

# Co-Occurring Disorders in Gambling Disorder

Jon E. Grant, JD, MD, MPH  
Professor  
University of Chicago  
Pritzker School of Medicine



# Disclosure Information

---

- I have the following **financial** relationships to disclose:
  - No conflicts with respect to this presentation
  - My research is supported by NIDA and Grant/Research support from: Janssen and Biohaven Pharmaceuticals
  - I will discuss off-label use and/or investigational use in my presentation as there are no FDA-approved medications for gambling addictions.



THE WEIRD WORLD OF

# GAMBLING

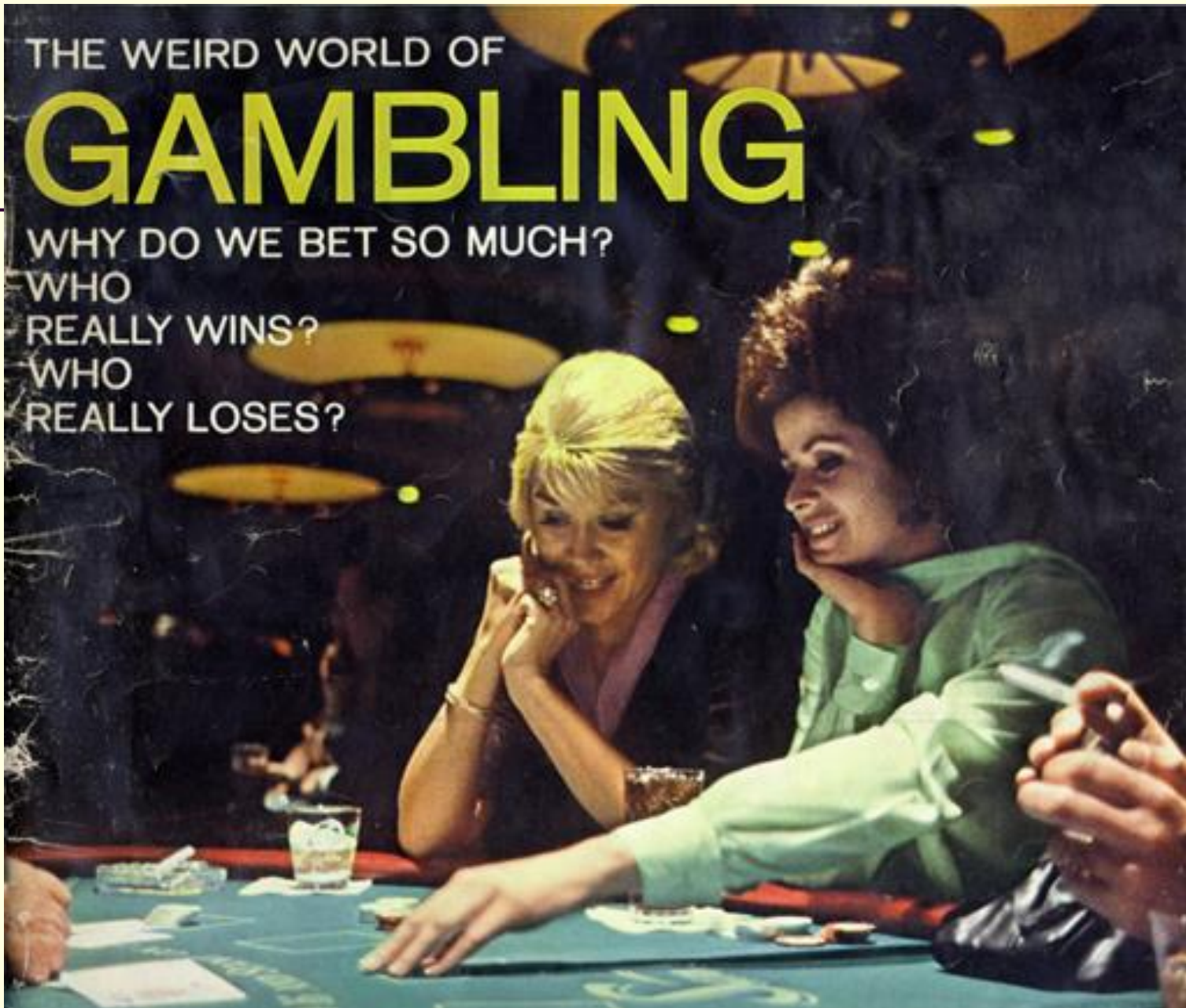
WHY DO WE BET SO MUCH?

WHO

REALLY WINS?

WHO

REALLY LOSES?





# Comorbidity

# Comorbidity

---

- Dual (or more) diagnosis is the “usual”, and not the exception
- It is important to screen and assess for co-morbid conditions when assessing for gambling disorder
- If a mental health problem or a substance abuse disorder co-exists with gambling disorder, should diagnoses should be considered primary? Should both be treated simultaneously or serially?

# Order of Onset

---

- National Co-Morbidity Survey Replication
- 3,435 respondents assessed for GD
- Prevalence and odds ratios for co-morbidity
- Looked at GD predicting other disorders and other disorders predicting GD

# Mood & Anxiety Disorders

Disorder	Prevalence	O.R.	GD First	Other First	Same Time
MDD or Dysthymia	38.6%	2.5	20.5%	73.5%	6.1%
Bipolar	17.0%	4.6	29.2%	46.3%	24.5%
Any Mood	55.6%	3.7	23.1%	65.1%	11.7%
Panic	21.9%	4.9	10.7%	81.8%	7.5%
Generalized Anxiety	16.6%	2.8	9.3%	79.8%	10.9%
Phobia	52.2%	3.2	0.0%	100.0%	0.0%
Any Anxiety	60.3%	3.1	13.4%	82.1%	4.5%

# Substance Use & Impulse Control Disorder

Disorder	Prevalence	O.R.	GD First	Other First	Same Time
Abuse	46.2%	4.5	18.7	70.9	10.4
Dependence	31.8%	5.8	44.3	55.7	-
Nicotine	63.0%	3.9	61.3	33.0	5.7
Any Substance	76.3%	5.5	36.2	57.4	6.4
Conduct Disorder	24.9%	3.1	100.0	0.0	0.0
Intermittent Explosive	27.0%	3.1	100.0	0.0	0.0



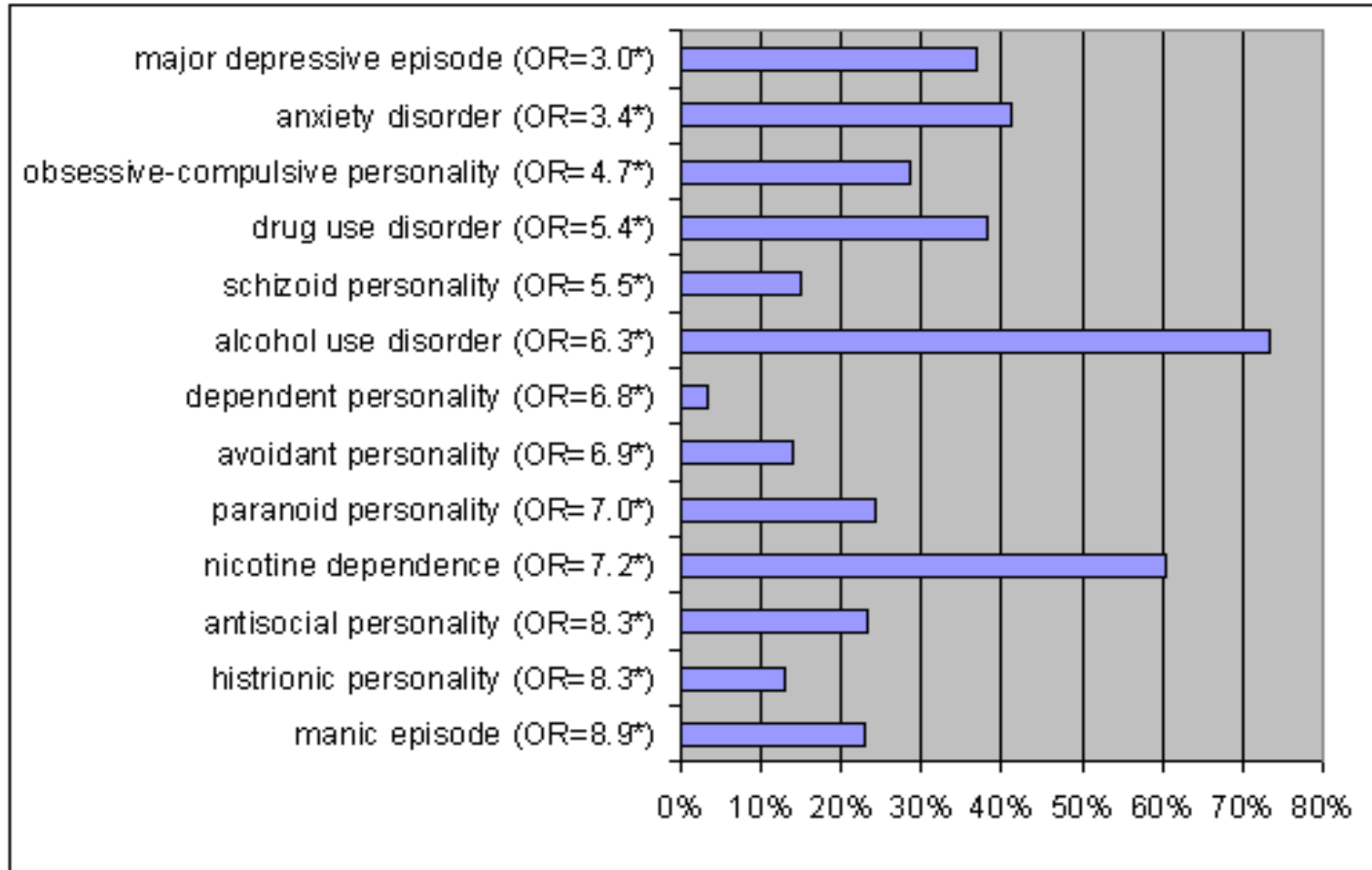
# Co-Occurring Disorders with Gambling Disorder

---

- Substance use disorders
- Attention deficit disorder
- Anxiety
- Depression
- Suicide
  - contemplation 48-70%
  - attempt 13-20%
- Personality disorders

\*Almost all data derived from treatment-seeking gamblers rather than community sample

# Percentage of Gamblers with Comorbid Disorders (lifetime)



(adapted from Petry et al, 2005)

# Psychiatric Comorbidity – Which Came First

Disorder	Prevalence of disorder among those w/ PG	Temporal Sequence (for those with PG and other disorder)		
		PG first	Other disorder first	Onset at same time
Any mood disorder	55.6%*	23.1%	65.1%	11.7%
Any anxiety disorder	60.3%*	13.4%	82.1%	4.5%
Any impulse control disorder	42.3%	0.0%	100%	0.0%
Any substance use disorder	42.3%*	36.2%	57.4%	6.4%

- Note: Any impulse control disorder included ADD/ADHD
- Almost all (96.3%) participants had another lifetime disorder
- 64.3% suffered from 3 or more disorders

(adapted from Kessler et al., 2008)

# Comorbidity of Gambling Disorder and Substance Use Disorders

---

- Rate of substance abuse 7-fold greater in gamblers than non-gamblers
- Common genetic vulnerability between gambling and alcohol dependence
- 33% of substance abusers may have gambling disorder

# Substance Use Disinhibits Gambling

---

- Gambling while drinking is common
- Substances can adversely affect cognition leading to poor judgment and increased risk-taking
- Alcohol may increase risk-taking by restricting attention to only salient cues and ignoring actual odds and past losses

# Gambling Promotes Substance Use

---

- Regular gamblers self-administered more alcohol in a simulated gambling situation than did matched study participants engaged in a control activity

# Screening for Other Addictions/ Mental Health Issues

---

- Addiction Severity Index (ASI)
- Adult ADHD Self-Report Scale (ASRS-v1.1)
- Alcohol Use Disorder Identification Test (AUDIT)
- Drug Use Disorder Identification Test (DUDIT)
- Beck Depression / Anxiety Inventory (BDI / BAI)
- Personal Health Questionnaire (PHQ-4)
- Suicidal Behavior Questionnaire-Revised (SBQ-R)
- Brief Symptom Inventory (BSI)
- Stress Proneness Scale
- URICA (readiness to change)
- FRIEL Co-dependency Inventory

# Social/Personal Consequences

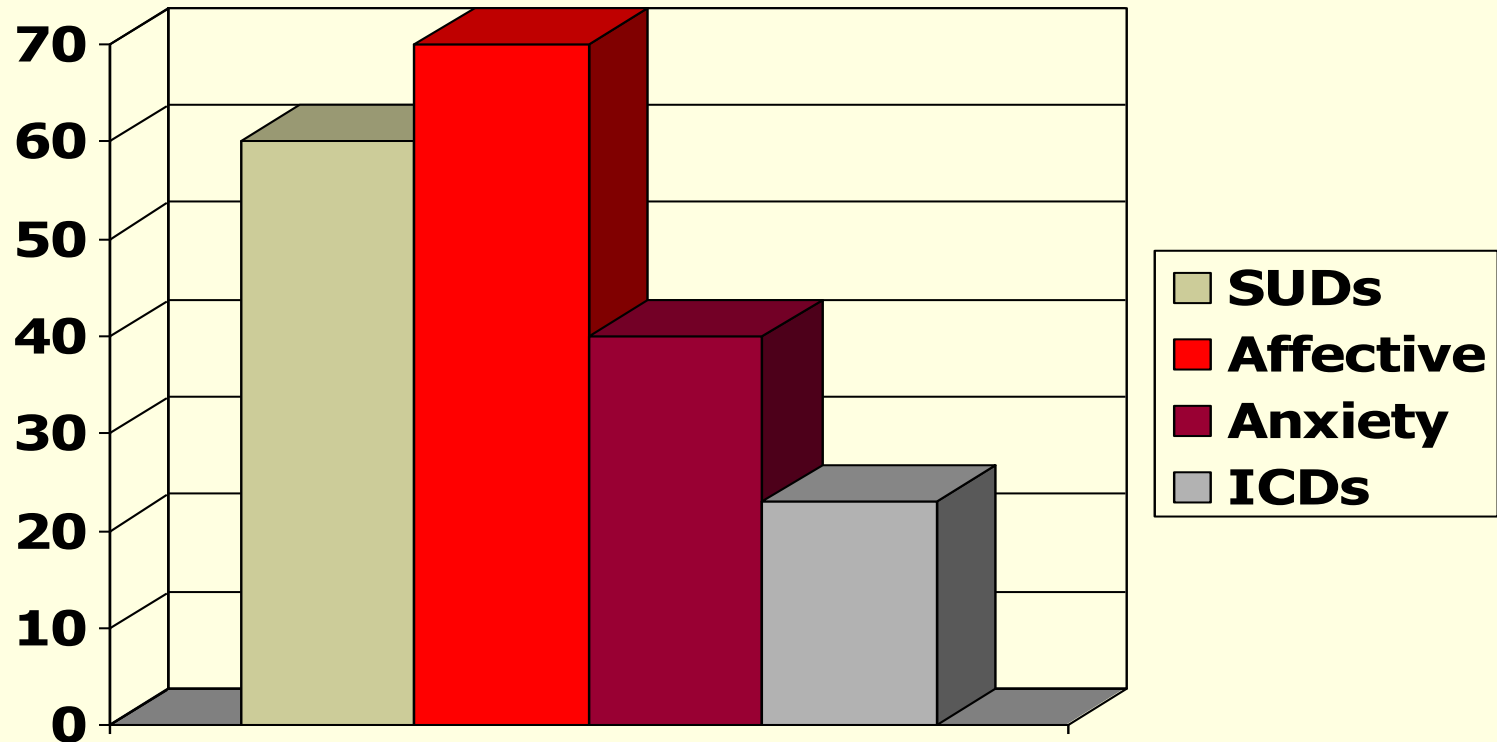
---

- **Family dysfunction and domestic violence**
  - spousal and child abuse
- **Alcohol and other drug problems**
- **Psychiatric conditions**
  - major depression and anxiety disorders
- **Suicidal thoughts and attempts**
- **Significant financial problems**
  - bankruptcy, unemployment, poverty)
- **Criminal behavior**
  - theft, prostitution, homicide, fraud, embezzlement)



# Co-Occurring Disorders in PG

---



# ADHD and Gambling

---

The ADHD - GD connection: adult data

**GD**

**non-GD**

---

**Rate of childhood ADHD**

**15-36%**

**4-8%**

# Cannabis and Gambling

---

- Many young adult gamblers smoke marijuana
- Unclear the effects of marijuana smoking on gambling
- Gamblers using cannabis had higher rates of current alcohol use disorders and more frequent gambling behavior per week.
- Gamblers who used cannabis also exhibited significantly greater scores on measure of attentional impulsivity.

# Obesity

---

- 207 non-treatment seeking young adults grouped according to weight
- Obese gamblers consumed more nicotine and lost more money per week to gambling.
- Obesity was associated with decision making and sustained attention impairments in gamblers, along with greater monetary loss due to gambling

# Role of Trauma

---

- Neglectful parenting style
- Addictive behaviors - more likely to report histories of
  - physical neglect
  - emotional abuse
  - Sexual abuse

# Suicide among problem gamblers

---

- Up to 20-25% of problem gamblers attempt suicide
- To seek a solution (Quick fix)?
- Goal is to seek cessation of consciousness (Escape)
- Stressor in suicide is unendurable psychological pain (Critical Self Talk)
- Emotions in suicide is hopelessness & helplessness

# Other Health Issues

---

## Health concerns of pathological gamblers:

- Heart disease
  - Liver disease
  - Hypertension
- 
- More likely to have had an injury
  - More likely to have needed ER visit
  - 28% of homeless people had gambling problem



20,679\* Physicians

say "LUCKIES are  
less irritating"

"It's toasted"

Your Throat Protection

against irritation against cough

The figures quoted have been checked and certified to by



# Increased Smoking Rates and Gambling Disorder

---

- 62% of treatment seeking gamblers in Connecticut
- 69% in Minnesota smoked
  - much higher than general population 25%

# While on the topic of health...smoking!

---

- Elevated rates of nicotine dependence have been linked to increased gambling severity.
- Problem gamblers who smoke also show higher levels of impulsivity (UPPS-P, negative urgency) compared to non-smoking gamblers.

# Smoking and Gambling: How and Why

---

- Nicotine may raise the “hedonic” value of gambling
- Nicotine may raise the “cue reactivity” of things surrounding gambling
- Nicotine may increase attention and focus on gambling (“stay in action”)

# Psychological Explanations

---

- Smoking eases stress of gambling
- Maximizes the “escape” and “action” of gambling
- Activity justified by gambler (e.g. “might as well”)
- High impulsivity
- Psychological myopia

# Sociological Explanations

---

- Access
- Availability
- Tolerability
- Cultural portrayal
- Peer pressure
- Learned co-occurring activities

# UCLA Gambling Sleep Study

---

- National Epidemiological Survey: (N=3412)
  - PGs were almost 3.5 times more likely to experience a sleep problem compared to individuals who did not have a gambling problem
- Community Survey: (N=120)
  - PGs experience significantly poorer sleep quality and increased daytime sleepiness relative to those that recreationally gamble



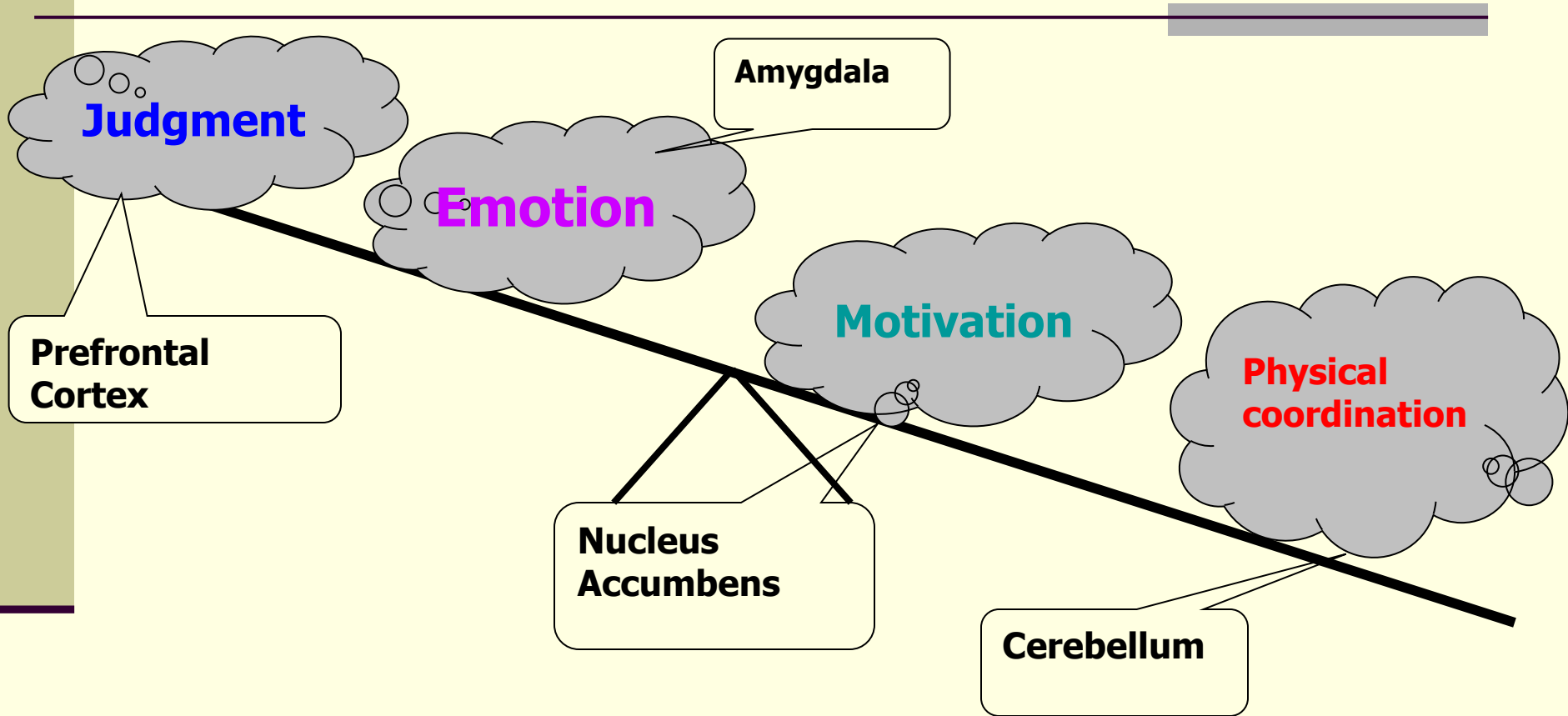
What explains  
comorbidity?

# Developmental Biology

---

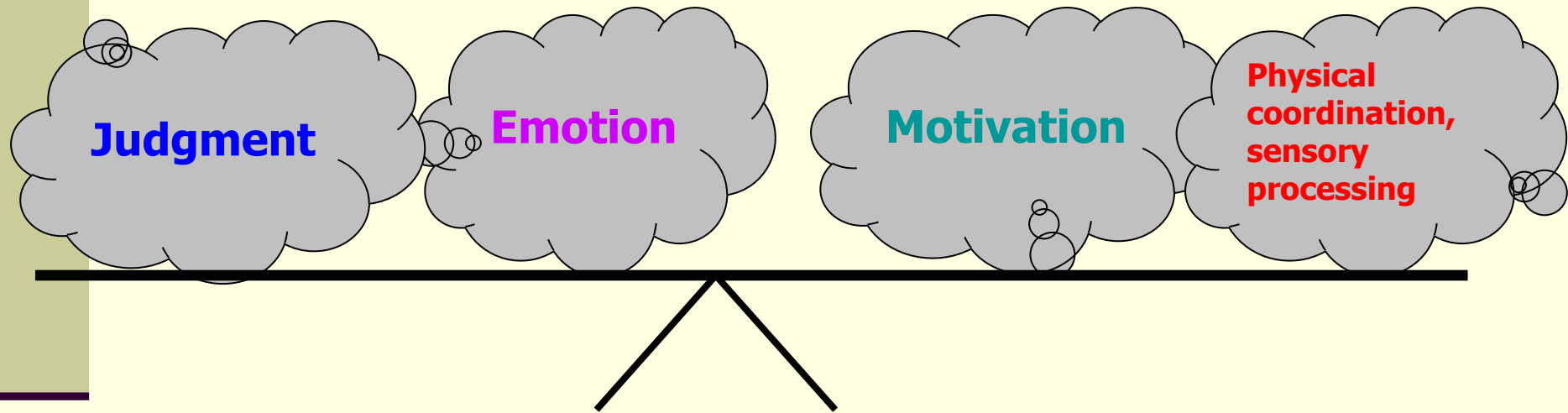
- Gambling addiction generally start in young adulthood.
- Environmental and genetic influences - vulnerability to and expression of gambling addiction
- Changes in brain structure and function during adolescence might influence the motivation to engage in risk-taking behaviors.





Notice: Judgment is last to develop!

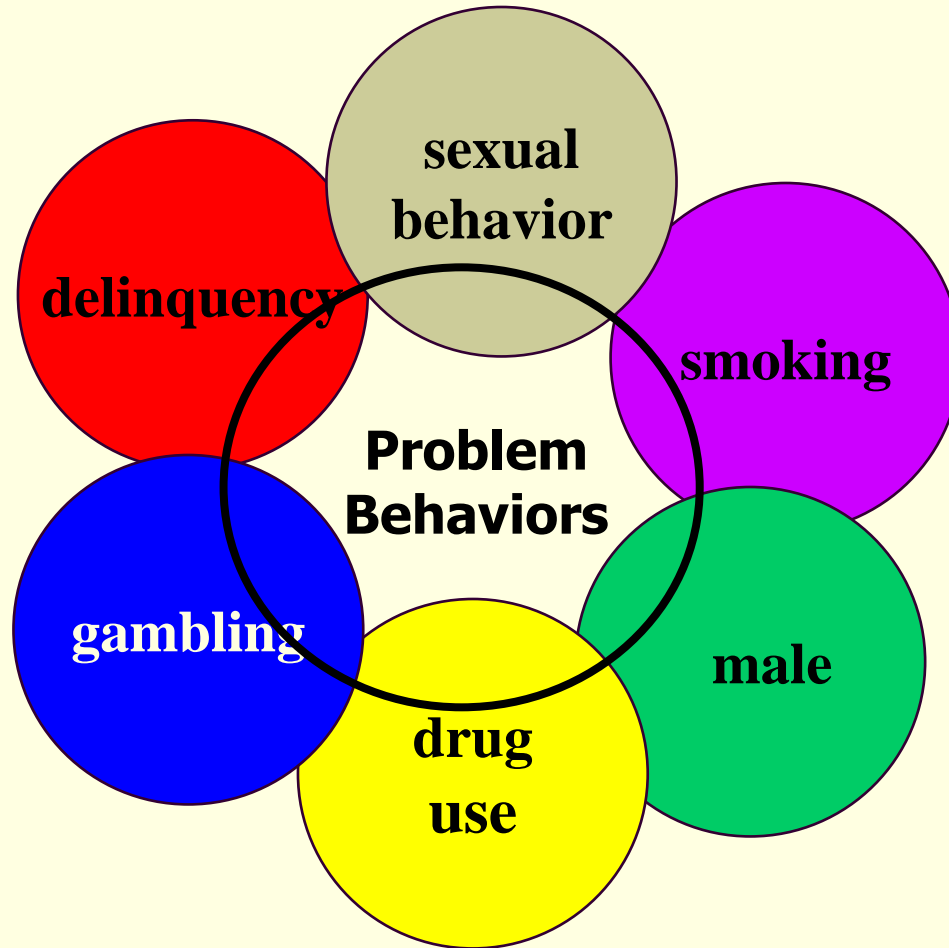
# Age 24



**Balance**

# Youth Problem Behaviors

---



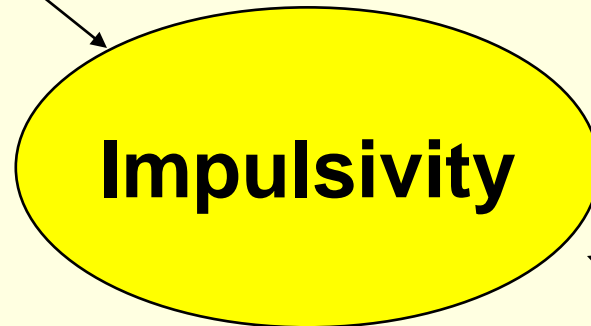
# Family/Genetic Factors

---

- Male twin study - 12 to 20% of the genetic variation in risk for gambling, and 3 – 8% of the nonshared environmental variation in the risk for gambling, accounted for by risk for alcoholism.
- Additionally, 64% of the co-occurrence between gambling and alcoholism - attributable to genes that simultaneously influence both disorders.

# Neurochemistry of Behavioral Dyscontrol

GLUTAMATE  
SEROTONIN  
DOPAMINE



GLUTAMATE  
DOPAMINE

# Glutamate

---

- Levels of glutamate within the nucleus accumbens mediate reward-seeking behavior
- Restoring extracellular glutamate concentration in the nucleus accumbens seems to decrease cravings.

# Role of Dopamine

---

- Dopamine release into the nucleus accumbens - translates motivated drive into action - a “go” signal
- Dopamine release associated with rewards and reinforcing
- Dopamine release - maximal when reward is most uncertain

# Biochemistry – Opioid System

---

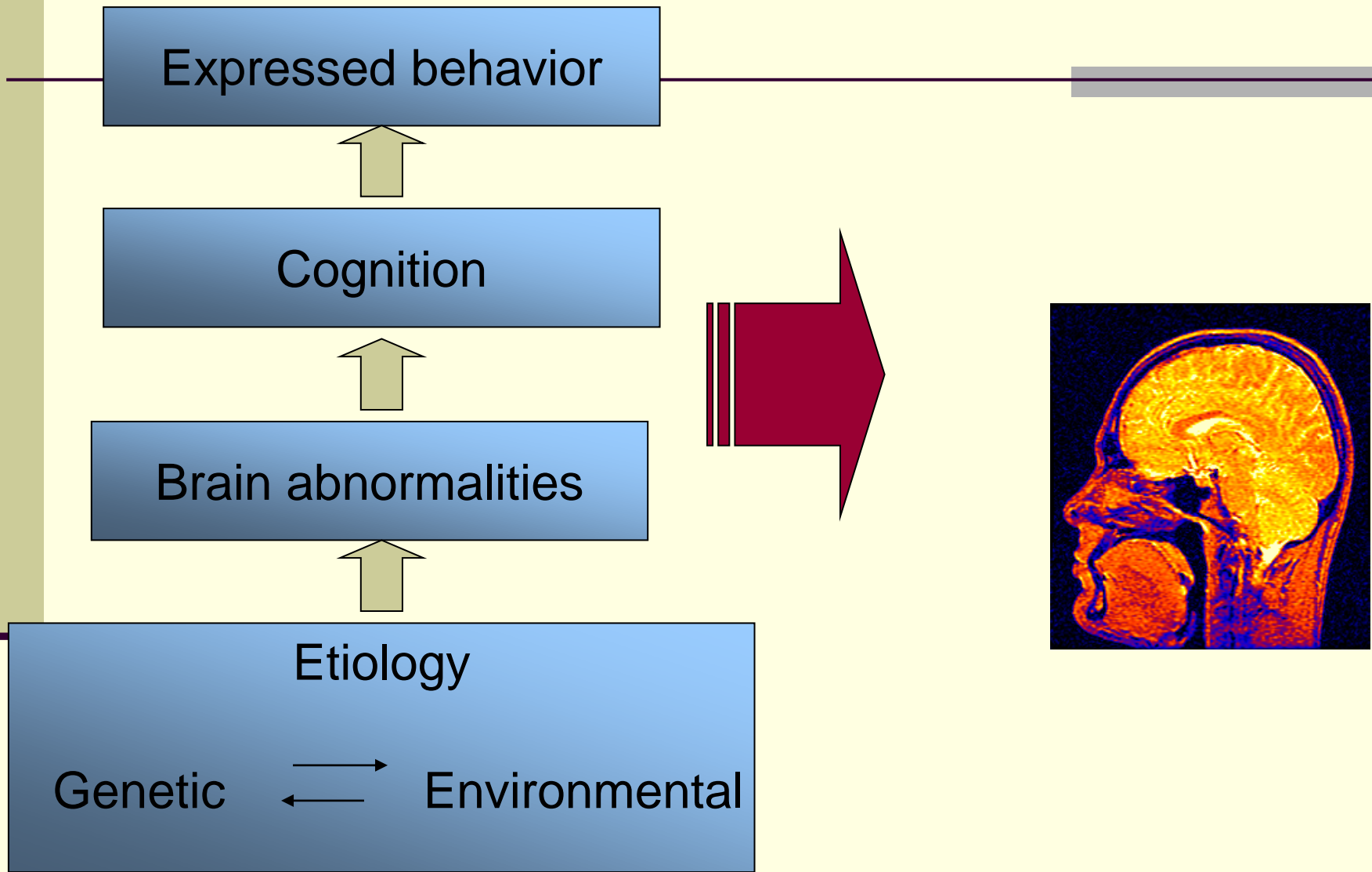
- The endogenous opioid system influences the experiencing of pleasure.
- Opioids modulate mesolimbic dopamine pathways via disinhibition of  $\gamma$ -aminobutyric acid input in the ventral tegmental area.
- Addictions have been associated with elevated blood levels of the endogenous opioid  $\beta$ -endorphin.



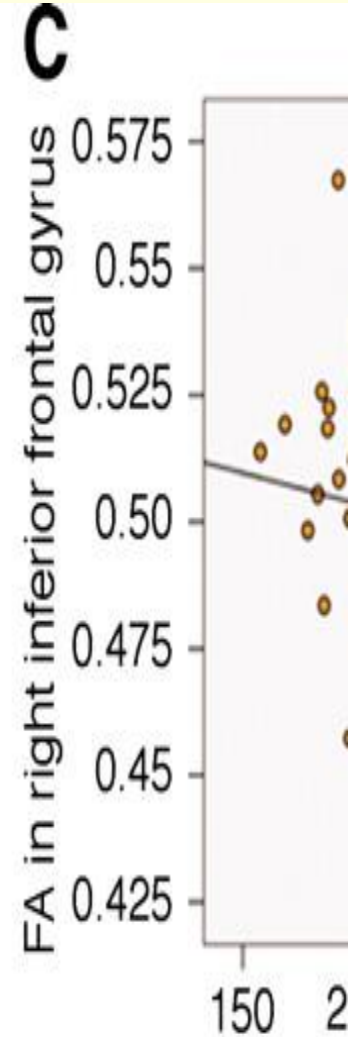
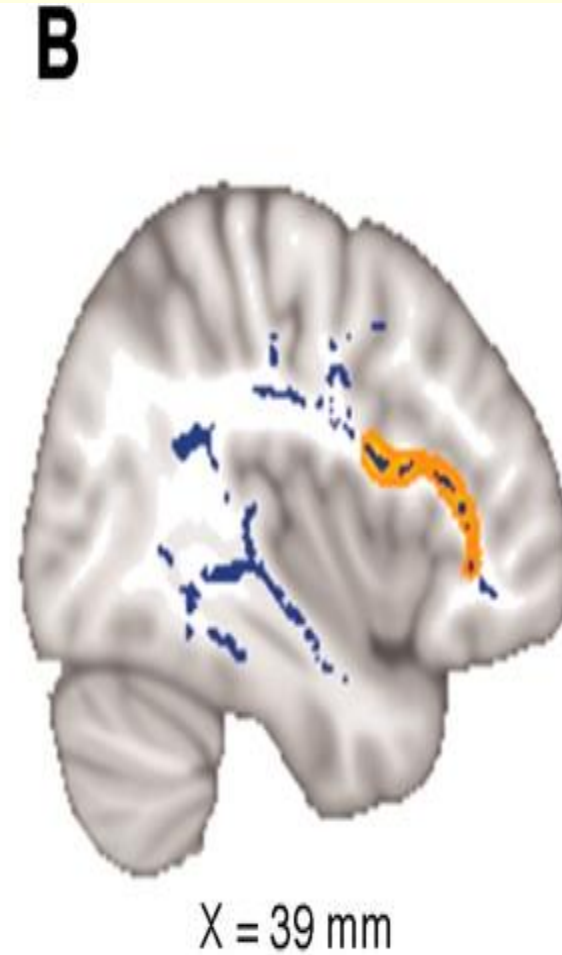
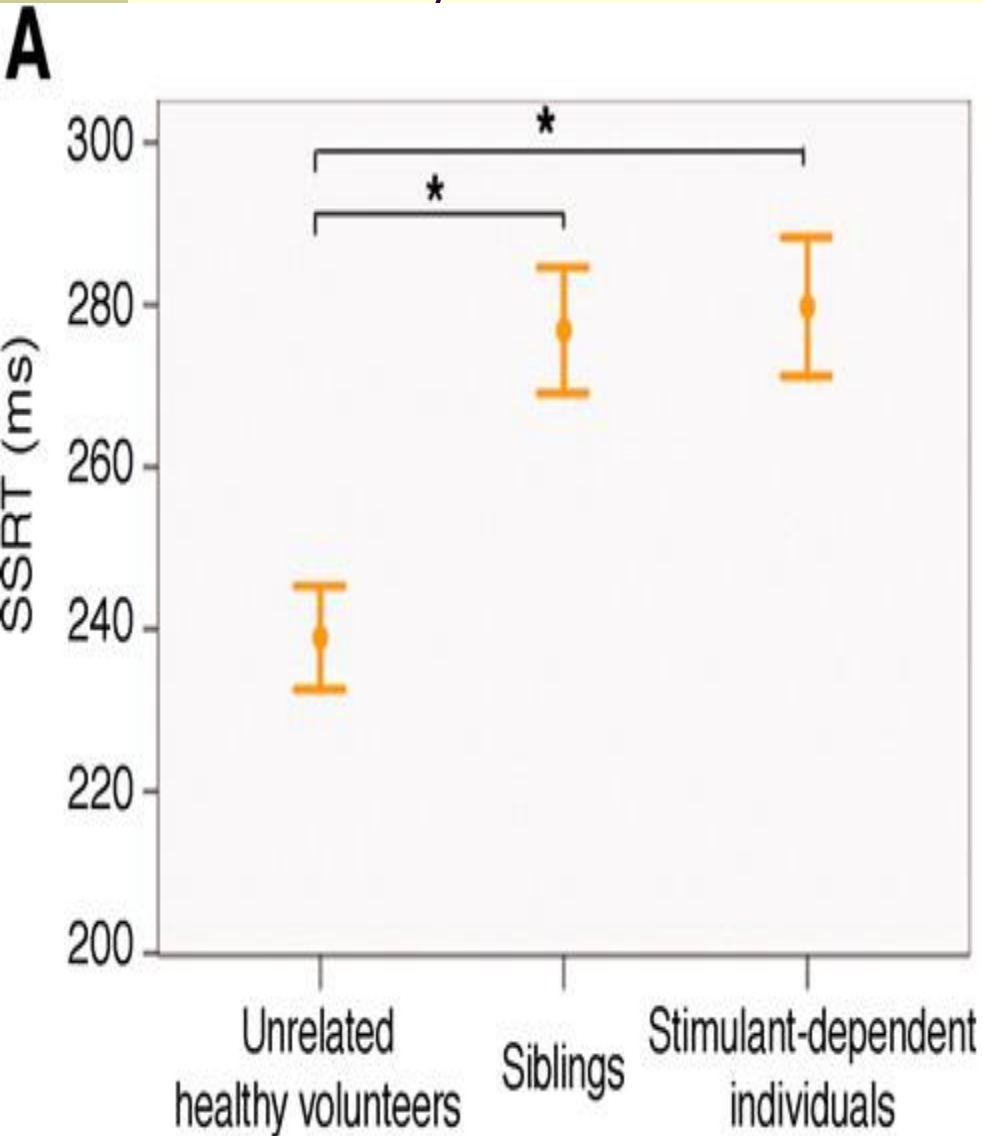
# Neurocognition in Gambling

---

- Executive function deficits are greater in those with gambling than in control subjects, including:
  - Planning
  - Cognitive flexibility
  - Inhibition



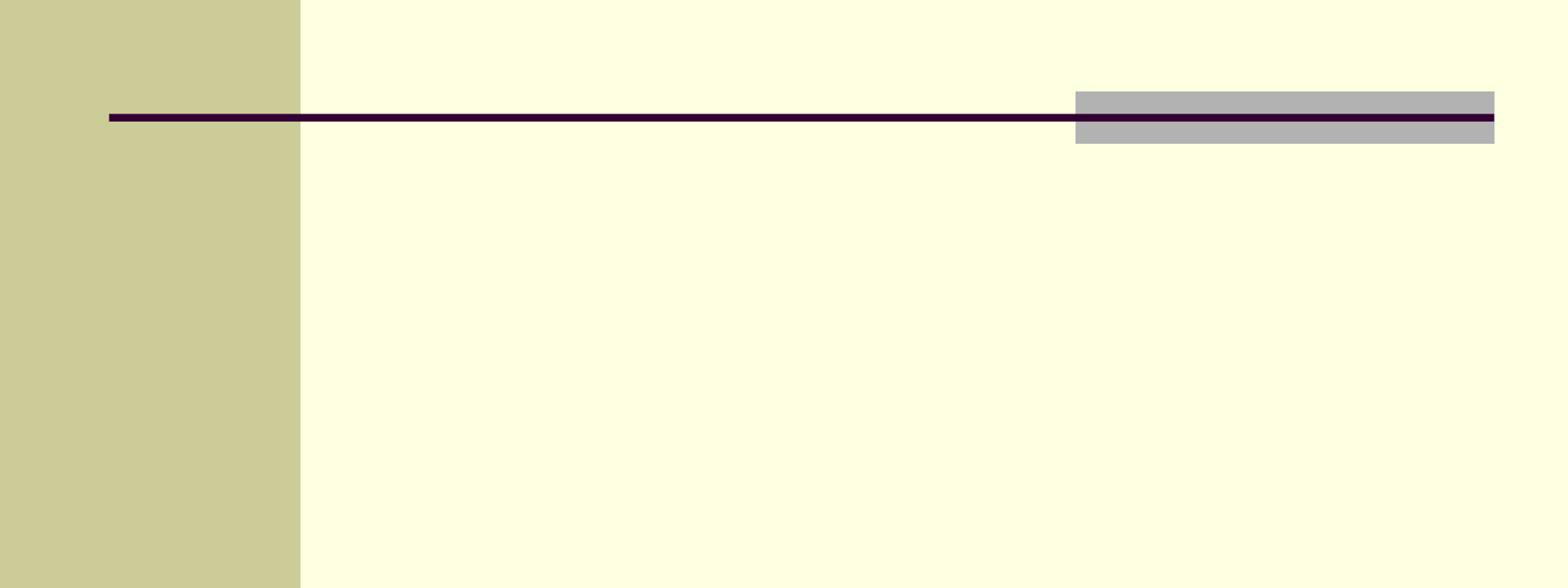
# Inhibitory Control - Familial



# Impulsivity as an Endophenotype

---

- **Impulsivity Across Psychiatric Groups**
  - **Substance use disorders**
  - **Behavioral addictions**
  - **ADHD**
  - **Bipolar disorder**
  - **Personality disorders**
  - **Suicidality**



What do we do about  
comorbidity?



"Betcha I recover before you do."

# Treatment

---

- Pharmacotherapy
  - No medication FDA-approved for GD
- Cognitive-Behavioral Therapy (CBT)
  - Length of treatment unknown; brief interventions have shown benefit;
  - Multiple versions of CBT have shown benefit

# Psychosocial Treatments

---

- Motivational enhancement
- Individual and Group Cognitive behavioral therapy
  - social skills, assertiveness, anger management; cognitive restructuring
- Imaginal exposure
- Brief interventions



# Psychosocial Treatments (Cont)

---

## Brief Interventions

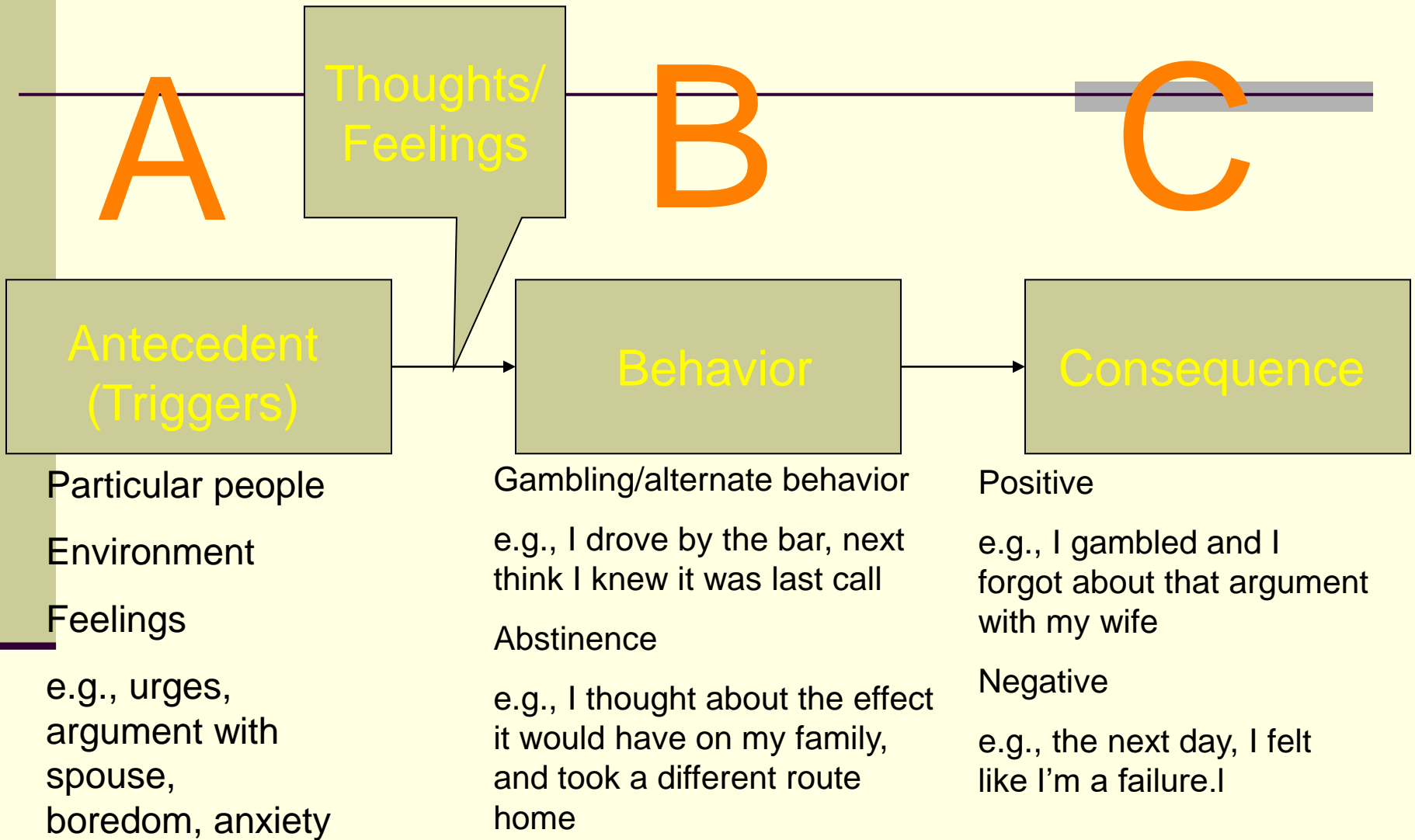
Single-session interventions, workbooks, bibliotherapy, or motivational interviewing.

Workbooks include CBT and motivational enhancement techniques.

CBT workbook, a workbook plus a telephone motivational enhancement.

# Motivation to Quit Gambling

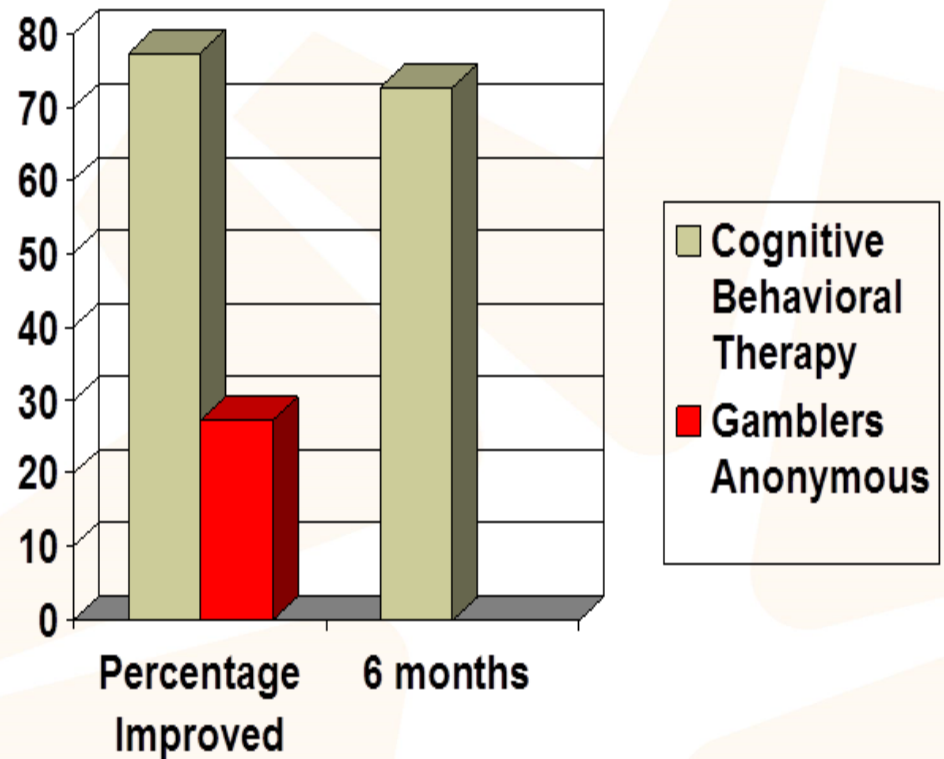
<b>1) <u>Positive</u> aspects of impulsive behavior (what are the positive things gambling gives me?)</b>	<b>2) <u>Negative</u> aspects of quitting (what do I lose if I stop gambling?)</b>
<b>3) What are the <u>negative</u> consequences of gambling (current and future?)</b>	<b>4) What are the <u>advantages</u> of quitting gambling (what do I have to gain?)</b>



# Psychosocial Treatments (Cont)

## Imaginal Exposure

Client and therapist develop an imaginal exposure script that includes all the relevant internal and external triggers that relate to the behavioral addiction



# Groups

---

## Group CBT – 3 studies

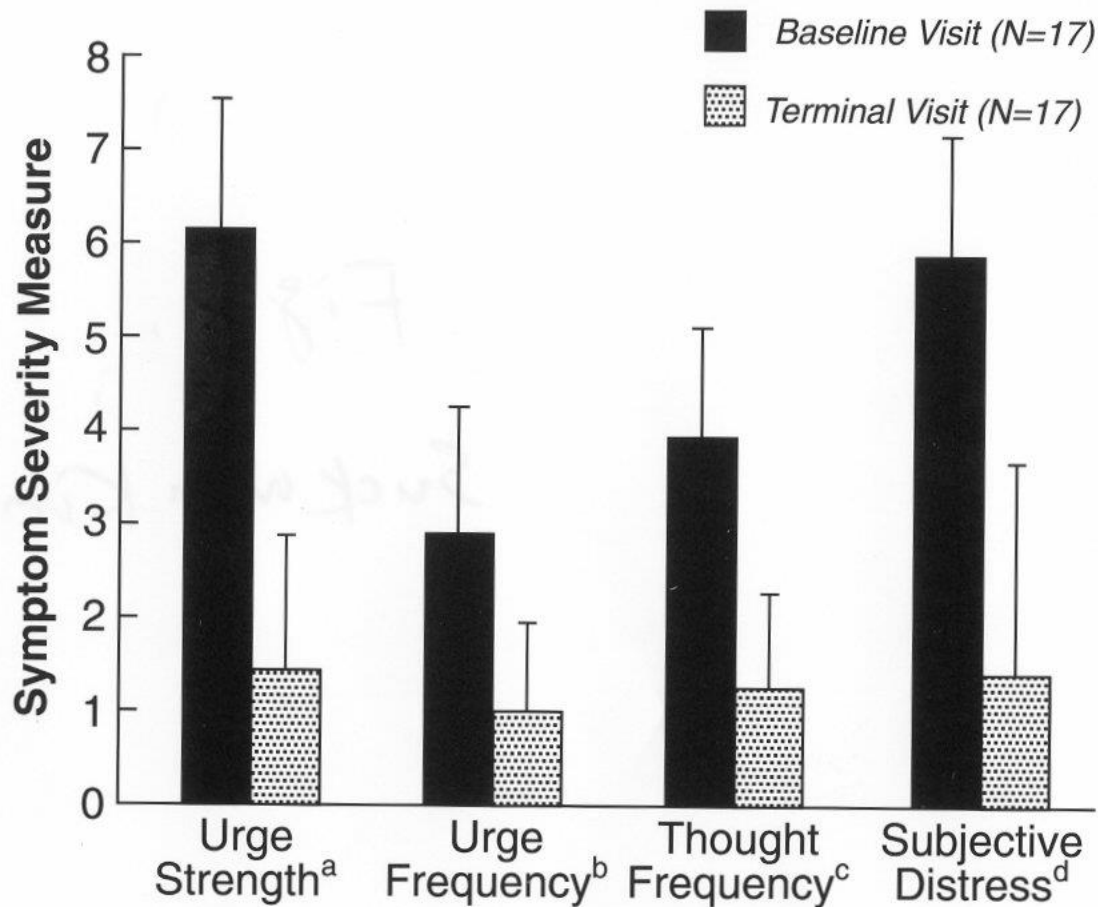
- Cognitive restructuring
- Coping skills and identification of high-risk situations.
- Imaginary exposure with response prevention.
- Financial limit setting and activity scheduling of leisure activities.
- Problem-solving training
- Relapse prevention



# Opiate Antagonists

# Figure 1. Baseline and Terminal Visit Gambling Symptom Ratings

(Carry Forward Paired t-test)



<sup>a</sup> 0=None, 2=Mild, 4=Moderate, 6=Severe, 8=Extreme. Significantly different ( $t=14.28, p<0.05$ )\*.

<sup>b</sup> 0=None, 1=Once a day, 3=Three times a day, 5=Five times a day, 6=More than five times a day. Significantly different ( $t=7.29, p<0.05$ )\*.

<sup>c</sup> 0=None, 1=Once a day, 3=Three times a day, 5=Five times a day, 6=More than five times a day. Significantly different ( $t=5.25, p<0.05$ )\*.

<sup>d</sup> 0=None, 2=Mild, 4=Moderate, 6=Severe, 8=Extreme. Significantly different ( $t=8.68, p<0.05$ )\*.

\* Bonferroni corrected



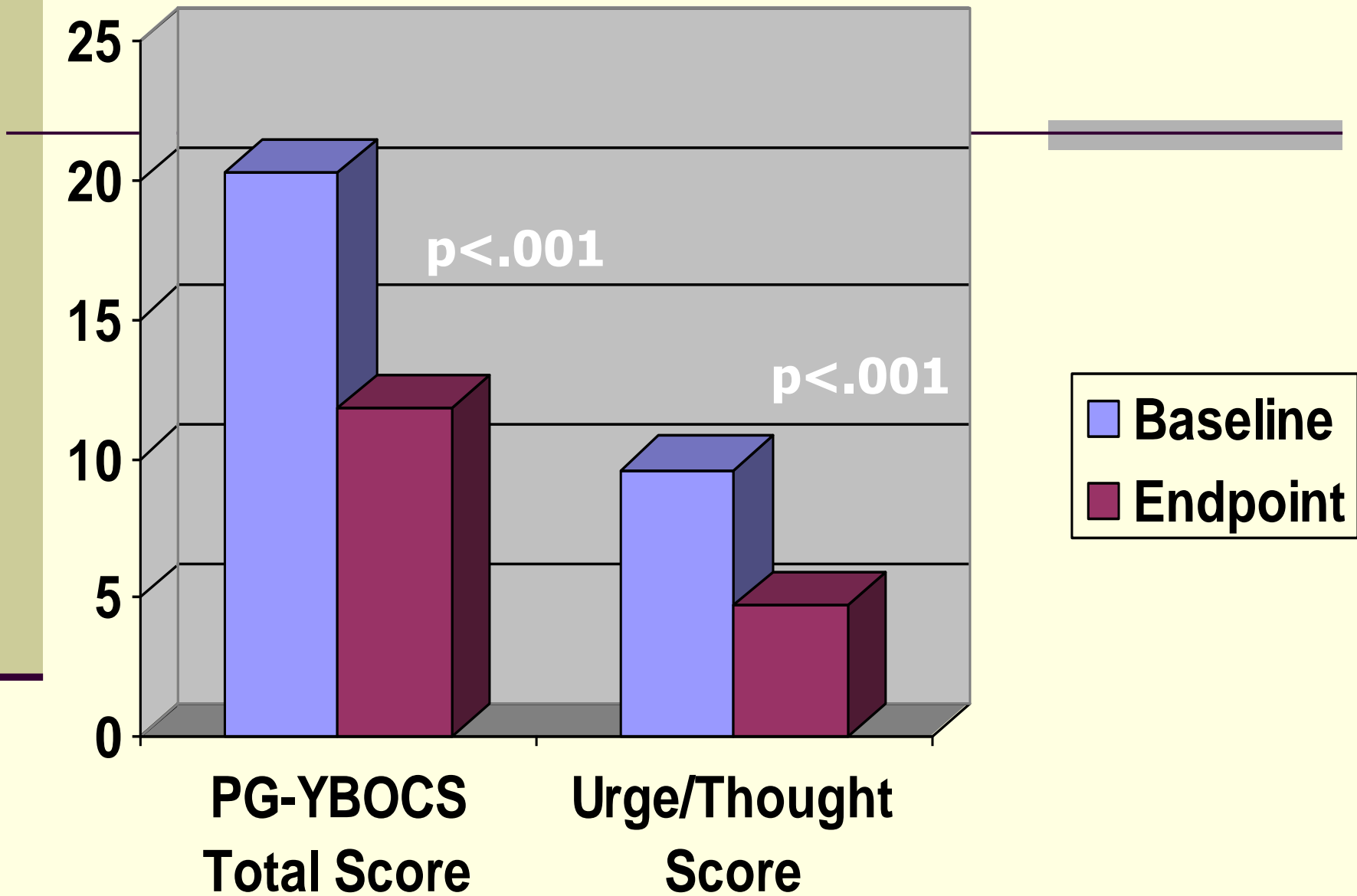
# Glutamate Agents

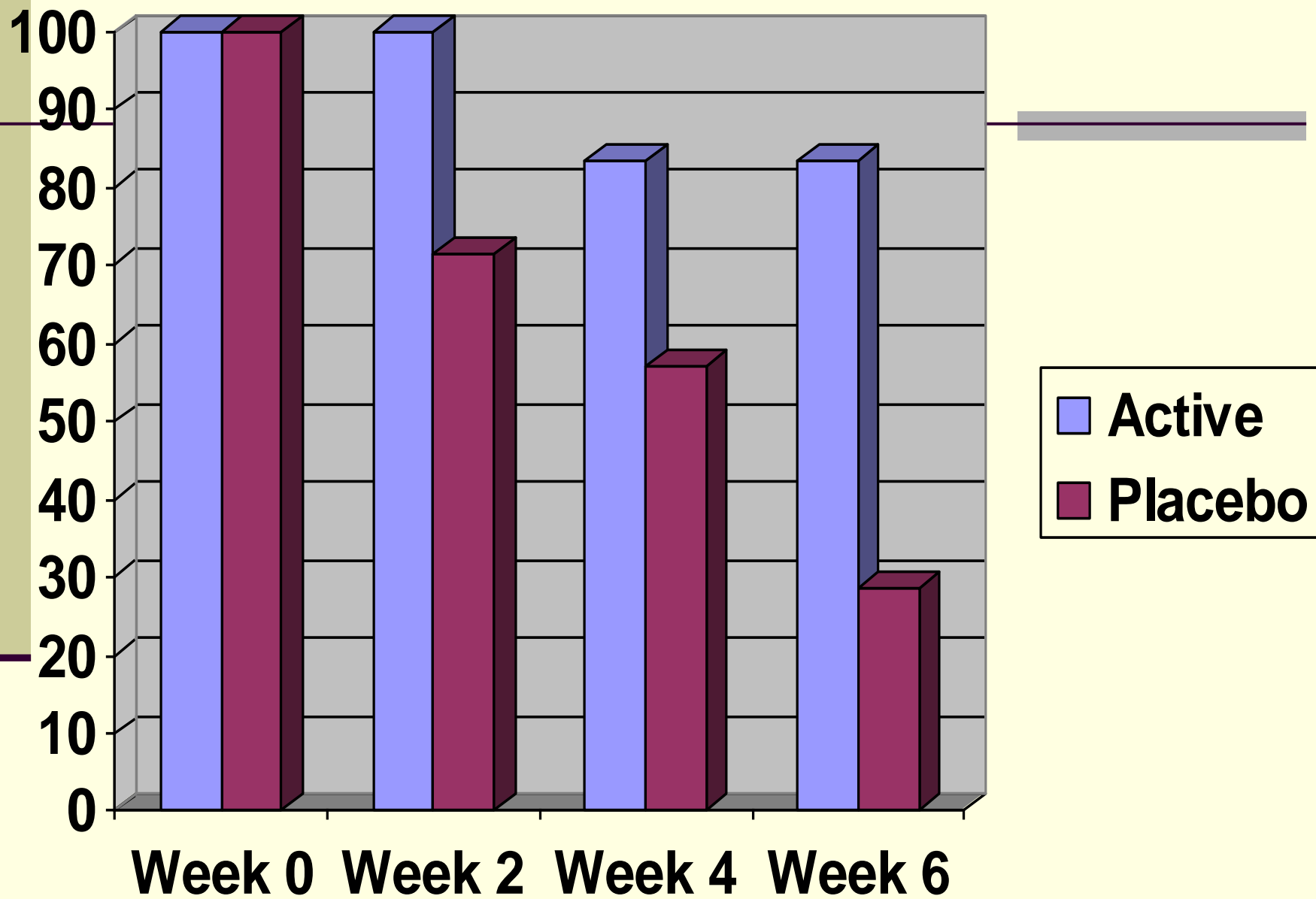


# N-Acetyl Cysteine

---

- Amino acid and antioxidant
- Lack of significant side effects
- Levels of glutamate within the nucleus accumbens mediate reward-seeking behavior
- NAC potentially modulates brain glutamate transmission





# Clinical Subtyping

---

Comorbidity?

Neurocognition?

Genetics?

Imaging?

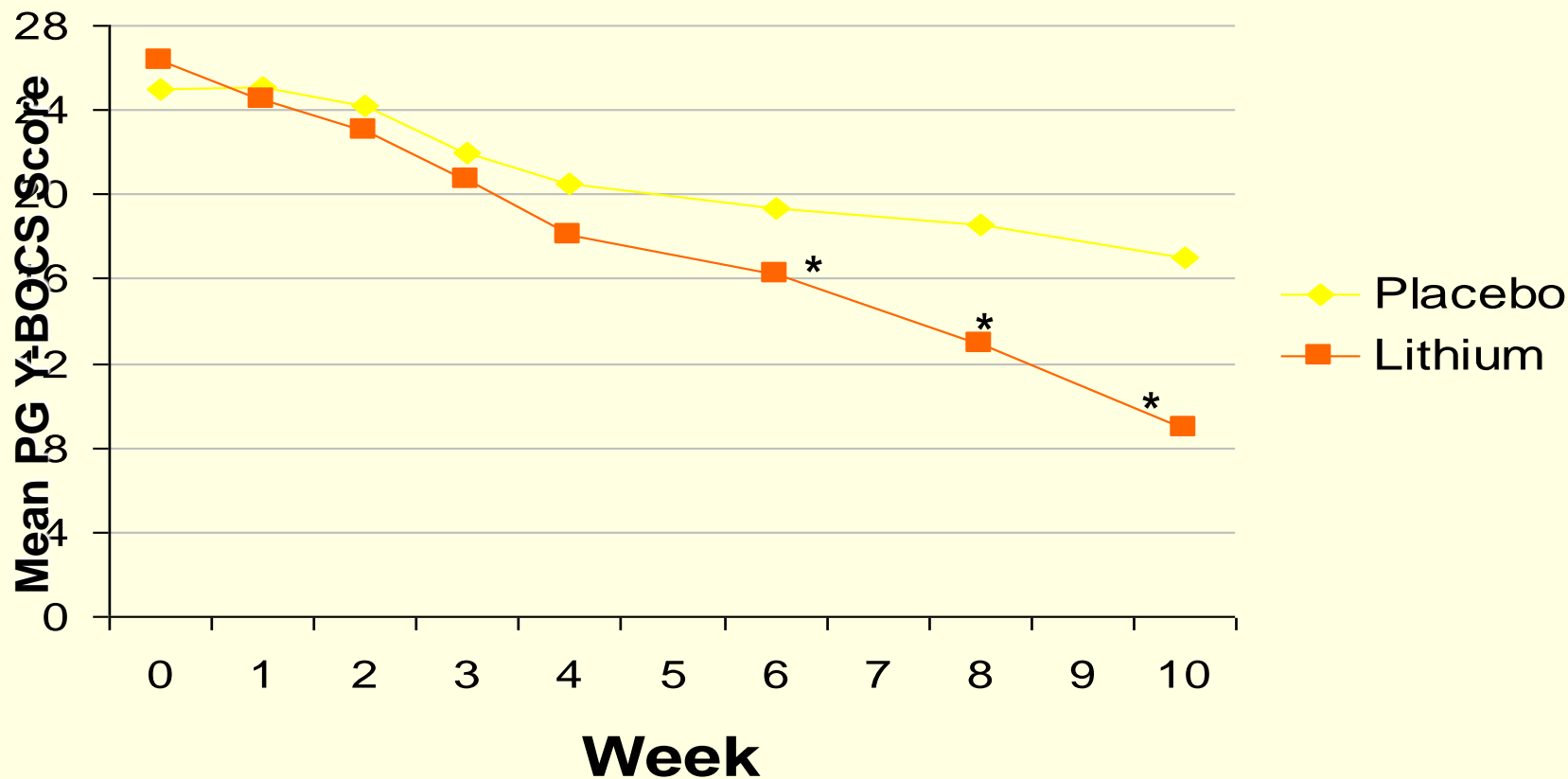
# Comorbidity – Means What?

---

- Gambling causes the other disorder?
- Other disorder causes gambling?
- Gambling one branch of a tree?
- Co-occurrence by chance?
- Common stress, genetics, trauma cause?

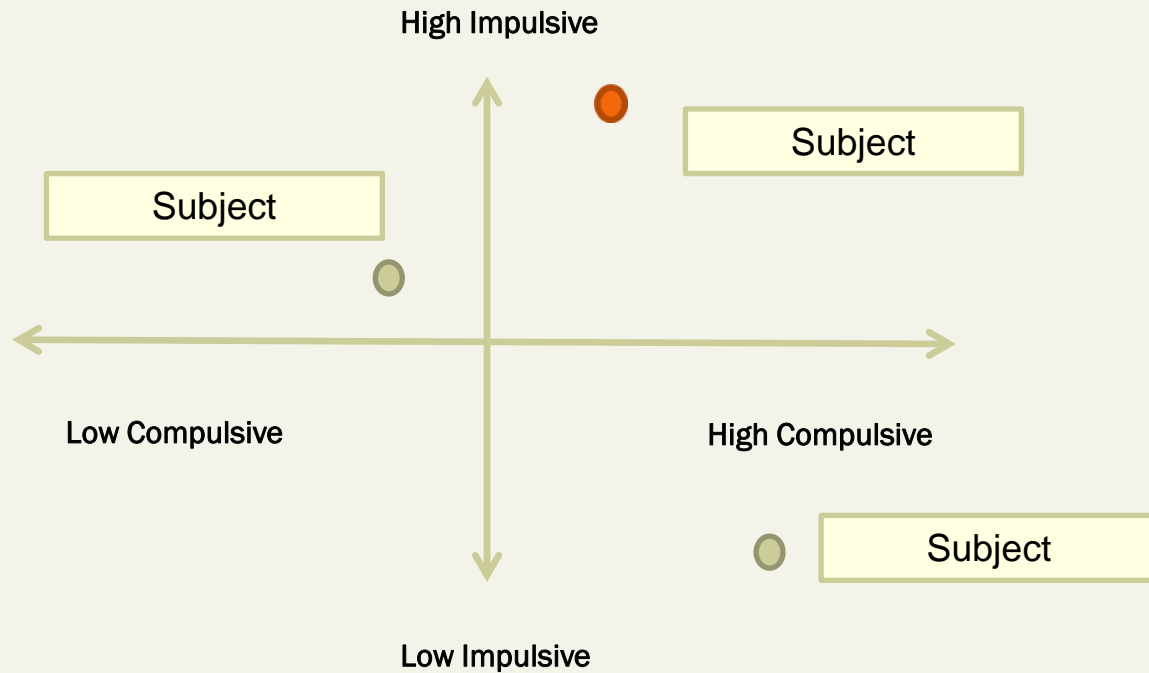
# Bipolar Spectrum Gamblers

## PG-YBOCS Total Score Over Time



\* p<.05

# Heterogeneous Profiles?



# Case Example

## Bank Robber

---

- 22 year old Caucasian
- No prior legal problems
- Worked in a bank
- Problem gambling onset at age 20
- Ran up debts; borrowing from family
- Impulsively “robbed” a bank



# Case Example

## Bank Robber

---

- Court-ordered for an examination
- Results reveal no other psychopathology other than PG
- Neurocognitive testing showed attentional and impulsivity impairments
- No brain imaging

# Case Example

## Bank Robber

---

- Very personable to interview
- Accepts guilt
- Wants “treatment” instead of incarceration
- States he won’t gamble ever again

# Case Study 2 – Other Addictions

---

- Brad is a 30 yo separated male with 2 young children. He has a Hx of polysubstance abuse, a 10 year Hx of gambling disorder (sports), early trauma experience, and ADHD.
- He reports returning to ETOH this past year (after 7 years sober), increasing consumption since separation from wife. Abstinent from gambling 3 months, now in relapse mode. “Gambling fills more voids”.
  - Where to start?
  - What to include in his treatment plan?



[jongrant@uchicago.edu](mailto:jongrant@uchicago.edu)

