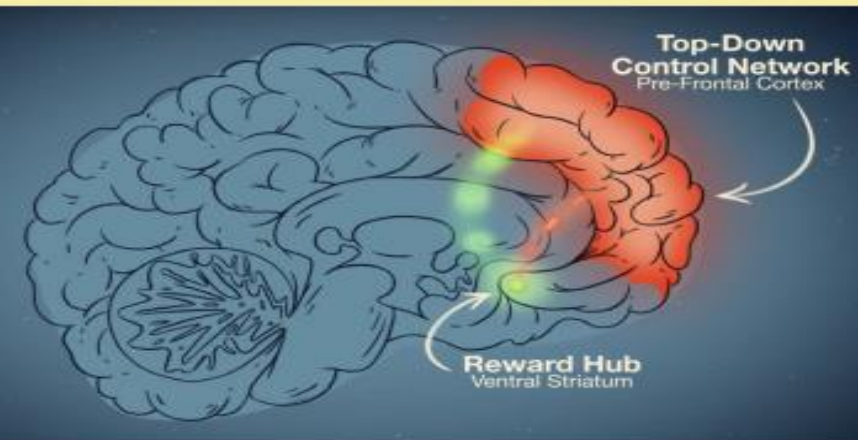


GAMBLING: WHY CAN'T I STOP?

One reason why gambling is hard to stop is because it affects your brain.

Gambling is like pressing the gas pedal of your car. Your brain's reward hub 'fires up' as you think about a win.

Your brain also has a brake system. The 'top-down control network' is used when you want to stop gambling.



Your brain's gas and brake pedals
The reward hub and the top-down-control network

When your gas and brake pedals work, it's easier to control your gambling.

For some people though, gambling no longer 'fires up' the brain with excitement.

So, to feel pleasure, they 'floor it' by gambling more.



Pressing the gas by gambling too much can lead to problems

Meanwhile, their brakes may be faulty. They might not notice it's time to stop gambling.

Or, if they try to stop, the brakes may not work.



It can be hard to notice signs and put on the brakes

If you think that your gas and brake pedals are worn out:

- Step back from gambling and give your brain a rest.
- Reward yourself with other activities that you enjoy (e.g., a social activity, a good meal, a hug, a hobby).



Give yourself a break and try other rewards!

- Remember that games are designed to keep you playing longer. Set limits on your time and money.
- If you're worried about gambling, talk to someone you trust or get help from a counsellor.

KEY CONCEPT #2:

The Habit Hub



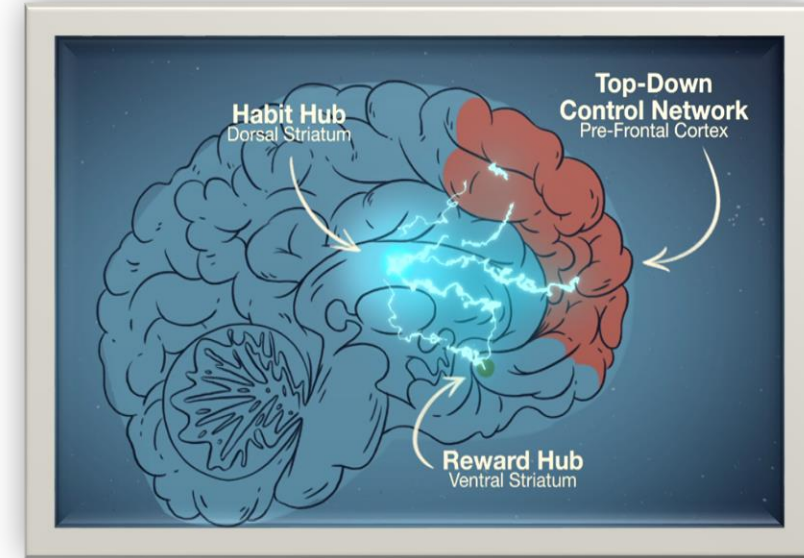
NEUROBIOLOGICAL CONCEPT: **Habit Formation**

Reward Hub (Ventral Striatum)

- Allows us to experience pleasure

Habit Hub (Dorsal Striatum)

- Helps establish habits



KEY CONCEPT #2:

The Habit Hub



NEUROBIOLOGICAL CONCEPT: **Habit Formation**

Reward Hub (Ventral Striatum)

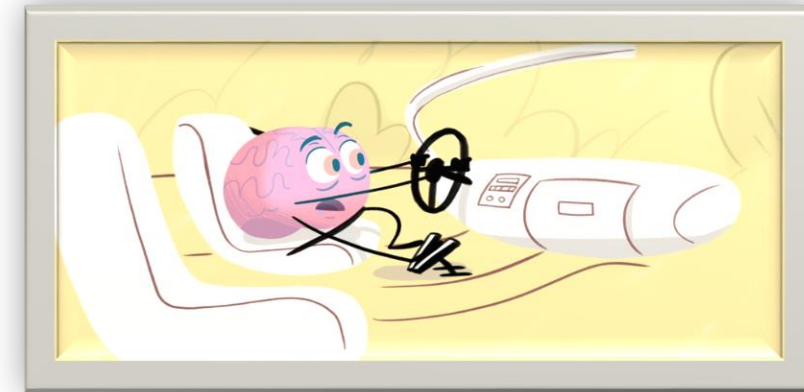
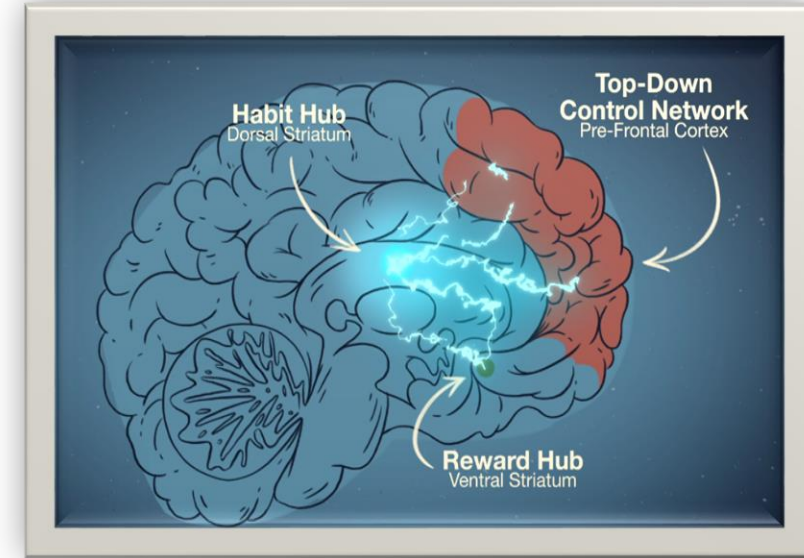
- Allows us to experience pleasure

Habit Hub (Dorsal Striatum)

- Helps establish habits

In addiction:

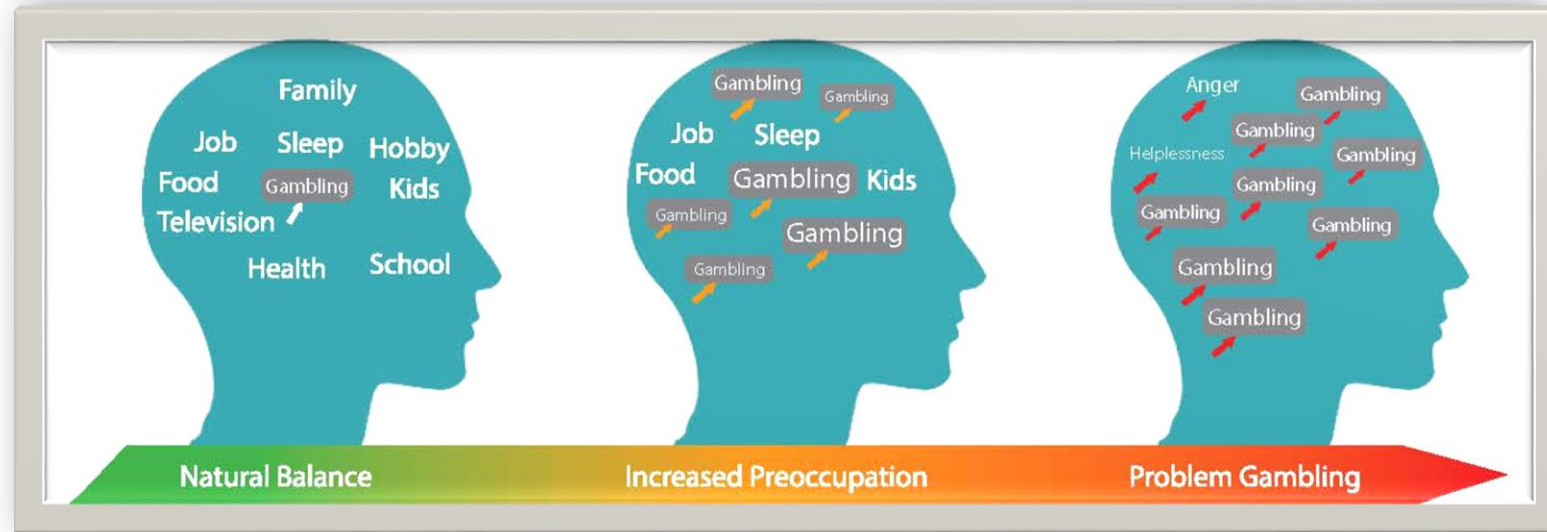
- Reward and Habit Hubs stop working harmoniously
 - Gambling ceases to be a pleasure and becomes a habit



KEY CONCEPT #3: Over-Awareness of Gambling Cues



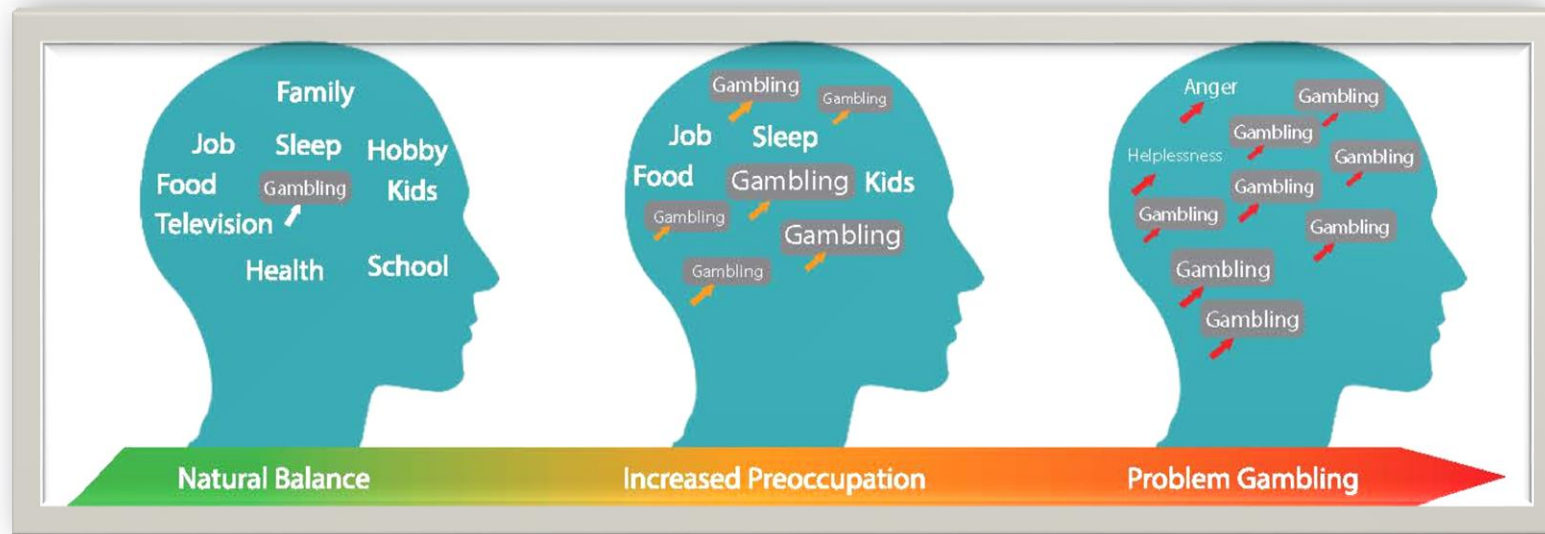
NEUROBIOLOGICAL CONCEPT: **Incentive Salience**



KEY CONCEPT #3: Over-Awareness of Gambling Cues



NEUROBIOLOGICAL CONCEPT: Incentive Salience

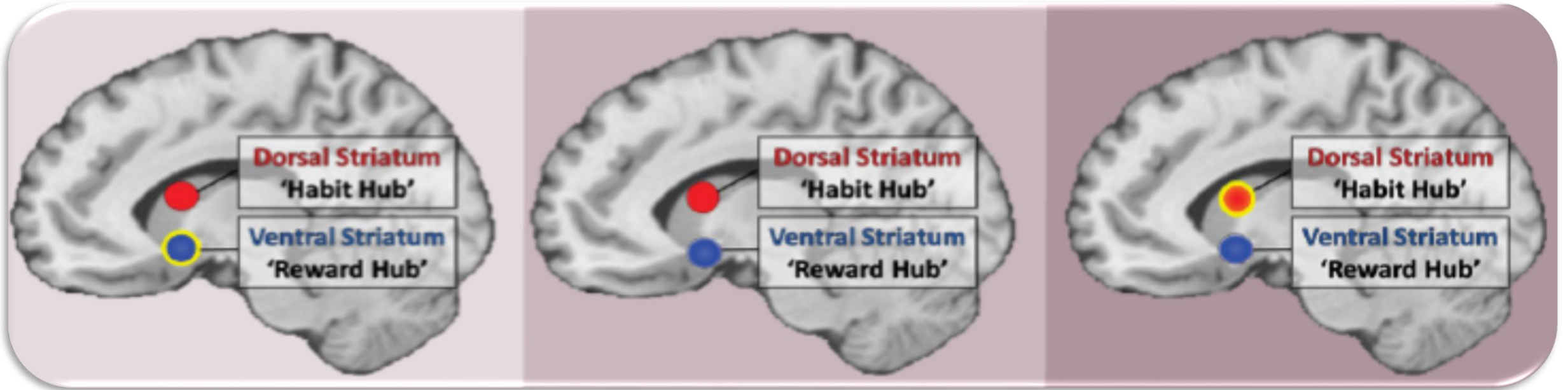


- We rapidly associate stimuli with reward (e.g. sounds of a slot machine, feel of a poker table, seeing money)
- With the habit hub in charge, our attention gets easily hijacked by gambling cues – we notice anything related to gambling very quickly

KEY CONCEPT #4: Liking vs Wanting



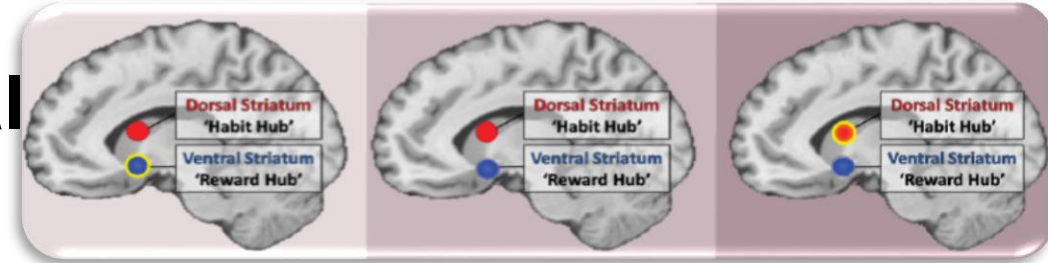
NEUROBIOLOGICAL CONCEPT: **Incentive Salience**



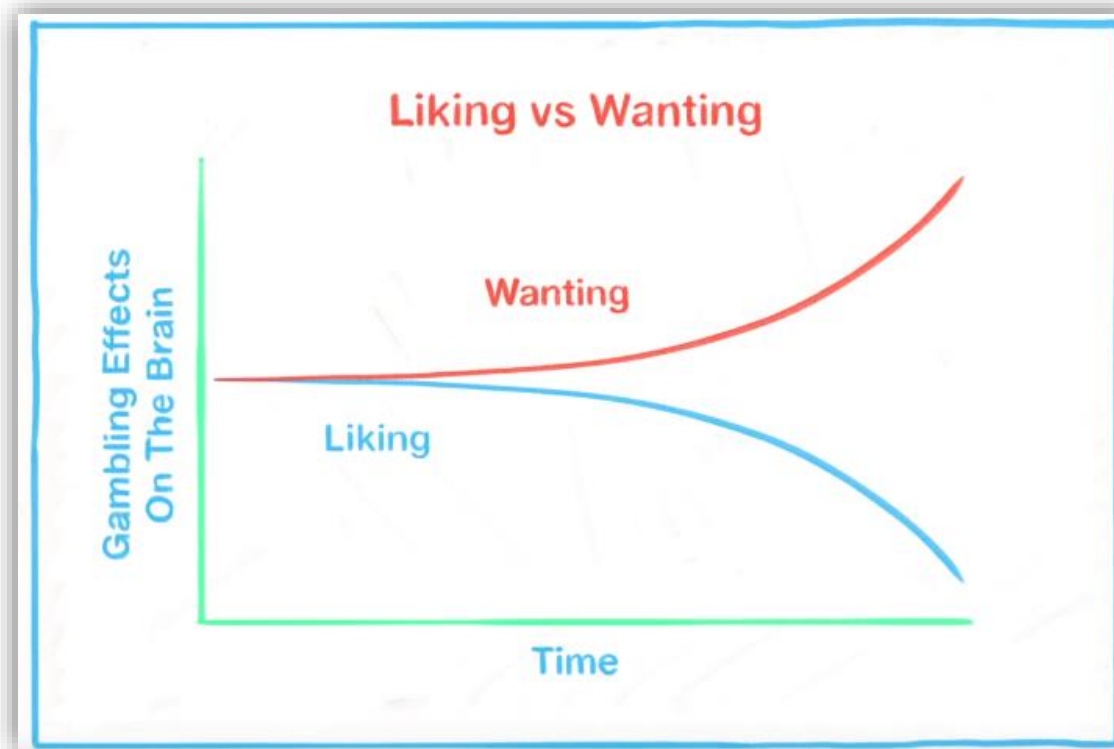
KEY CONCEPT #4: Liking vs Wanting



NEUROBIOLOGICAL CONCEPT: Incentive Salience



- See the gambling cue (e.g. cash)
- Experience a strong urge
- Habit Hub overrides the Reward Hub
- Seeing the cash = want to gamble (out of habit)
- Gambling becomes a way to ease the uncomfortable urge (not to feel pleasure)



KEY CONCEPT #5: **Setpoints**



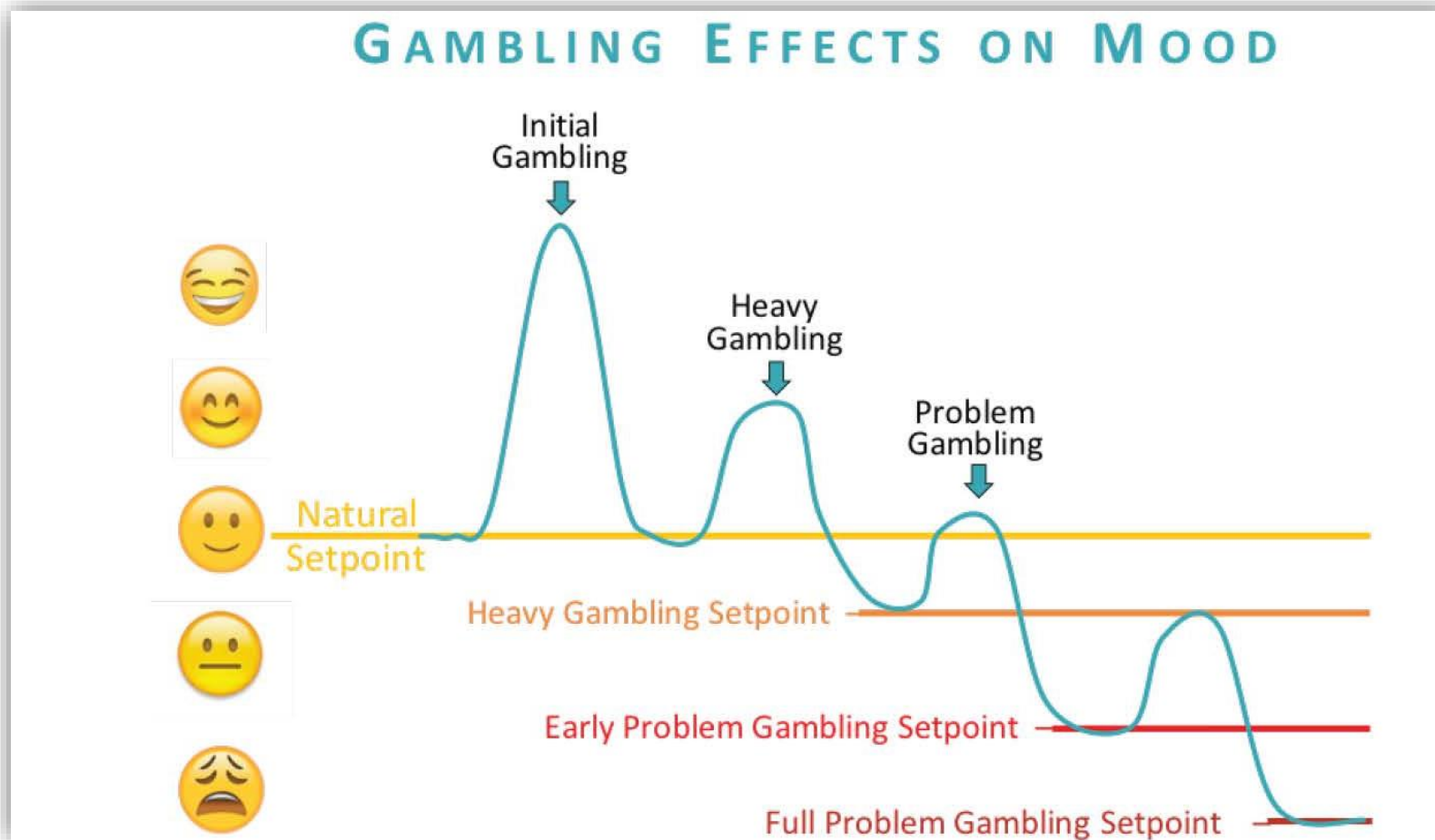
NEUROBIOLOGICAL CONCEPT: **Negative Emotionality**



KEY CONCEPT #5: Setpoints



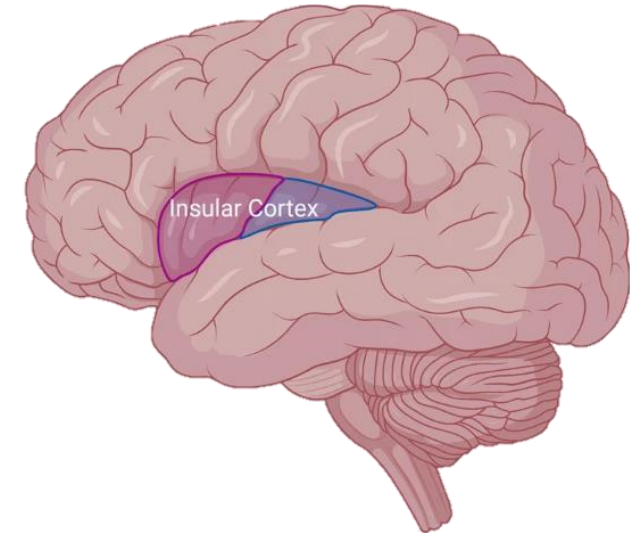
NEUROBIOLOGICAL CONCEPT: **Negative Emotionality**



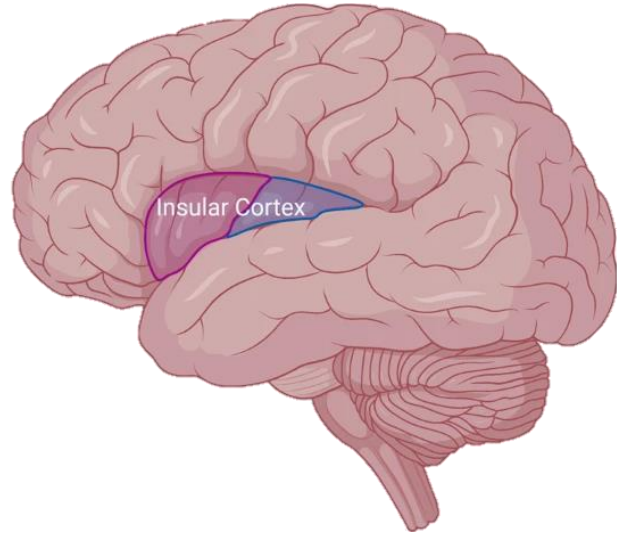
KEY CONCEPT #6: Interoception



NEUROBIOLOGICAL CONCEPT: **Interoception**



KEY CONCEPT #6: Interoception



NEUROBIOLOGICAL CONCEPT: Interoception

- Your gut feeling... your 'Spidey Sense'
- The Insula
- Allows you to process sensations coming from your body
- Combines the sensation with the drive to do something
- Signals get misinterpreted in addiction



KEY CONCEPT #7: Coding Rewards



NEUROBIOLOGICAL CONCEPT: **Coding Rewards**



Would you rather have \$10 now or get \$100 next week?

KEY CONCEPT #7: Coding Rewards



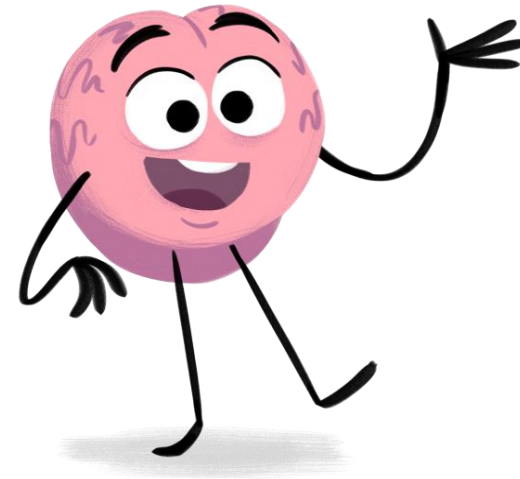
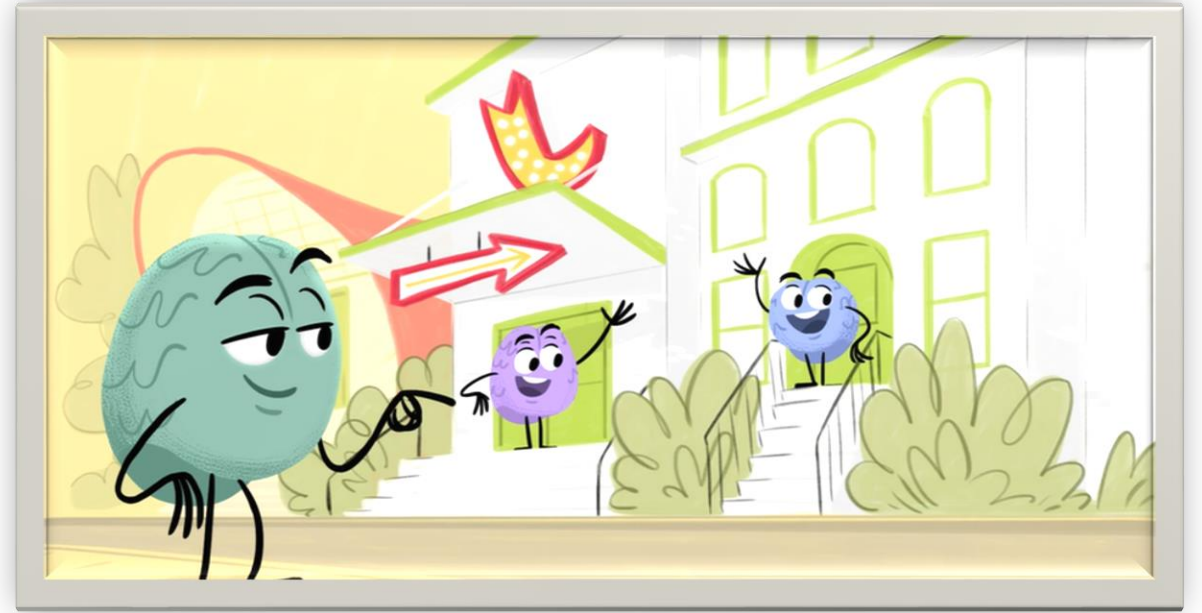
NEUROBIOLOGICAL CONCEPT: Coding Rewards

- People with gambling problems don't code rewards in the same way
- Instant gratification wins out
- Delayed rewards are less valued

"\$10 now,
of course!!"



Phase 2: The Video & Website



BE
(Brain Emoji)

We aren't script writers, but we had to:

- Find a metaphor to describe how gambling becomes an addiction that anyone could understand
- Create a character that was gender neutral, that everyone could relate to, and that you actually cared about when you saw their distress
- Show how the drive to gamble can take a person over
- Clearly show someone's life falling apart due to gambling addiction in less than 2 minutes
- Show gambling losing its veneer
- And make brain talk interesting and accessible... all on a tight budget!

Find a metaphor

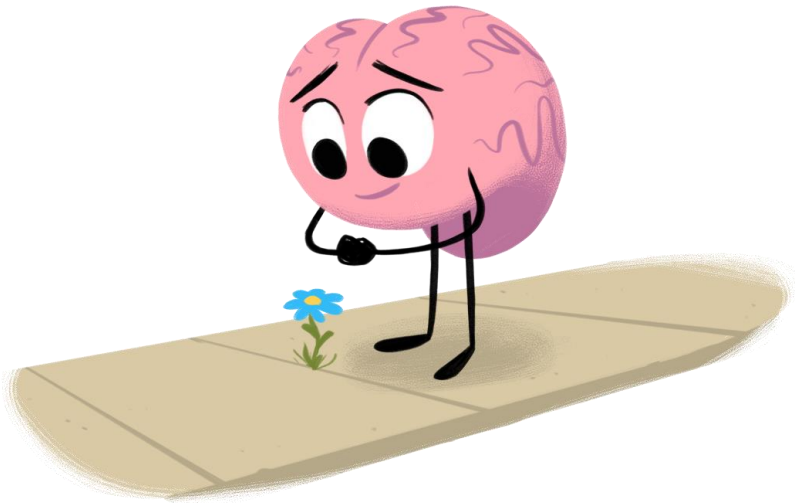
- Addiction is like pressing the 'gas pedal' (Reward Network) too much in order to feel pleasure
- 'Brakes' (top down control network) don't work consistently
- Put the word 'gambling' on the car. We hear BE polishing the car, just like gambling presents itself – a shiny, fun, cool, red race car
- BE puts on shades and expertly races out the driveway and manoeuvres through all sorts of obstacles, demonstrating gambling 'skill' and confidence
- Everyone is envious and admiring of this cool/winner/VIP BE (just like the winning phase of gambling)



Create a character

BE ('brain emoji') is:

- **Universal:** we all have a brain!
- **Relatable:** we can all relate in one way or another to BE's emotions and BE can be any gender or cultural background
- **Engaging:** you really do find yourself caring what happens to BE
- **Accurate:** BE experiences are accurate in terms of neurobiology (a brain... not a peach!)

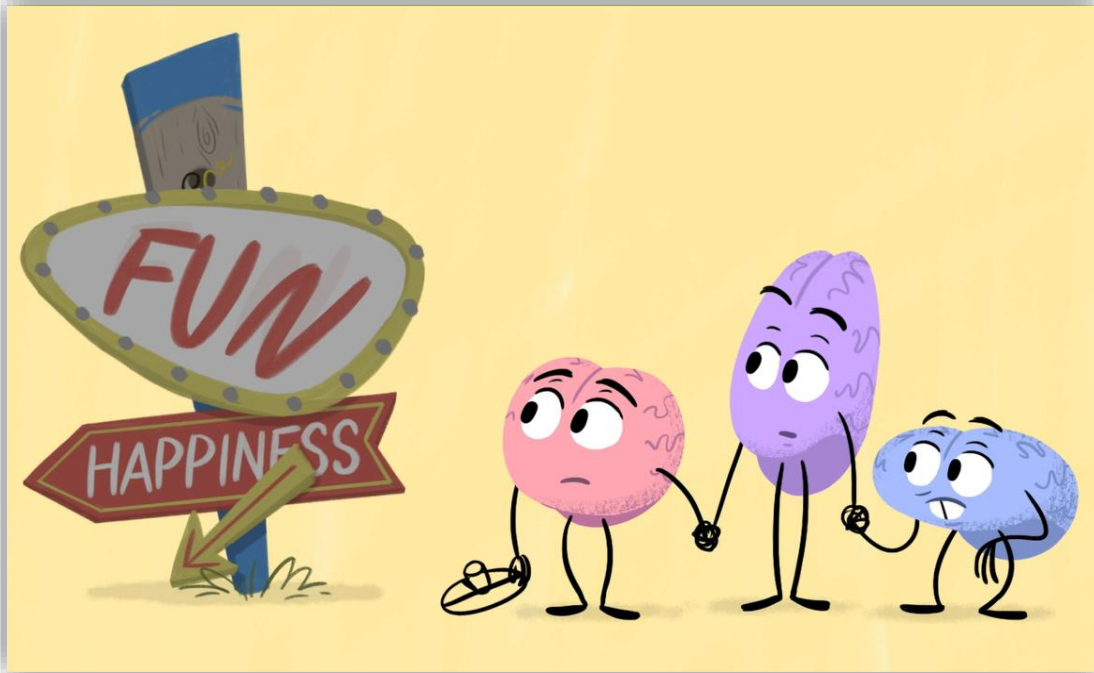




Show the drive

- BE had some near accidents on the road but kept going
- BE barely slows down at a rest stop after hitting some potholes
- In the auto-pilot fog, BE chooses the road to gambling instead of the road home
- To demonstrate 'autopilot': BE has spacey eyes and a bit of drool - BE lost self-awareness and awareness of the environment and the risks being taken

Show gambling losing its veneer

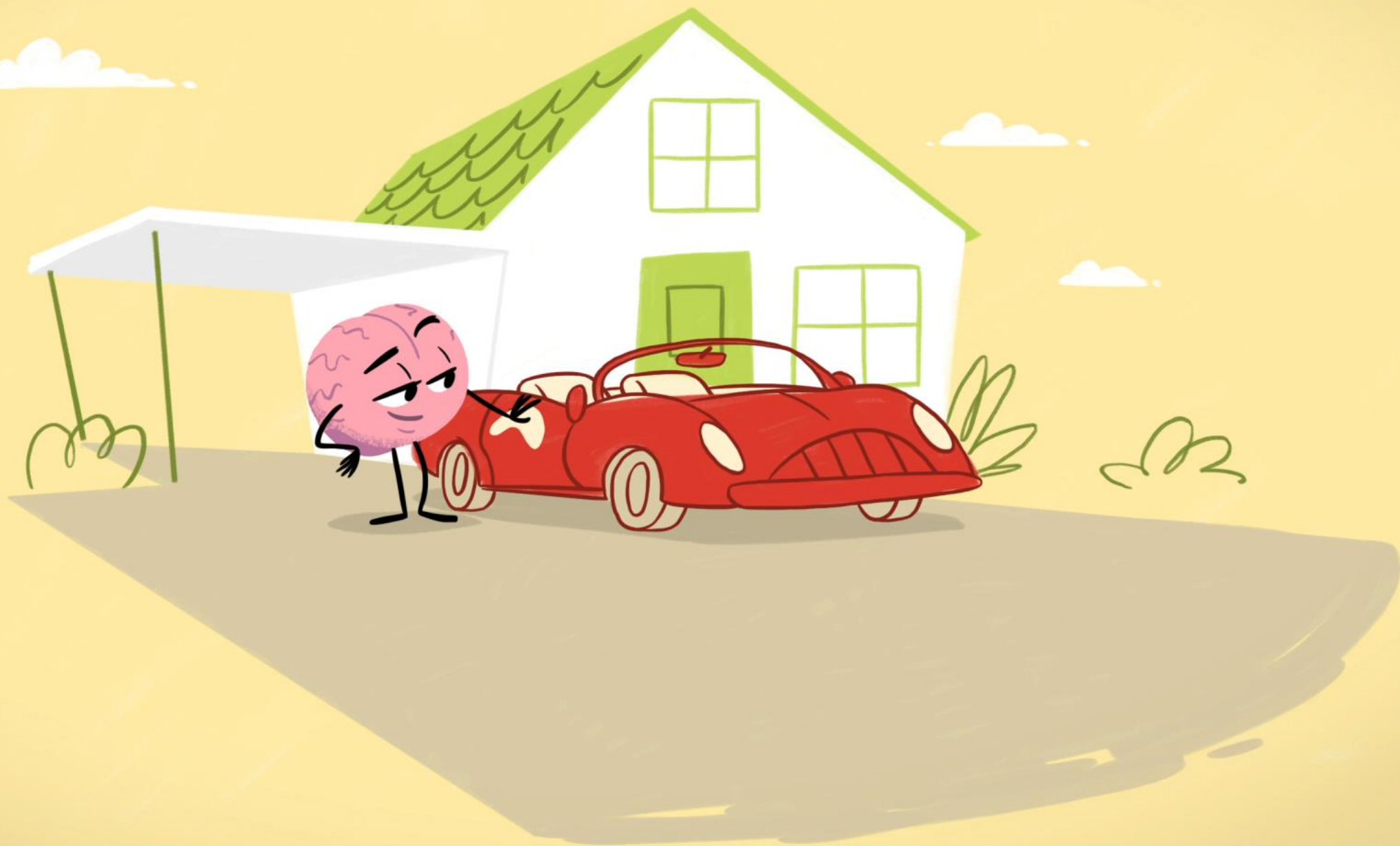


- Fun/Happiness sign starts to fall apart
- BE is picking something that is hard work
→ recovery
- But doesn't mean leaving fun and happiness forever... for someone with a gambling problem, fun and happiness doesn't exist in a gambling venue

Make brain talk interesting and accessible on a budget

- Choose the right animator (even if that means scaling back our vision)
- Keep it short; use imagery to express our concepts; use music to express the ups and downs
- Hire a great voice actor – not shame, no judgement, just enough hopefulness that change is possible
- Get creative about representing loved ones (other BEs, the narrator in recovery)





How to use the video

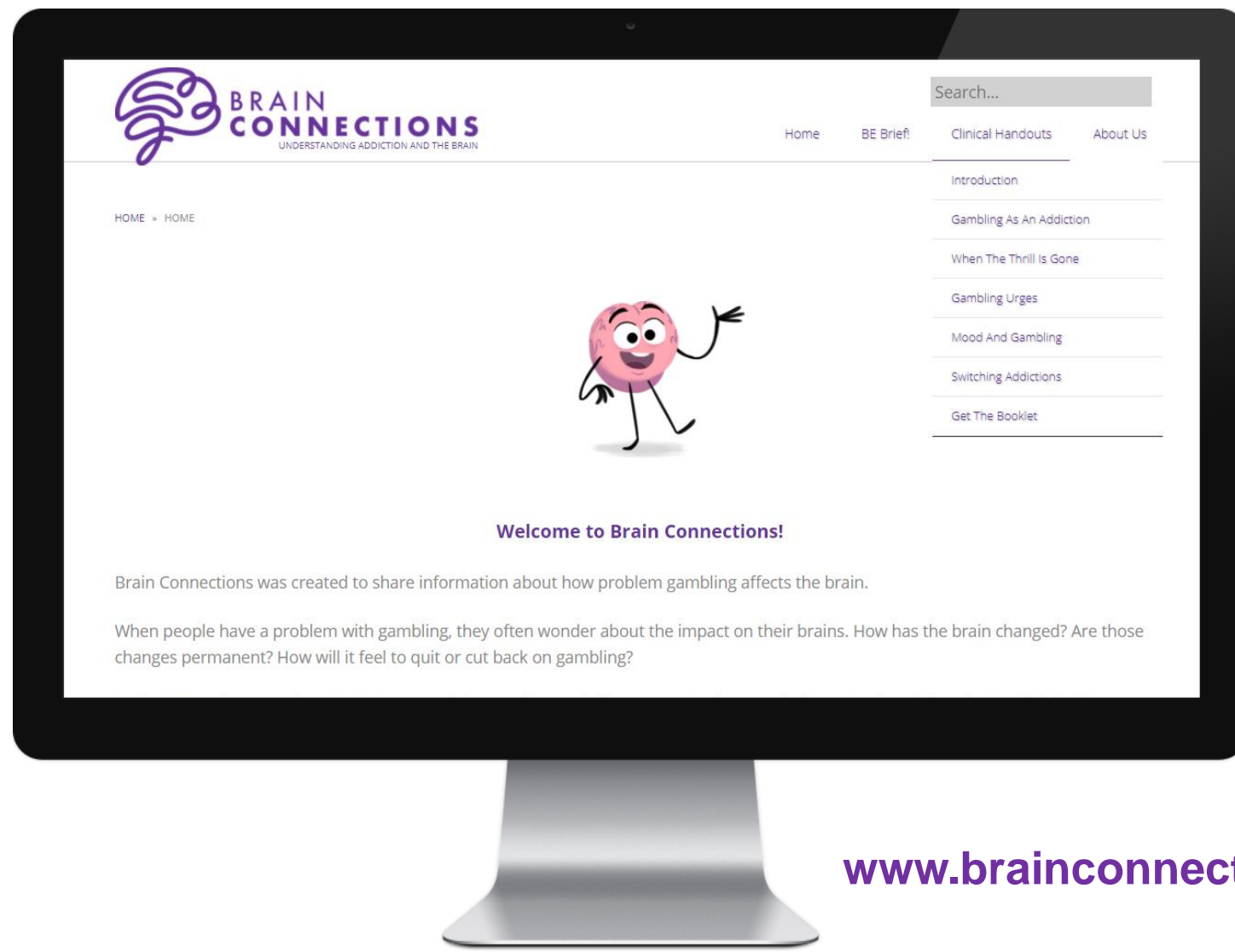
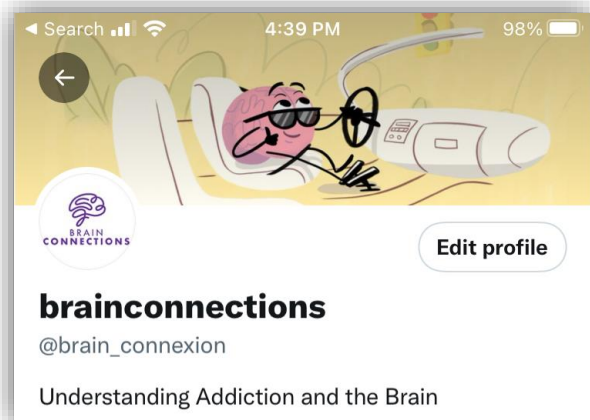
1. To introduce key neurobiology concepts in an accessible and interesting way in a session
2. For family members to watch at home or in-session to better understand the impact of gambling on the brain
3. For other stakeholders (the public, Gambling Information Specialists, researchers, health care practitioners) to learn key neurobiology concepts
4. To act as a 'teaser' to encourage reading the handouts which are more detailed

Website

FB: @Brainconnexions



Twitter: @brain_connexion



www.brainconnections.ca

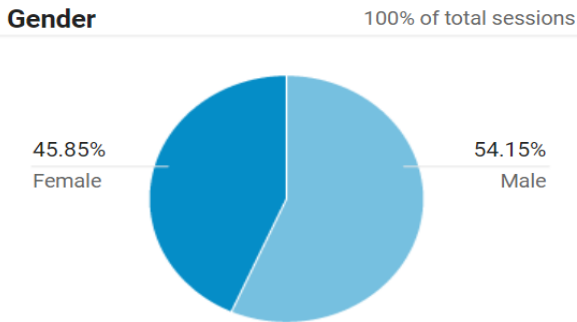
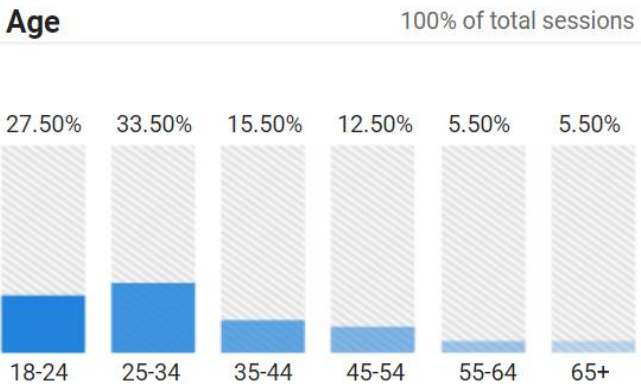
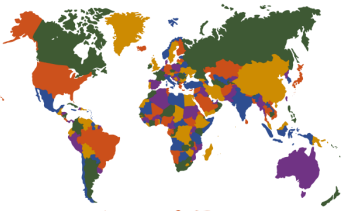
What's our reach?

Website visits: Over 14k

Page views: Over 35k

YouTube visits: Over 16k

Viewed in 157 countries (top 5: US, Canada, UK, Australia, China)



Phase 3: The BE Briefs



Are you wondering...

Should I be worried about my gambling urges?

What slot machine features keep me playing?

Why does my loved one keep gambling?

How does gambling affect my mood?

Why can't I stop gambling?

Find answers and more at
www.brainconnections.ca

Brain Connections Phase 3: BE BRIEF!

- **The Dream:** Create a product suitable for RG/Gambling Information Specialists to share with visitors at casinos
- **The Process:**
 - Talk to RG specialists/GIS and RGC Directors
 - Take their feedback about what to develop
 - Develop products that are eye catching, easily accessible and user-friendly
 - Present the products to RG specialists/GIS/operators/service providers

Do RG staff get brain related questions?

RG scenarios where brain-related questions arise:

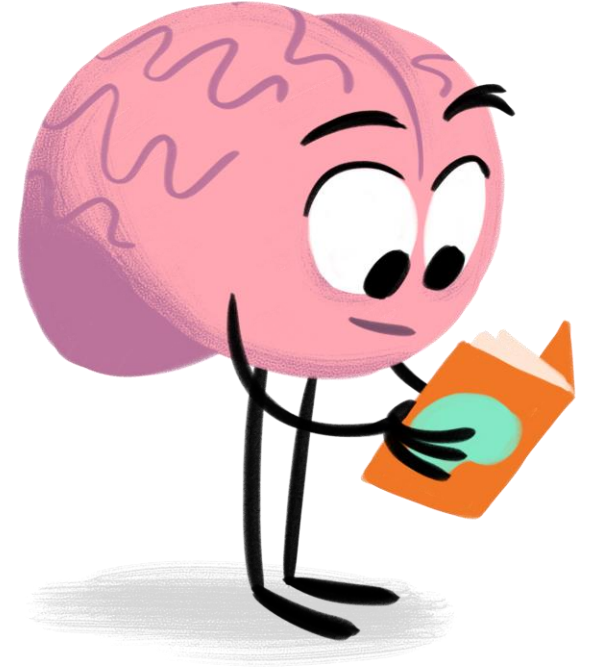
- Curious social players
- Players who wonder
 - ‘Why do I keep coming back?’
 - ‘Why do I need to gamble?’
- Family members
- People who present for self-exclusion



Making an RG product

Translating Brain Connections for an RG setting:

- Be brief!
- Make it easy-to-read
- Focus on key concepts
- Make it accessible
- Make it in different formats (online, cards)

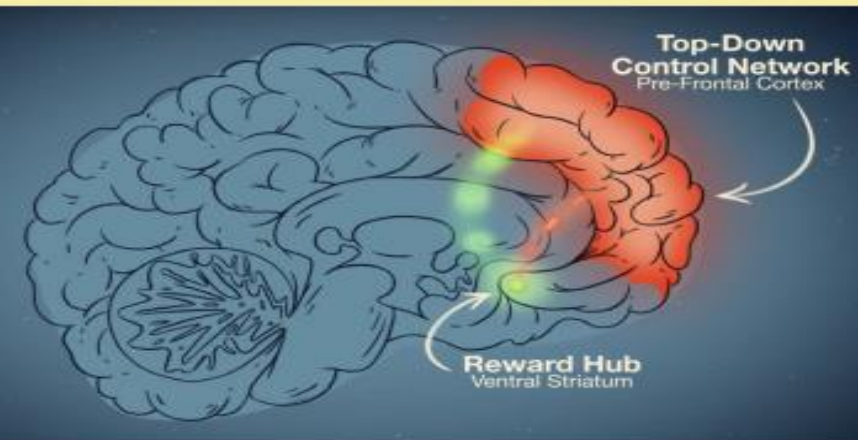


GAMBLING: WHY CAN'T I STOP?

One reason why gambling is hard to stop is because it affects your brain.

Gambling is like pressing the gas pedal of your car. Your brain's reward hub 'fires up' as you think about a win.

Your brain also has a brake system. The 'top-down control network' is used when you want to stop gambling.



Your brain's gas and brake pedals
The reward hub and the top-down-control network

When your gas and brake pedals work, it's easier to control your gambling.

For some people though, gambling no longer 'fires up' the brain with excitement.

So, to feel pleasure, they 'floor it' by gambling more.



Pressing the gas by gambling too much can lead to problems

Meanwhile, their brakes may be faulty. They might not notice it's time to stop gambling.

Or, if they try to stop, the brakes may not work.



It can be hard to notice signs and put on the brakes

If you think that your gas and brake pedals are worn out:

- Step back from gambling and give your brain a rest.
- Reward yourself with other activities that you enjoy (e.g., a social activity, a good meal, a hug, a hobby).



Give yourself a break and try other rewards!

- Remember that games are designed to keep you playing longer. Set limits on your time and money.
- If you're worried about gambling, talk to someone you trust or get help from a counsellor.

SLOT MACHINE FEATURES & THE BRAIN

Many slot machine features impact your brain, mood and behaviour.

Feature #1: Losses That Look Like Wins

Multi-line slot machines often highlight 'wins' across lines of play, with triumphant sounds and flashing lights: these are signs that you've won!

But have you really?

Imagine you bet \$10. The machine lights up, makes winning sounds, and shows: 'YOU WON \$3!'

But, the machines don't highlight your losses.

The Reality...

You have lost \$7.

By presenting winning lights and sounds, it feels like you're on a 'winning streak.'

You may actually be steadily losing money but not realize it.

If the machine made losing buzzer sounds with each loss, you probably would stop gambling sooner.



Feature #2: Near Misses

A 'near miss' occurs when reels show two matching symbols, with a third *almost* lining up at the pay line.

Near misses impact the body and the brain in several ways:

- It feels bad to 'almost' win
- You spin again because it seems like a win is close
- Your brain's reward network 'fires up' as if you had won, even though you lost
- It feels like your chances of winning are improving, so you spin again

The Reality...

wins and losses are already pre-determined by the slot machine's random number generator.

Whether you 'almost won' on the previous spin has no impact on the next spin. Each play is separate and already determined.



Feature #3: The STOP button

Slot machines often have a button that gives you the chance to stop the reels.

Pressing the button tricks the brain into thinking that, if you are skilled, fast or have the right pattern of presses, you have a better chance of winning.



The Reality...

The button only affects the length of time for each spin. It does not affect whether you win or lose.

Slot machines use mental connections that we already have to keep us playing: winning sounds usually mean that you won. Near misses mean you should try again. STOP buttons should give us control.

But, this life experience does not apply to slot machines.

It's important to take frequent breaks from playing to clear your head and give your brain a rest.

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I'M HAVING GAMBLING URGES: SHOULD I BE WORRIED?

When you gamble, it can affect your brain and your body.

Feeling the need, or urge, to gamble can happen to anyone.

Common signs of an urge are:

- Thinking a lot about gambling or winning
- Feeling like you can't sit still
- Difficulty focusing
- Bodily responses like sweating and rapid heartbeat
- Irritability

Urges can range from mild to very strong. They can be so strong that they become uncomfortable.



An urge can be a powerful, full-body experience

Why Do Urges Happen?

Urges can happen for many reasons. Here are a few:

- The sights, sounds and sensations of gambling can grab your attention (e.g., when you see a gambling ad or when you get paid).
- When you are stressed, gambling might feel like a relief and a distraction.

Urges can happen for no reason at all, such as when you wake up and want to gamble.

There are many parts of the brain involved in gambling urges.

When urges happen, they can feel like powerful, full body experiences.

Urges hold your attention hostage and it can be hard to put on the brakes.



Urges can feel like you are in a fog or on auto-pilot

Is Willpower Enough?

Willpower alone is not always enough to deal with gambling urges.

This is because, when urges are very strong, other options may not come to mind. And, if you are in the tempting gambling environment, it can be harder to stop.

If you feel like your urges for gambling are getting stronger or more uncomfortable, you may need to use strategies to keep you safer such as:

- Taking a break from gambling
- Reducing your access to money
- Voluntary self-exclusion
- Building a support system
- Cutting back on the time you spend gambling

If you are worried about your urges to gamble, talk to someone you trust, or get help from a counsellor.



There are many strategies you can use to conquer an urge

HOW CAN GAMBLING AFFECT MY MOOD?

Gambling has an impact on your brain and your mood.

Gambling can be fun and exciting. The reward network in your brain 'lights up' when you gamble. This is how you experience pleasure.



At first, gambling can light up the reward network in your brain

However, when gambling becomes a problem, it can lower your mood, even to the point of depression.



Gambling problems can lower your mood

Changing Setpoints

Your brain is always changing and so can your setpoint.

When you take a break from gambling and give your brain a rest, it can start to respond to other rewards.

Over time, you will start to feel pleasure again from the things you used to enjoy.



Take a break from gambling and you can begin to enjoy other activities

If you are worried about your mood, talk to someone you trust, or get help from a counsellor.



MY LOVED ONE IS GAMBLING: WHY CAN'T THEY STOP?

It can be difficult and frustrating seeing a loved one get lost in gambling.



It can be hard to stop gambling

Gambling has a big impact on the brain. This is one reason why gambling problems occur.

When gambling is a problem, the brain is affected in several ways:

- A person can feel like gambling is the only thing that's exciting.



It can feel like gambling is more exciting than anything else

- A person's attention can be taken over by gambling; paying less attention to what used to matter.



Gambling can take over your attention

- A person may no longer be able to 'put on the brakes' with gambling, even when the signs to stop are there.



You may not notice that it's time to put on the brakes

- A person's mood is often lowered, even to the point of depression.

GAMBLING EFFECTS ON MOOD



Gambling problems can lead to mood swings

If your loved one is caught up, encourage them to take a break from gambling and give their brain a rest.

Stepping away from gambling can allow them to devote attention to other aspects of their life and to feel more in control.



Encourage your loved one to take a break from gambling

You may feel like your loved one's gambling is your fault.

It's not.

It can take time for the brain to heal from a gambling problem.

But there is help.

Talk to someone you trust or a counsellor for ideas on how to help yourself and your loved one.

Brain Connections Phase 3: **BE BRIEF** **TEASERS**



Are you wondering...

Should I be worried about my gambling urges?

What slot machine features keep me playing?

Why does my loved one keep gambling?

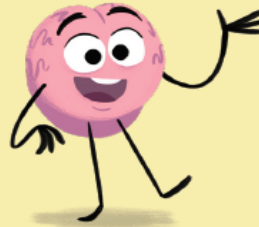
How does gambling affect my mood?

Why can't I stop gambling?

Find answers and more at
www.brainconnections.ca



Brain Connections is a series of educational tools designed to share current research about gambling and the brain.



info@brainconnections.ca

[@Brain_Connexion](https://twitter.com/Brain_Connexion) [@BrainConnexions](https://facebook.com/BrainConnexions)

Brain Connections is a collaboration between
The City of Hamilton's Alcohol, Drug, & Gambling Services &
The Peter Boris Centre for Addictions Research



FIND OUT MORE AT
BRAINCONNECTIONS.CA

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[@BRAINCONNEXIONS](https://facebook.com/BRAINCONNEXIONS)



Break



1

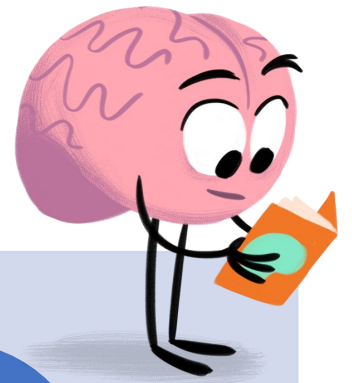
Review the key concepts in the Brain Connections handouts

2

Try deciding which handouts to use to answer real, commonly-asked client questions

3

Think about how your response is different based on using the Brain Connections material





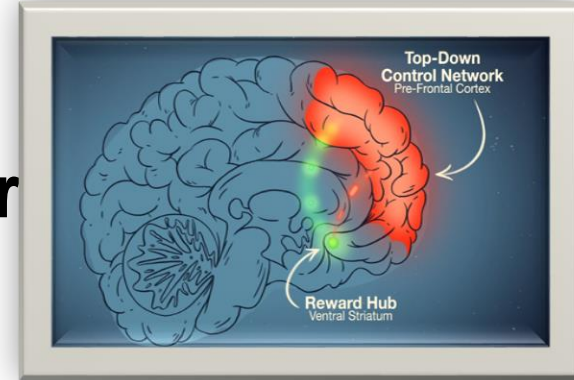
Key Concepts: Review

KEY CONCEPT #1:

Gas and Brake Pedal



NEUROBIOLOGICAL CONCEPT: Top-Down & Bottom-Up Pr



In addiction:

- Press the 'gas pedal' (reward hub) too much to feel pleasure
- The brakes (top-down control network) are inconsistent

Good for questions about:

- Why gambling becomes an addiction
- Whether it's a good idea to test control
 - Why there is a strong desire to 'press the gas pedal'
- Why we shouldn't rely on willpower alone (since the brakes are inconsistent)

KEY CONCEPT #2:

The Habit Hub



NEUROBIOLOGICAL CONCEPT: **Habit Formation**

Reward Hub (Ventral Striatum)

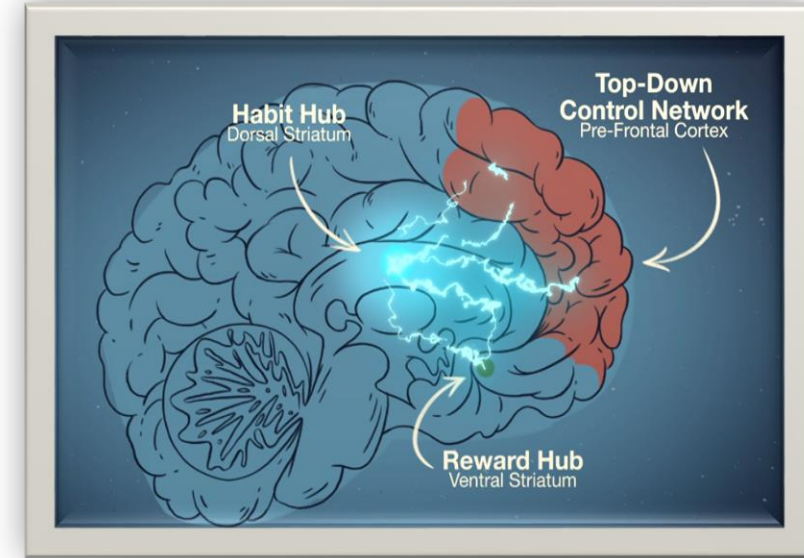
- Allows us to experience pleasure

Habit Hub (Dorsal Striatum)

- Helps establish habits

In addiction:

- Reward and Habit Hubs stop working harmoniously
 - Gambling ceases to be a pleasure and becomes a habit



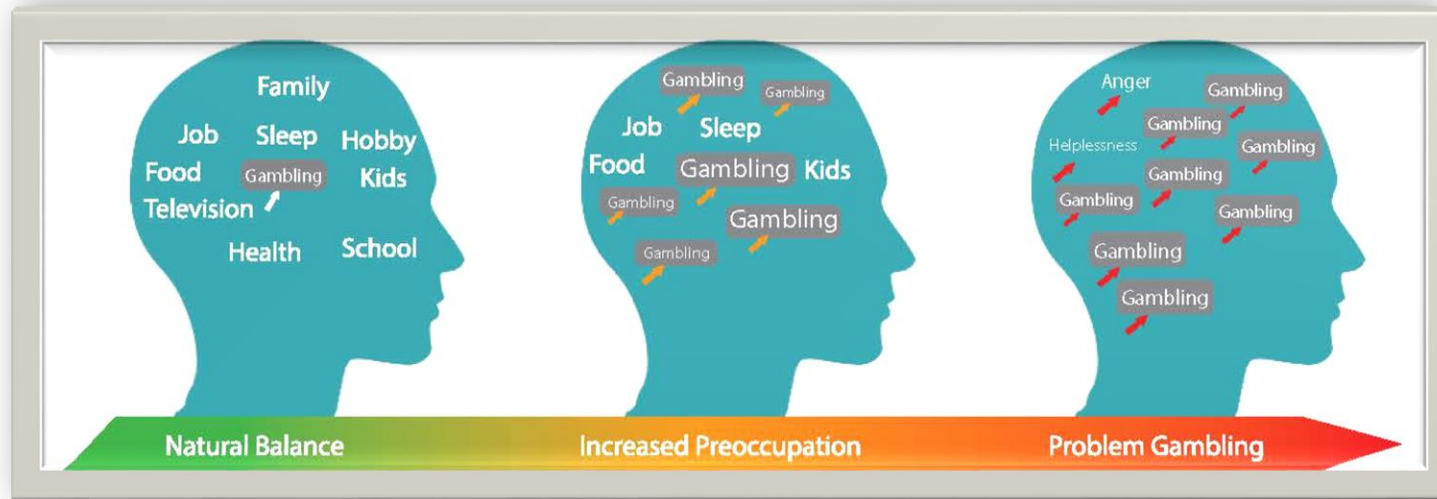
Good for questions about:

- Why it's hard to say 'no' to gambling urges
- Why gambling doesn't feel fun anymore
 - Why gambling feels like 'auto pilot'

KEY CONCEPT #3: Over-Awareness of Gambling Cues



NEUROBIOLOGICAL CONCEPT: **Incentive Salience**



Good for questions like:

- Why does it feel like I see every gambling ad?
- Why can't I think of anything other than gambling?

- We rapidly associate stimuli with reward (e.g. sounds of a slot machine, feel of a poker table, seeing money)
- With the habit hub in charge, our attention gets easily hijacked by gambling cues – we notice anything related to gambling very quickly

KEY CONCEPT #4: Liking vs Wanting

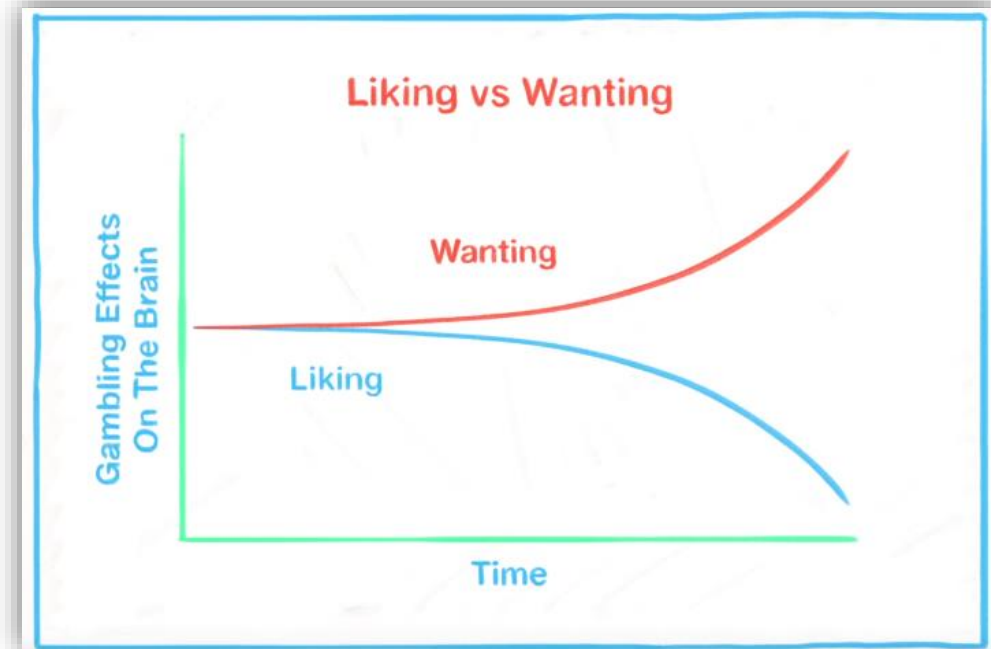


NEUROBIOLOGICAL CONCEPT: Incentive Salience

Good for questions like:

- Why does nothing feel fun like gambling used to?
- Why am I gambling? It's not even fun anymore!

- See the gambling cue (e.g. cash)
- Experience a strong urge
- Habit Hub overrides the Reward Hub
- Seeing the cash = want to gamble (out of habit)
- Gambling becomes a way to ease the uncomfortable urge (not to feel pleasure)



KEY CONCEPT #5: Setpoints



NEUROBIOLOGICAL CONCEPT: **Negative Emotion**



Good for questions like:

- Why does nothing feel fun since I've stopped gambling?
- Why do I still feel depressed since I quit gambling?
- Why does gambling not give me the excitement it used to?
- Am I going to switch addictions?



KEY CONCEPT #7: Coding Rewards



NEUROBIOLOGICAL CONCEPT: Coding Rewards

- People with gambling problems don't code rewards in the same way
- Instant gratification wins out
- Delayed rewards are less valued

Good for questions like:

- Will I just switch addictions?
- Why do I have problem with spending?
- Why do I always go for instant gratification?



KEY CONCEPT #6: Interoception



NEUROBIOLOGICAL CONCEPT: Interoception

- Your gut feeling... your 'Spidey Sense'
- The Insula
- Allows you to process sensations coming from your body
- Combines the sensation with the drive to do something
- Signals get misinterpreted in addiction

Good for questions like:

- Will I just switch addictions?
- Why do I have problem with spending?
- Why do I always go for instant gratification?



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But have you really?

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The Reality...

You have lost \$7.

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The Reality...

The button only affects the length of time for each spin. It does not affect whether you win or lose.

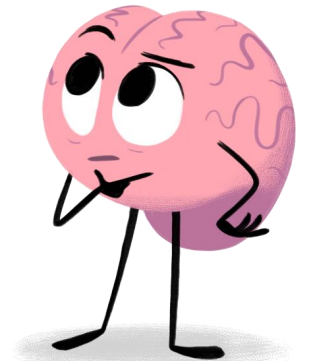
Slot machines use mental connections that we already have to keep us playing: winning sounds usually mean that you won. Near misses mean you should try again. STOP buttons should give us control.

But, this life experience does not apply to slot machines.

It's important to take frequent breaks from playing to clear your head and give your brain a rest.

Let's work through some examples

1. **Read the question**
2. **Consider what concept(s) you might use to answer the question**
3. **Think about the difference between how you would normally answer this question without the handout information and your answer using the handout.**



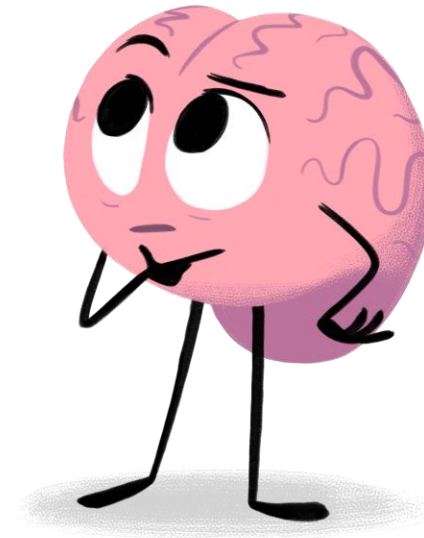
“I quit gambling... so why don't I feel better?”

What you might have said before Brain Connections:

- Change takes time
- You have problems from the gambling that you're dealing with now, like debt, lack of trust and boredom – these don't heal overnight
- It's normal to feel worse before you feel better
- With time, you will start building a new life in recovery and it will start to feel better
- Keep trying the new hobbies we discussed
- Don't go back to gambling to feel better... it won't work

Which key concept(s) would you use?

1. Gas and Brake Pedals
2. Habit Hub
3. Over-Awareness of Gambling Cues
4. Liking vs. Wanting
5. Mood Setpoints
6. Coding Rewards
7. Interoception
8. Slot Machine Features

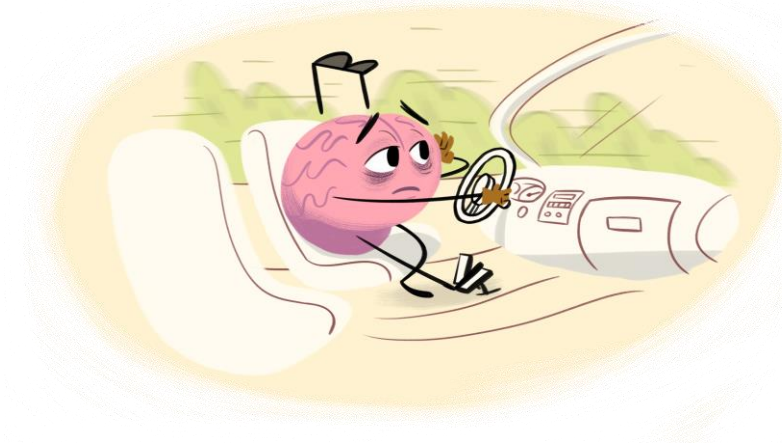


“I quit gambling... so why don't I feel better?”



Key Concepts:

- Gambling addiction lowers mood setpoint (**Mood Setpoints**)
- The brain's attention network is focused on gambling cues (**Over-Awareness of Gambling Cues**)
- Anhedonia (reduced ability to feel pleasure) is common and urges can be high (**Mood Setpoints**)
- It can take time for the brain to respond to natural rewards... keep trying! (**Coding Rewards**)



“I quit gambling... so why don't I feel better?”

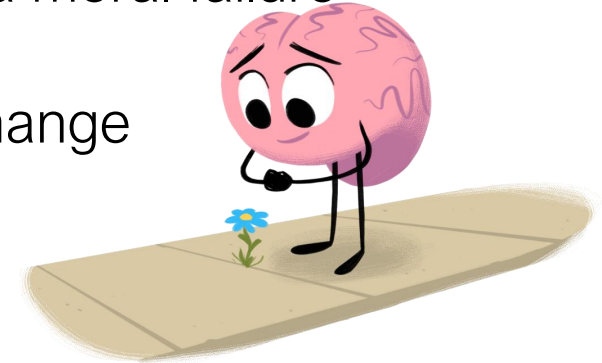
Pros of using Brain Connections:
It helps...

- Take the shame out of the problem
- Destigmatize addiction and see it as a biological change and not a moral failure
- People to feel more patient with themselves and the process of change

Challenges of using Brain Connections:

It takes more time - you need to get familiar with the concepts yourself and it takes a bit of extra time in session to add this dimension.

But it's worth it!



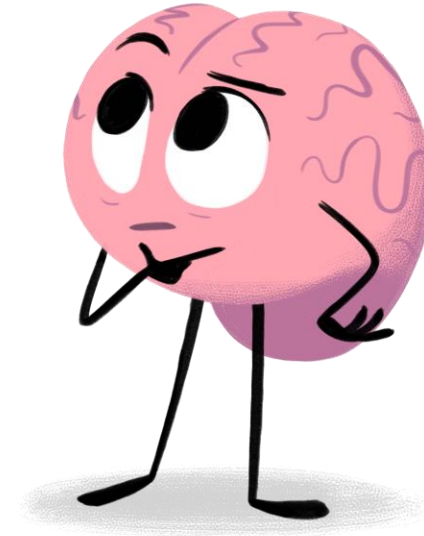
“Will I Ever Be Able to Gamble Normally Again?”

What you might have said before Brain Connections:

- You have an addiction now... it's risky to try gambling again
- You have a lot to lose by trying again
- Your brain has changed forever... you can't really go back to the way it was before

Which key concept(s) would you use?

1. Gas and Brake Pedals
2. Habit Hub
3. Over-Awareness of Gambling Cues
4. Liking vs. Wanting
5. Mood Setpoints
6. Coding Rewards
7. Interoception
8. Slot Machine Features



“Will I Ever Be Able to Gamble Normally Again?”



Key Concepts:

- **Gas and Brake Pedals**
- Natural rewards ‘less exciting’ (**Coding Rewards**)
- Games are designed to keep you playing longer (**Slot Machine Features**)
- Look for other rewards; avoid unnatural rewards (**Coding Rewards**)



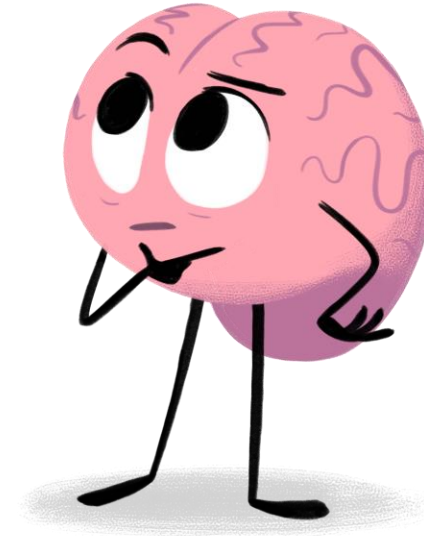
“Why are slot machines so addicting?”

What you might have said before Brain Connections

- Well, they are designed that way... that's how the casino makes money
- They look enticing with familiar characters and comfy chairs – creating safety for you to want to stay

Which key concept(s) would you use?

1. Gas and Brake Pedals
2. Habit Hub
3. Over-Awareness of Gambling Cues
4. Liking vs. Wanting
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Why are Slot Machines So Addicting?



Key Concepts (Slot Machine Features)

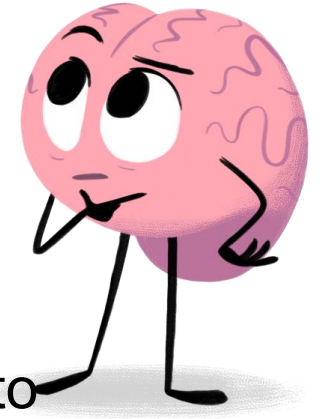
- Losses that look like wins
- Near Misses
- STOP button
- Life experience does not apply to slot machines



“Gambling ruined my life, so why do I still want to do it sometimes?”

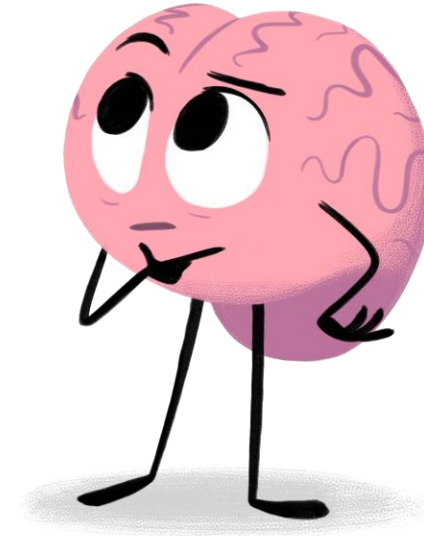
What you might have said before Brain Connections:

- Urges are common in addictions
- Making a change takes time and it makes sense that you’re drawn back into old habits
- The lure of the win is hard to resist, especially when you have debt



Which key concept(s) would you use?

1. Gas and Brake Pedals
2. Habit Hub
3. Over-Awareness of Gambling Cues
4. Liking vs. Wanting
5. Mood Setpoints
6. Coding Rewards
7. Interoception
8. Slot Machine Features



“Gambling ruined my life, so why do I still want to do it sometimes?”



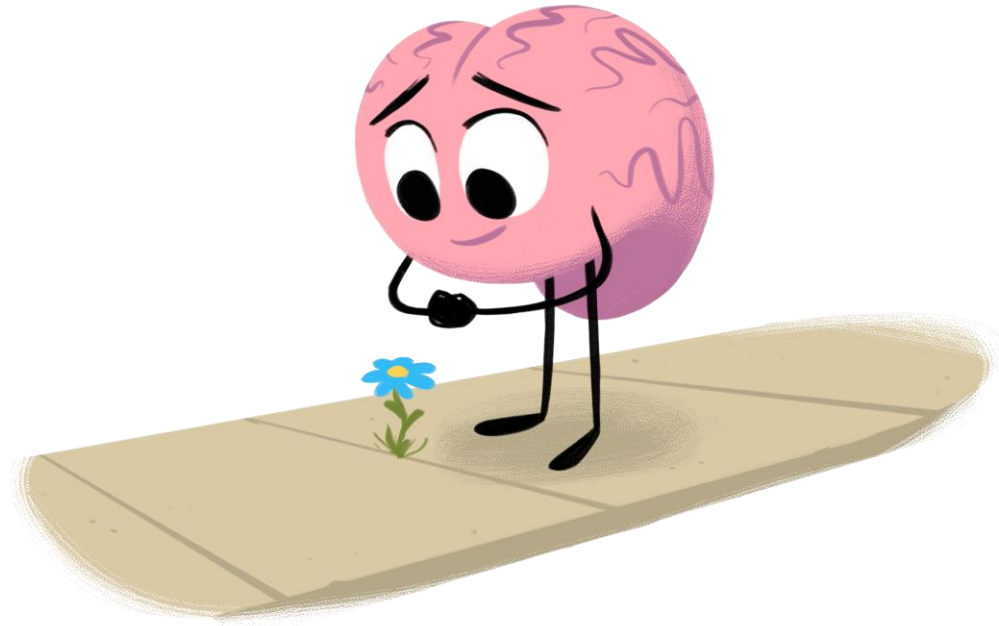
Key Concepts

- Urges can be full-body experiences that hold your attention hostage;
 - hard to put on the brakes
 - willpower alone may not be enough (**Over-Awareness of Gambling Cues**)
- You may not notice/misinterpret the danger signal (**Interoception**)
- You may want to gamble to ease urges but that's not the same as liking gambling (**Liking vs. Wanting & Habit Hub**)

What did you notice?

- Any differences between how you would normally answer this question?
- Benefits of the handout?
- Drawbacks?
- Anything unclear or difficult?
- How might you incorporate the handouts into your practice?

Future Directions



Translations

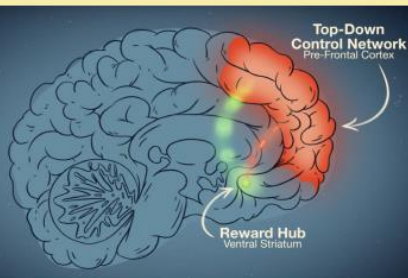
We understand the desire to have Brain Connections translated into different languages!

GAMBLING: WHY CAN'T I STOP?

One reason why gambling is hard to stop is because it affects your brain.

Gambling is like pressing the gas pedal of your car. Your brain's reward hub 'fires up' as you think about a win.

Your brain also has a brake system. The 'top-down control network' is used when you want to stop gambling.



Your brain's gas and brake pedals
The reward hub and the top-down-control network

Juegos de azar: ¿Por qué no puedo parar?

Una razón por la que el juego es difícil de detener es porque afecta a su cerebro.

Apostar es como pisar el acelerador de tu coche. El centro de recompensa de tu cerebro se "enciende" mientras piensas en una victoria.

Su cerebro también tiene un sistema de frenos. La "red de control de arriba hacia abajo" se utiliza cuando desea dejar de

SLOT MACHINE FEATURES & THE BRAIN

Many slot machine features impact your brain, mood and behaviour.

Feature #1: Losses That Look Like Wins

Multi-line slot machines often highlight 'wins' across lines of play, with triumphant sounds and flashing lights: these are signs that you've won!

But have you really?

Imagine you bet \$10. The machine lights up, makes winning sounds, and shows: 'YOU WON \$3!'

But, the machines don't highlight your losses.



Características de la máquina tragamonedas y el cerebro

Muchas características de las máquinas tragamonedas afectan su cerebro, estado de ánimo y comportamiento

Característica # 1: Pérdidas que parecen victorias

Las máquinas tragamonedas multilínea a menudo resaltan las "victorias" en todas las líneas de juego, con sonidos triunfantes y luces intermitentes: ¡estas son señales de que has ganado!

Pero, ¿realmente lo has hecho?

Imagina que apuestas \$10. Las máquinas se iluminan, hacen sonidos ganadores y muestran: "¡GANASTE \$3!"

En français!



CERVEAU
CONNECTÉ.CA



Bientôt disponible!

La dépendance au jeu existe

Parfois, il est difficile de dire «non» au jeu.

Découvrez pourquoi sur cerveauconnecte.ca



 Hamilton

St. Joseph's
Healthcare  Hamilton

McMaster
University 

La dépendance au jeu existe

Vous vous inquiétez du jeu d'un proche?

Découvrez pourquoi sur cerveauconnecte.ca



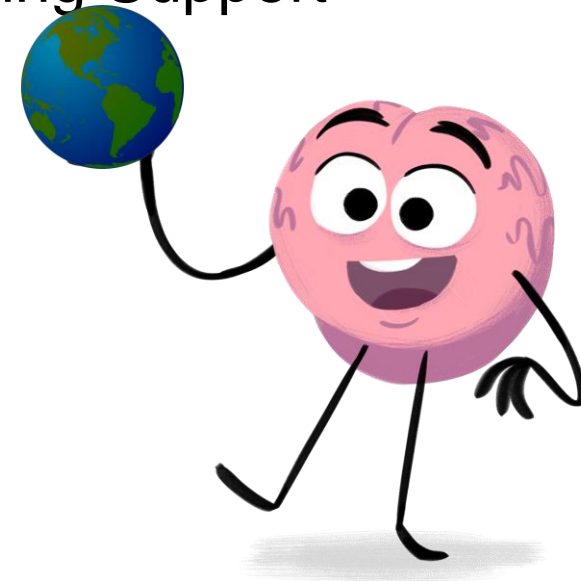
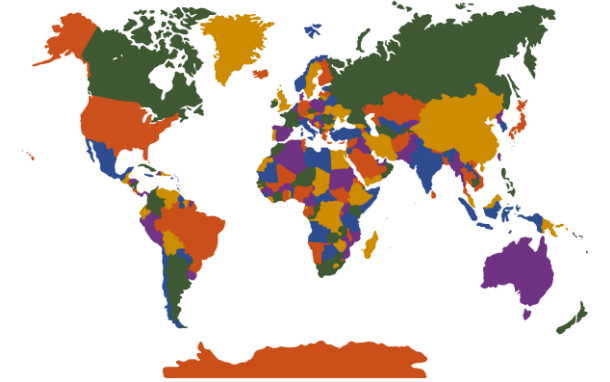
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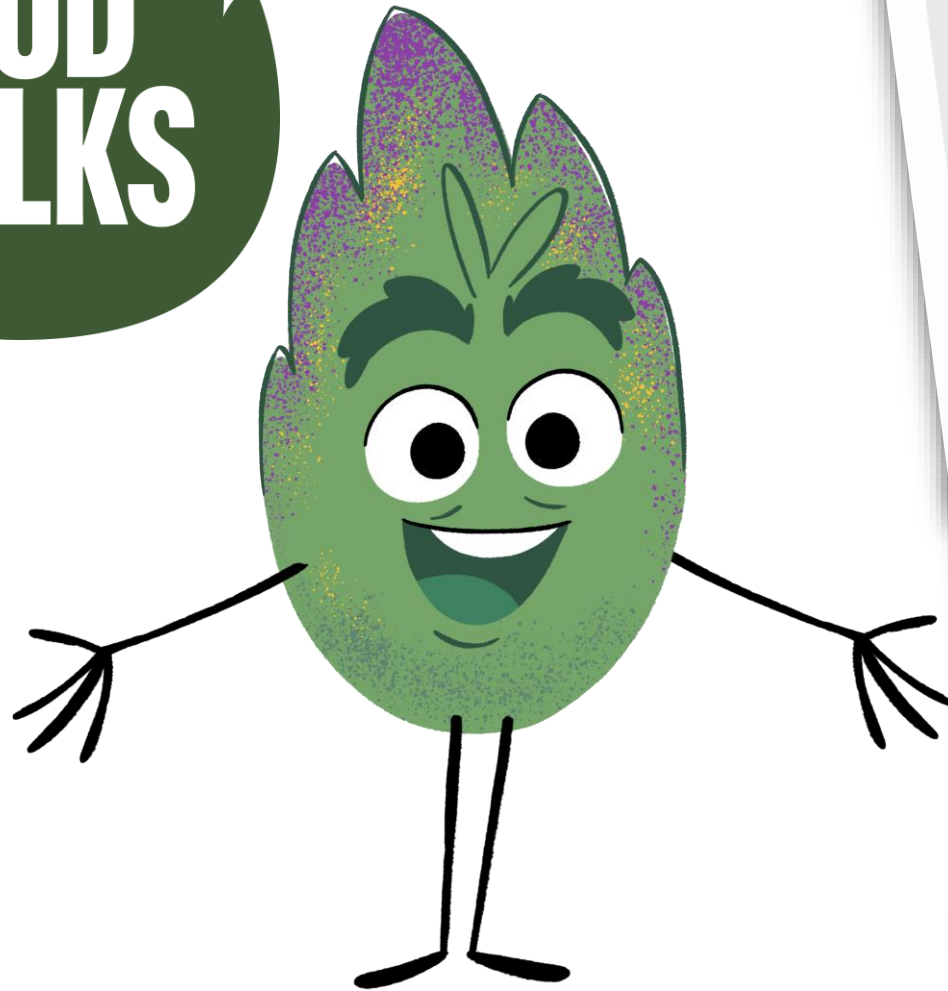
St. Joseph's
Healthcare  Hamilton

McMaster
University 

Collaborations

- BBC Persia
- Spanish translation
- Indigenizing Brain Connections (Indigenous Services Gambling Support BC)
- Wyoming Department of Health media campaign
- Mass Council on Gaming and Health





Youth Gaming and Gambling

RAGE QUITTING?

What's risky about gaming? Tell us!




The illustration shows a person on the left, engulfed in flames, shouting with a frustrated expression. In the center is a large 'VS' symbol. On the right is a closed door with a lightning bolt on it, and a video game controller sits on the floor next to it.

Email us at info@brainconnections.ca to join a research focus group in **January 2024**.

Gift cards to compensate you for your time!

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BEHAVIOURAL NEUROSCIENCES

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Is Gaming Grinding your Gears?


What's risky about gaming? Tell us!



The illustration features a pixelated brain with an angry face being crushed by a game controller. Surrounding the brain are icons for a speech bubble, headphones, an hourglass, a laptop, and three hearts. The words 'GAME OVER' are written in large, pixelated letters at the bottom.

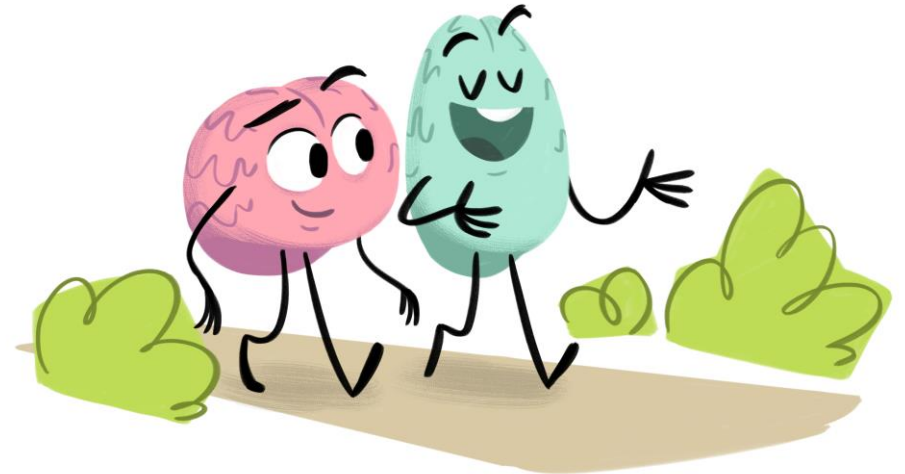
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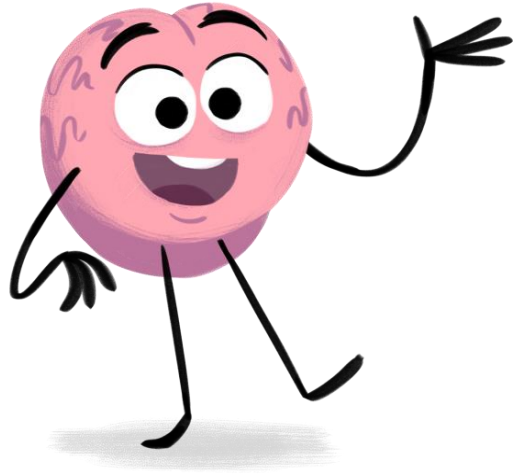
Gift cards will be provided to compensate you for your time!



Can you help our dream come true?

- Can you see a place for Brain Connections in the work you do?
- How can we work together?
- Questions???





Thank you!

info@brainconnections.ca

deirdre.querney@hamilton.ca

balodisi@mcmaster.ca



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