



Evidence Based Treatments for Problem Gambling What Do We Know and What Do We Need to Learn?

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



Disclosure Information

- I have the following **financial** relationships to disclose:
 - No conflicts with respect to this presentation
 - My research is supported by NIDA, AFSP, and the NCRG
 - Grant/Research support from: Takeda and Psyadon Pharmaceuticals
 - I will discuss the following off-label use and/or investigational use in my presentation.



Gambling Disorder

Persistent and recurrent maladaptive gambling behavior:

Preoccupation

Tolerance

Inability to control

Withdrawal

Escape

Lying

Illegal acts

Impairment

Relying on others

Chasing losses

Categorization

- DSM-IV vs DSM-5

- ICD-10 vs ICD-11

Impulsive-compulsive behaviors

Drug Addiction

ADHD

Gambling

Stealing

Sexual behavior

Trichotillomania/Skin Picking

OCD



Addiction - Arbitrary Definitions?

- Stigmatize addicts and endorse a runner's high?
- Equivocate about caffeine and alcohol and condemn cocaine?
- 18th century – books were addictive: women would have passions awakened
- Animals and humans self medicate

Behavioral Addictions?

- Gambling
- Stealing
- Sexual behavior
- Shopping
- Fire-setting
- Internet use
- Overeating

Common Core Qualities of Addictions

- Repetitive or compulsive engagement in a behavior despite adverse consequences
- Diminished control over the problematic behavior
- Appetitive urge or craving state prior to engagement in the problematic behavior
- Hedonic quality during the performance of the problematic behavior

Common Core Qualities of Addictions

- Tolerance
- Withdrawal
- Impairment in major areas of life functioning
- Telescoping

Substance Addictions and Gambling

- Both have onset in adolescence and young adulthood
- Higher rates in these age groups than in older adults.
- Both have natural histories that may exhibit chronic, relapsing patterns, but with many people recovering on their own without formal treatment (so-called “spontaneous” quitting)

- Ego-syntonic nature is similar to substance use behaviors.
- Gambling and substance addictions may become less ego-syntonic and more ego-dystonic over time - the behavior becomes less pleasurable and more of a habit or compulsion.
- Becomes motivated less by positive reinforcement and more by negative reinforcement (e.g., relief of dysphoria or withdrawal).

Comorbidity of Gambling & Substance Addictions

- Relative risk for an alcohol use disorder increased 3.8-fold when disordered gambling was present.
- 20% of alcohol dependent individuals have a gambling problem

Estimates of Problem Gambling- Past Year

Group	Percentage	
	Range	Median
Adult	<1 - 2%	0.9%
Adolescent	1 - 9%	6%
Adolescent-Drug Tx	9 - 13%	11%

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

Obesity

- 207 non-treatment seeking young adults ('normal weight' BMI<25, 'overweight' BMI≥25; or 'obese' BMI≥30)
- 22 (10.6%) were obese and 49 (23.7%) were overweight.
- Obese gamblers consumed more nicotine and lost more money per week to gambling.

Developmental Biology

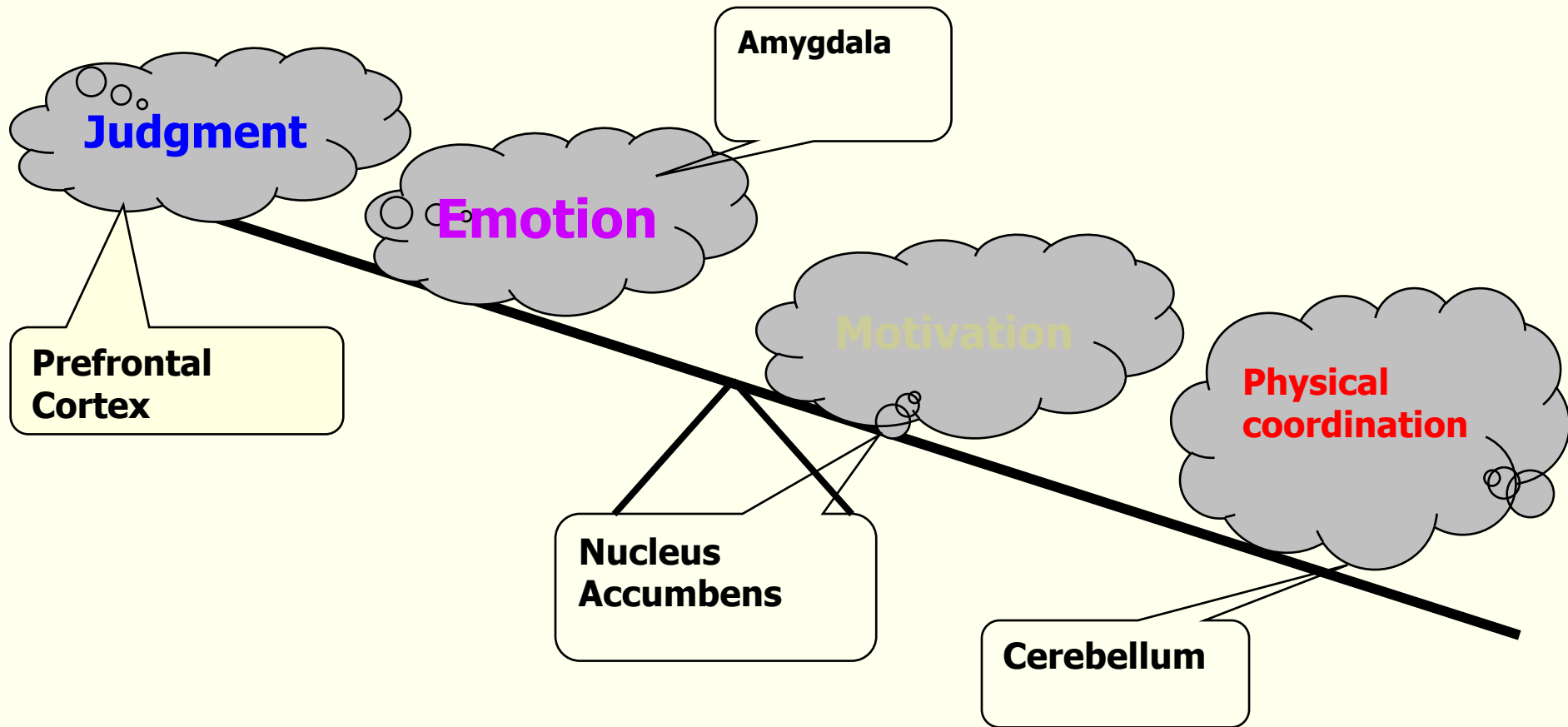
- Behavioral addictions generally start in young adulthood.
- Environmental and genetic influences - vulnerability to and expression of behavioral addictions
- Changes in brain structure and function during adolescence might influence the motivation to engage in risk-taking behaviors.

Brain Development

- During late childhood, neurons increase their number of connections.
- But around **11** – GIRLS; **12½** - BOYS:
 - Some of these connections are pruned off.

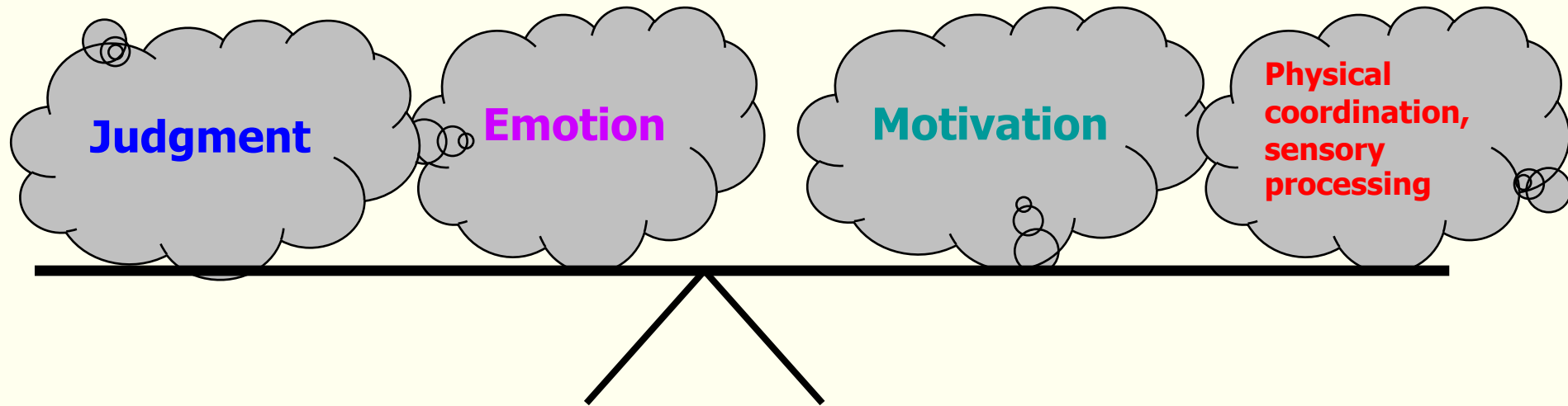
Development

- When the pruning is complete, the brain is faster and more efficient.
- **But...** during the pruning process, the brain is not functioning at full capacity



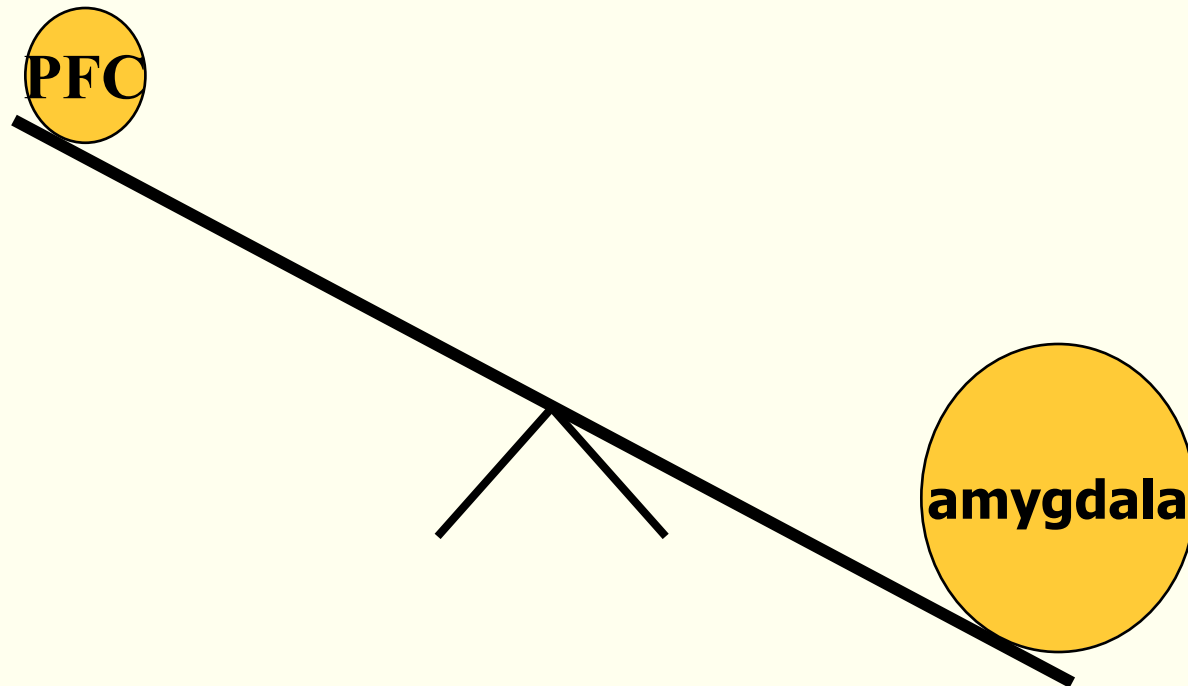
Notice: Judgment is last to develop!

Age 24



Balance

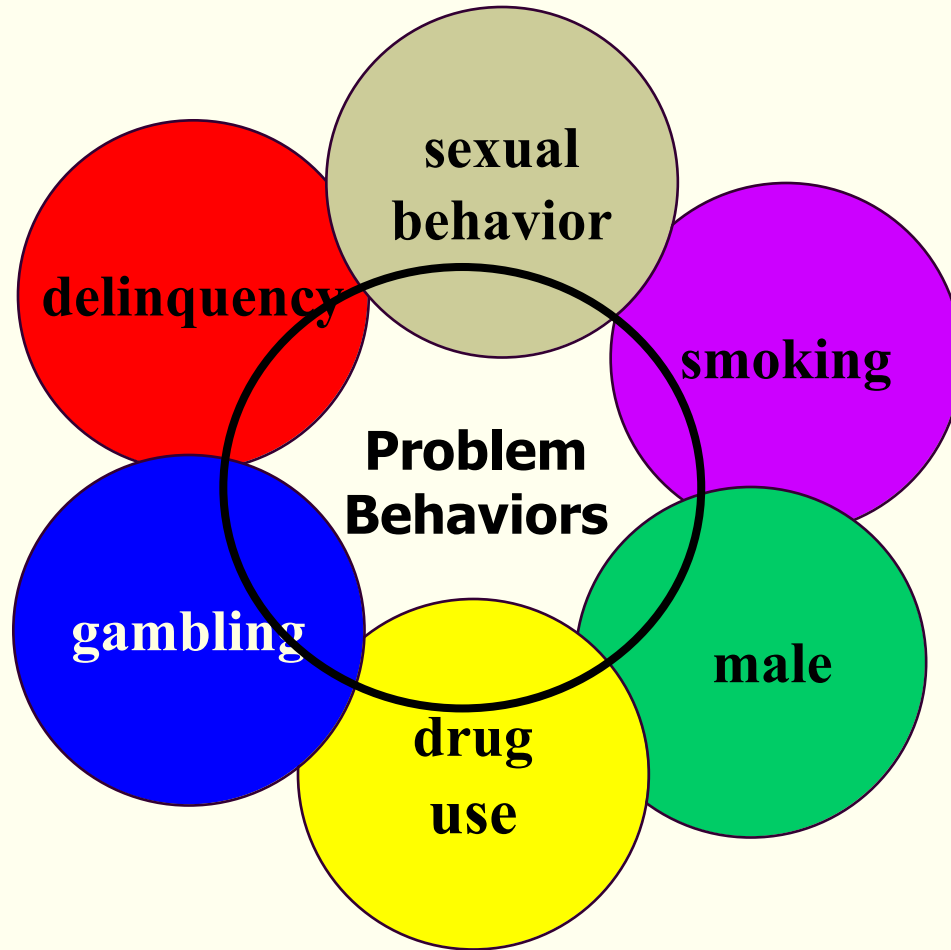
In the presence of stress...



Role of Trauma

- Neglectful parenting style
- Addictions more likely associated with
 - physical neglect
 - emotional abuse
 - Sexual abuse

Youth Problem Behaviors



Suicidality

- Rates of suicidality have been reported in 20% to 40% of individuals with gambling disorder
- Individuals with gambling disorder may be 3-4 times as likely as the general population to attempt suicide.
- What about lower levels of gambling problems?

Subsyndromal Gamblers and Suicidality

- 1-3 gambling disorder criteria (DSM-5)
- 18.4% endorsed scores on the MINI suicidality module (cf. to 5.3% in population)
- Degree of gambling behavior or the financial consequences of gambling did not differ between groups.
- Largely attributable to anxiety due to gambling

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.

Motivational Neural Circuits

- Multiple brain structures underlying motivated behaviors.
- Motivated behavior involves integrating information regarding internal state (e.g., hunger, sexual desire, pain), environmental factors (e.g., resource or reproductive opportunities, the presence of danger), and personal experiences (e.g., recollections of events deemed similar in nature).

Relationship to Substance Addictions

- Addictive substances exert to varying degrees their effects on the brain's reward pathways, particularly the ventral striatum, and thereby implicate the dopaminergic and opioid systems
- Pro-dopaminergic medication has been linked with gambling

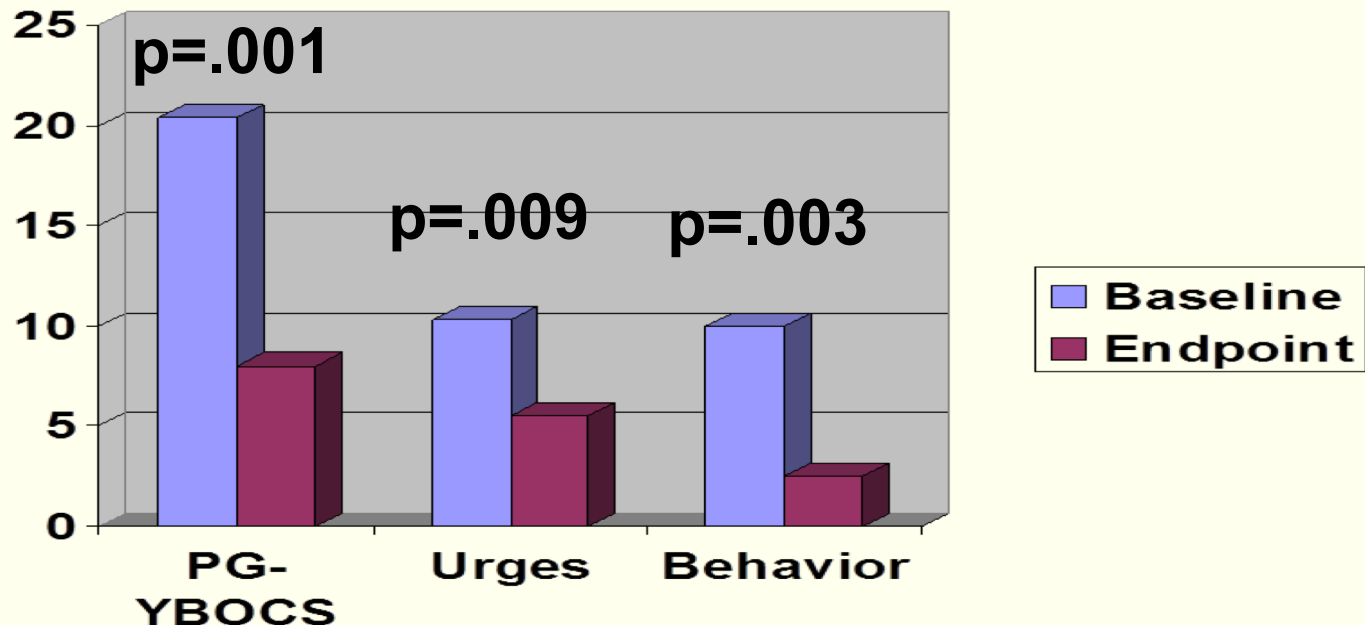
Dopamine and Parkinson's

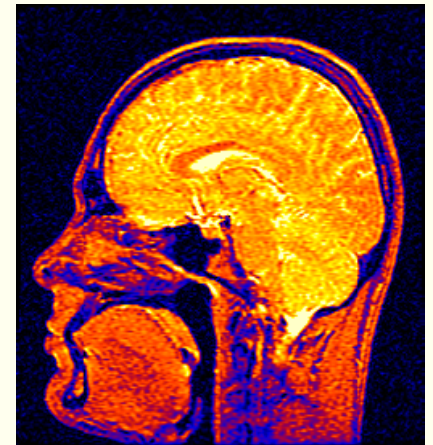
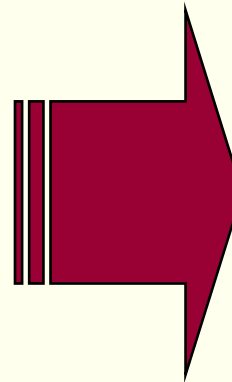
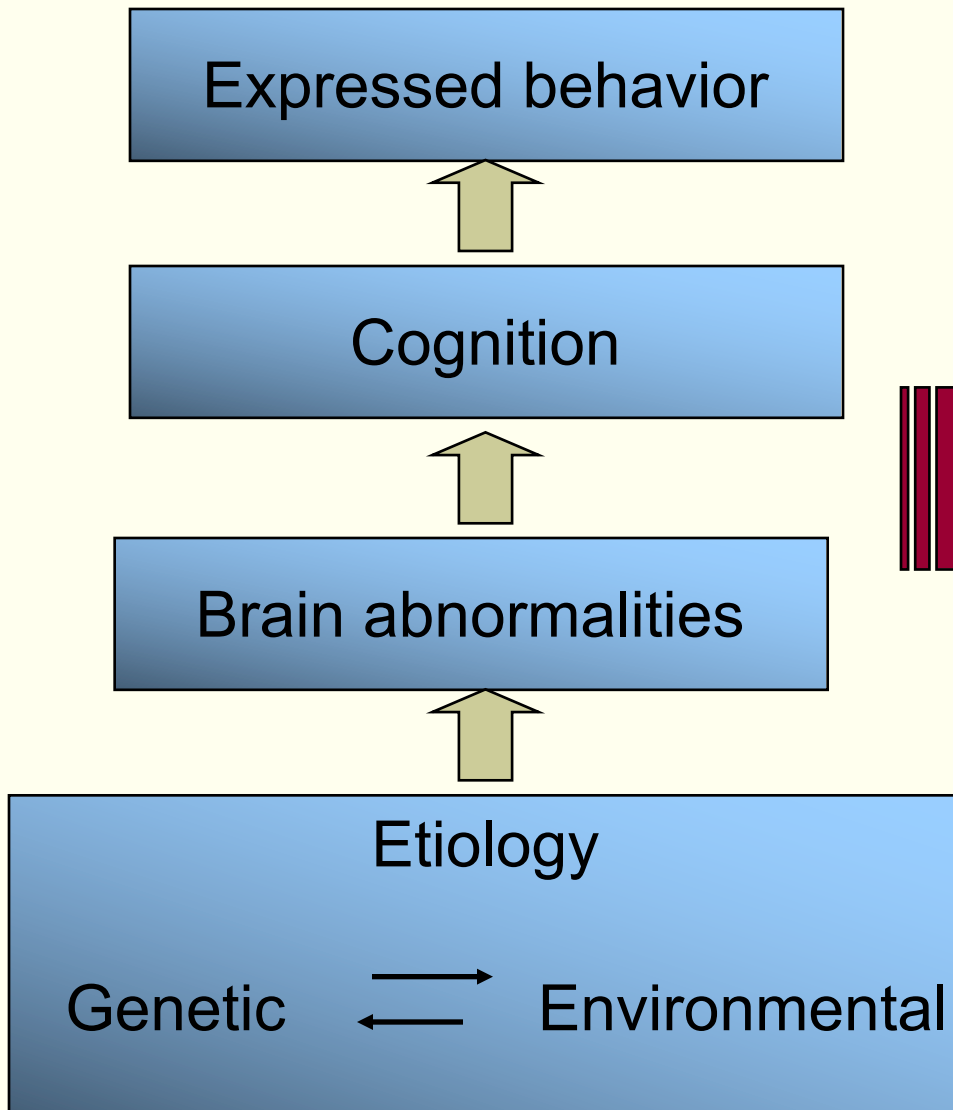
- **Gambling and substance addictions reported in Parkinson's Disease**
- **Association with Dopamine Agonist Treatment**
- **Prior addiction and Family history of addiction Associated with addictions in Parkinson's**

Open-Label Study of Tolcapone in Gambling: Primary Outcome Variables

RESULTS

- N=22 (91.7%) completed the study
- Side effects were mild/moderate; no liver toxicity found





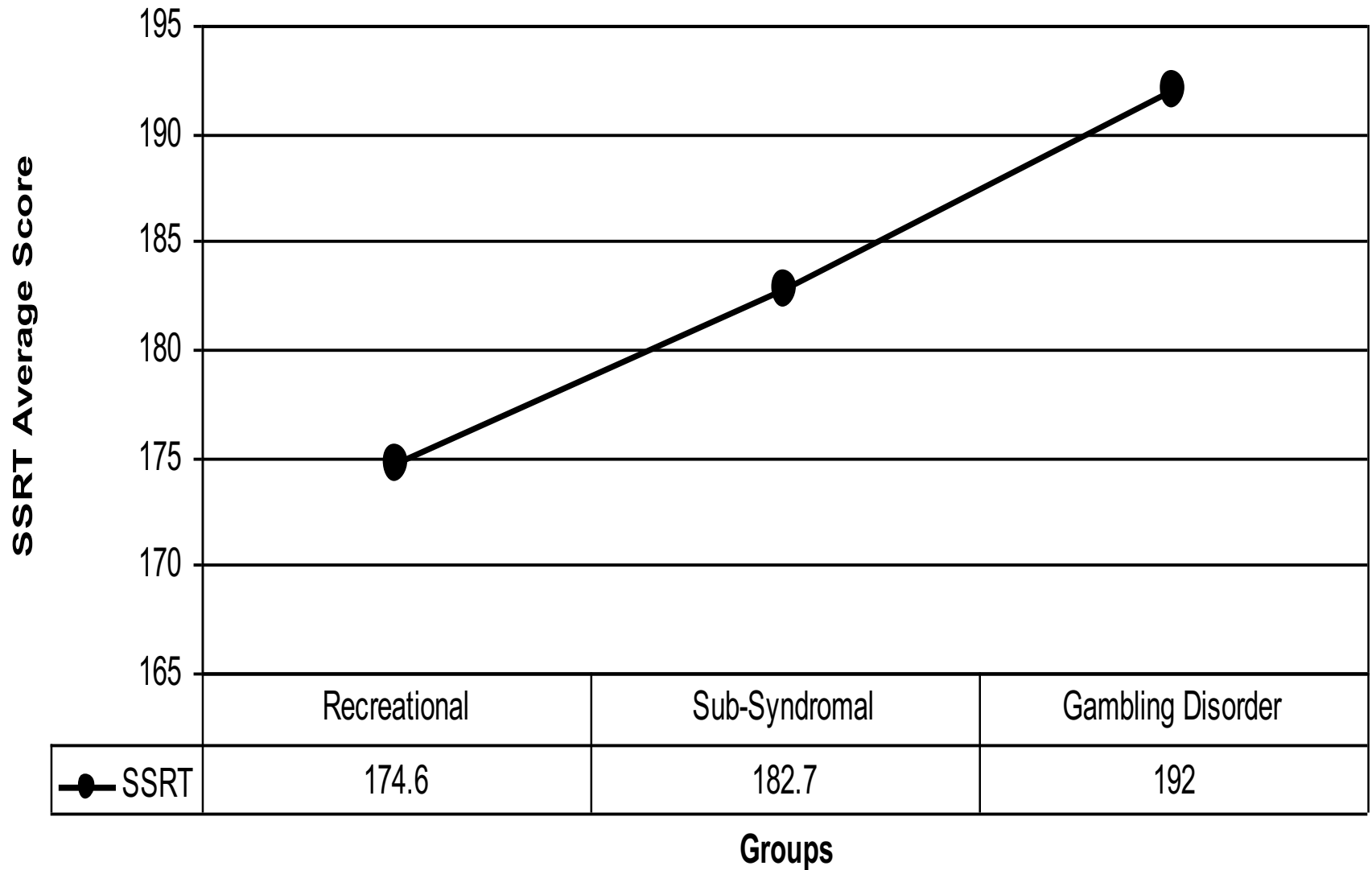
Neurocognition in Addictions

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

Cognitive Problems at Lower Gambling Levels

- Cognitive deficits in gambling disordered people across a variety of domains.
- Majority of studies have reported impaired response inhibition performance (i.e. increased motor impulsivity) in gambling disorder.
- Understanding the chain of progression from recreational gambling to gambling disorder is vital towards understanding the pathogenesis.

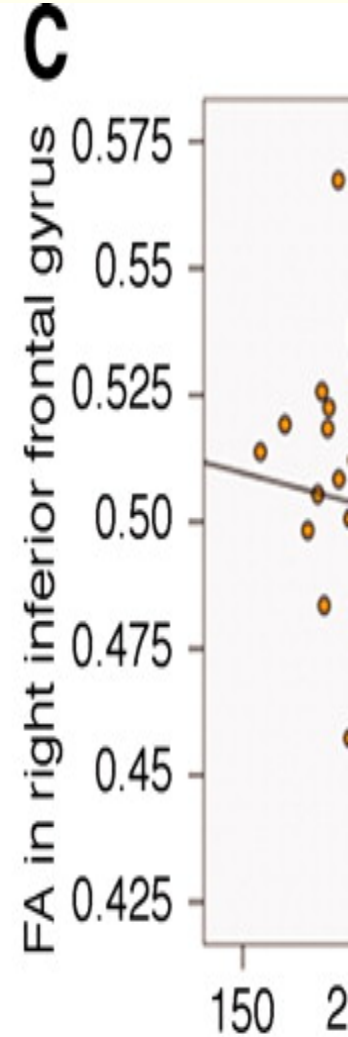
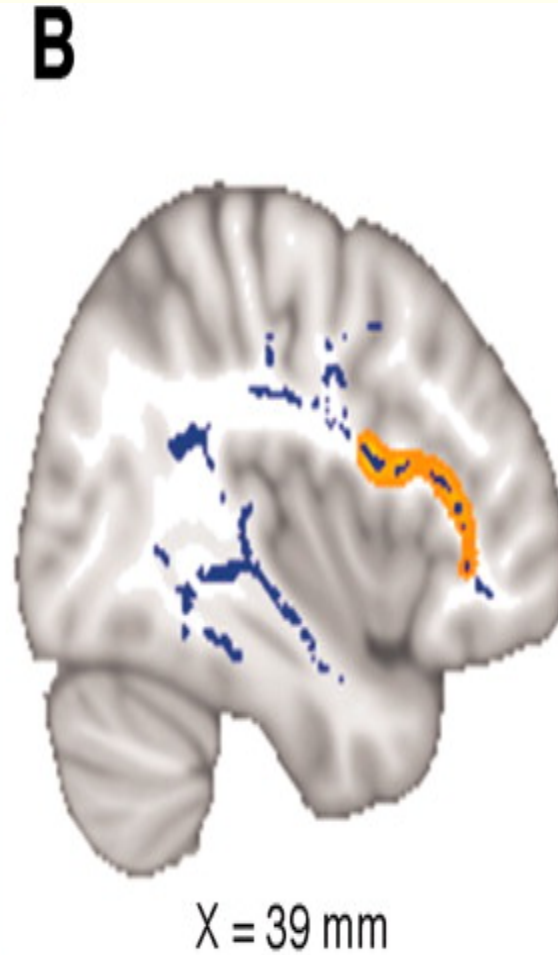
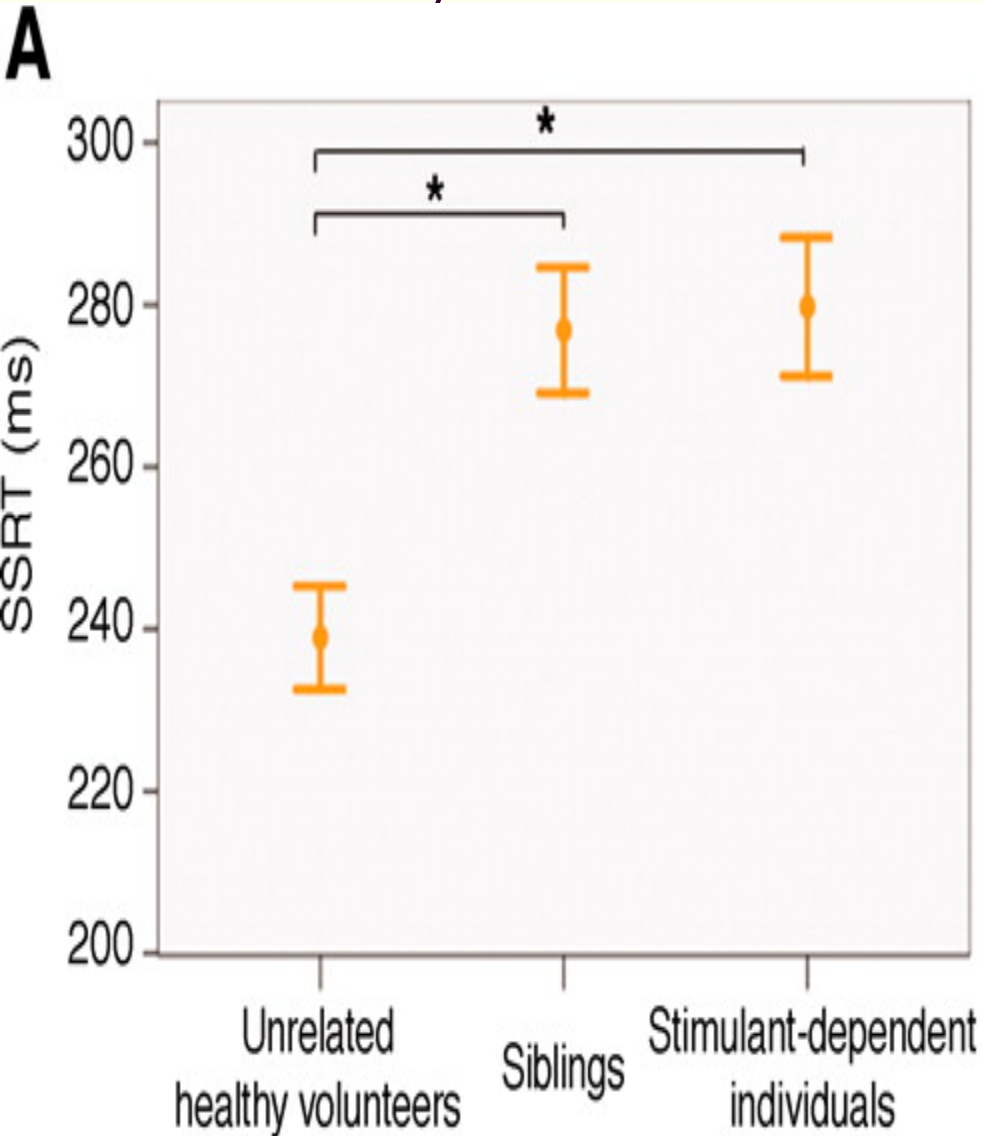
Stop Signal Reaction Time



Race/Ethnicity

- Young black adults with gambling disorder reported more symptoms of gambling disorder and greater scores on a measure of compulsivity.
- Young black adults - exhibited significantly higher total errors on a set-shifting task, less risk adjustment on a gambling task, greater delay aversion on a gambling task, and more total errors on a working memory task.
- Findings suggest that clinical and neurocognitive

Inhibitory Control - Familial



An Impulsive and Compulsive Disorder?

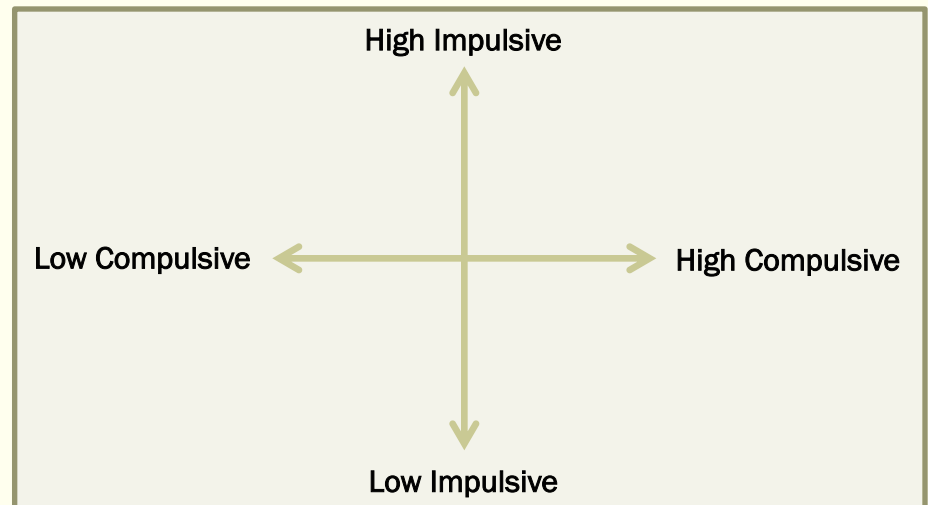
■ Complex Findings

- Gambling disorder shows components of both impulsivity and compulsivity.
- Best to consider impulsive and compulsive features as existing along a spectrum with one at each end?

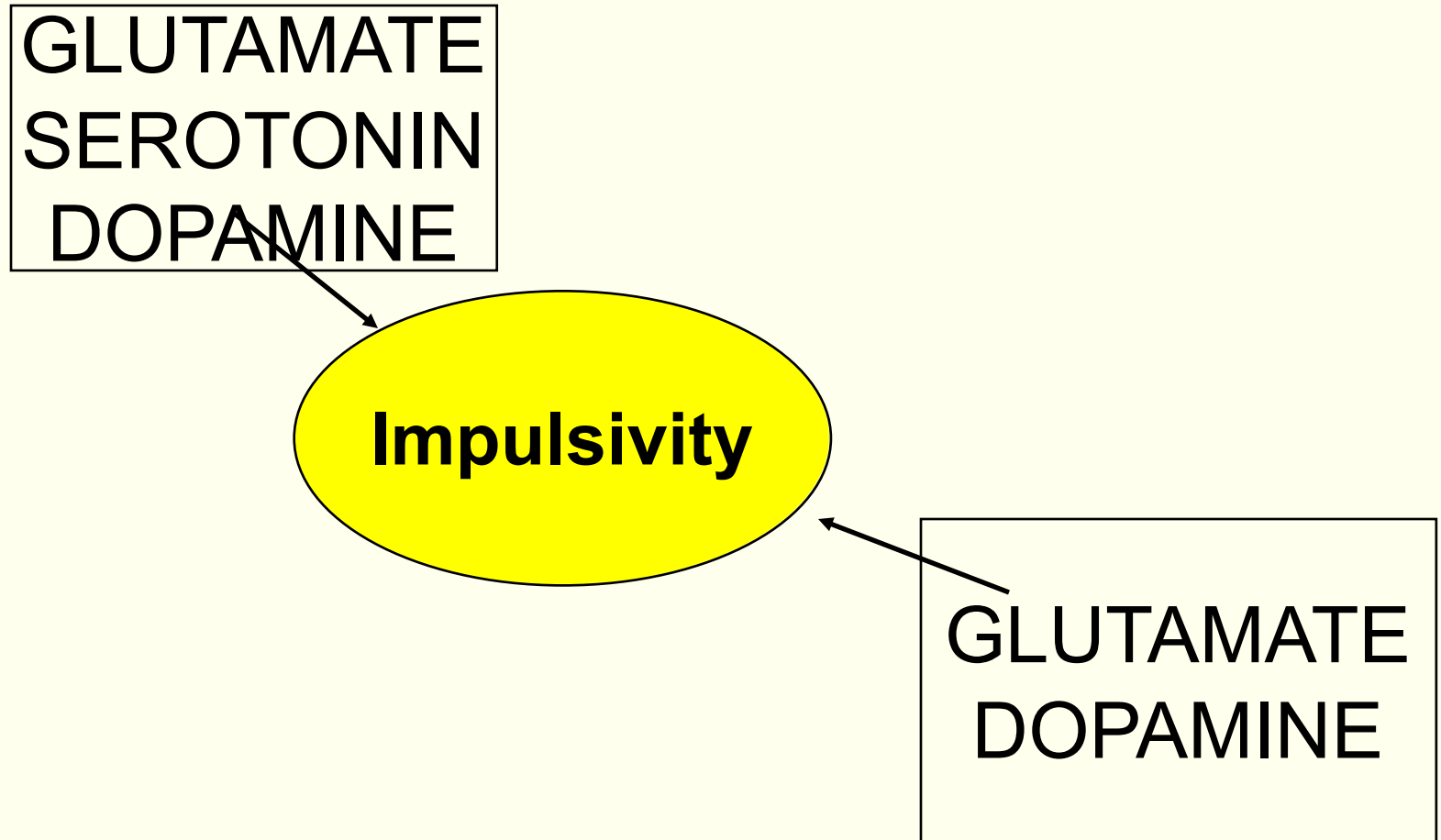


Blending Compulsivity and Impulsivity

- Similar Behavior, Disparate Cognitive Profile
 - Conflicting results suggest possible variation in neurocognition.
- ∞ A ■ Possible transdiagnostic conceptualization of behavioral addictions.



Neurochemistry of Behavioral Dyscontrol



GA High Dropout Rates

- 22.4% attended only 1 meeting,
- 15.5% attended only 2 meetings,
- 7.5% earned a 1-year abstinence pin.
- Those who stayed more likely to have initial realistic expectations of GA and a spouse in GamAnon.
- Those who dropped out more likely to endorse “controlled gambling,” and did not identify with severity of problems as other members.

Psychosocial Treatments

- Multiple controlled studies
- Cognitive Behavioral Therapy
- Sessions 1 to 16
- Increased awareness of irrational cognitions, and cognitive restructuring.
- Identification of gambling triggers and the development of non-gambling sources to compete with the reinforcers associated with gambling.