

Gambling and Other Addictive Disorders

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Disclosure Information

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 - I will discuss the following off-label use and/or investigational use in my presentation.



What is Addiction?

- **Addict (verb)** - "to devote or give (oneself) habitually or compulsively"; from Latin *addicere* - bound to or enslaved
- **Core Components of Addiction**
 - Continued Behavior Despite Adverse Consequences
 - Diminished or Lost Control / Compulsive Engagement
 - Craving or Urge State Component

Animals Studies

- Animals consume alcohol in the wild via fermenting fruits and nectar
- Animals exhibit signs of inebriation
- Darwin discussed monkeys getting drunk: "the following morning they were very cross, held their heads with both hands, and turned away from beer in disgust"

Expanding the Definition?



Source: Look Magazine, March, 1963



Behavioral Addictions?

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

Common Core Qualities of Behavioral Addictions

- Repetitive or compulsive engagement in a behavior despite adverse consequences
- Diminished control over problematic behavior
- An appetitive urge or craving
- A hedonic quality

Common Core Qualities of Behavioral Addictions

- Tolerance
- Withdrawal
- Repeated unsuccessful attempts to cut back or stop
- Impairment in major areas of life functioning
- Telescoping

Non-Substance-Related Disorders

Gambling Disorder

Gambling Disorder

A. Persistent and recurrent problematic gambling behavior leading to clinically significant impairment or distress, as indicated by the individual exhibiting four (or more) of the following in a 12-month period:

1. Needs to gamble with increasing amounts of money in order to achieve the desired excitement.
2. Is restless or irritable when attempting to cut down or stop gambling.
3. Has made repeated unsuccessful efforts to control, cut back, or stop gambling.
4. Is often preoccupied with gambling (e.g., having persistent thoughts of reliving past gambling experiences, handicapping or planning the next venture, thinking of ways to get money with which to gamble).

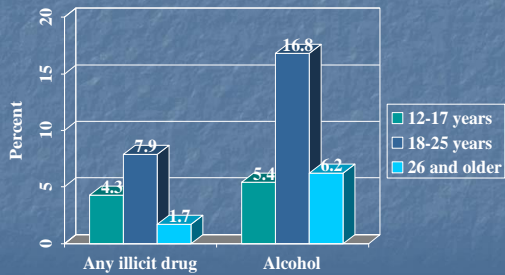
Gambling Disorder

5. Often gambles when feeling distressed (e.g., helpless, guilty, anxious, depressed). (former: gambles as a way of escaping from problems...)
6. After losing money gambling, often returns another day to get even ("chasing" one's losses).
7. Lies to conceal the extent of involvement with gambling.
8. Has jeopardized or lost a significant relationship, job, or educational or career opportunity because of gambling.
9. Relies on others to provide money to relieve desperate financial situations caused by gambling.

B. The gambling behavior is not better explained by a manic episode.

National Comorbidity Study	Past Year Rates (%) for All Ages
Anorexia	0.1
Schizophrenia / schizophreniform	1.1
Panic Disorder	1.3
Anti-social Personality	1.5
Social Phobia	1.7
Obsessive Compulsive	2.1
Dysthymia	2.5
Drug Use Disorder	2.9
Cognitive Impairment	2.9
Gambling addiction	4.0
Major Depression	5.8
Alcohol Use Disorder	7.3
Any Phobia	11.0
Any Anxiety	12.7
Any NCS disorder	28.0

Past Year Prevalence of DSM-IV Substance Use Disorders, 2007 NSDUH



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%

What Causes Addiction?

- No evidence for "addictive personality"
 - Although a number of personality disorders are associated with elevated risk for alcoholism
- Moral weakness? no evidence
- Using substances to deal with unpleasant affects: Maybe.

Self-medication

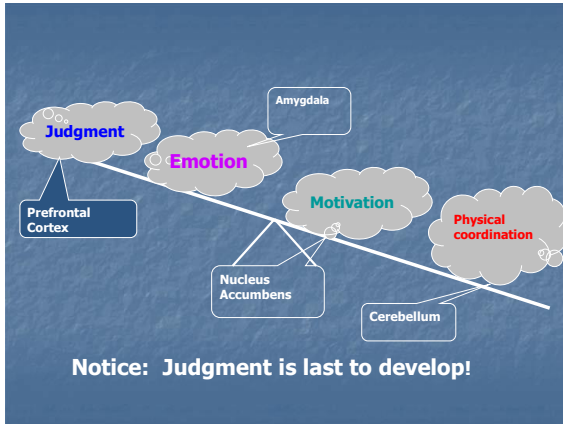
- Some psychotropic medications are available without a prescription
 - Caffeine
 - Alcohol
 - Nicotine
 - Illicit ones
- People make decisions about which ones and how much
- What can we learn about our patients from these choices?

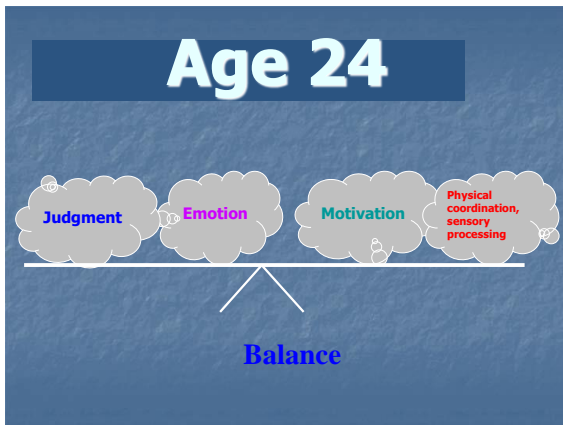
Biological Factors:

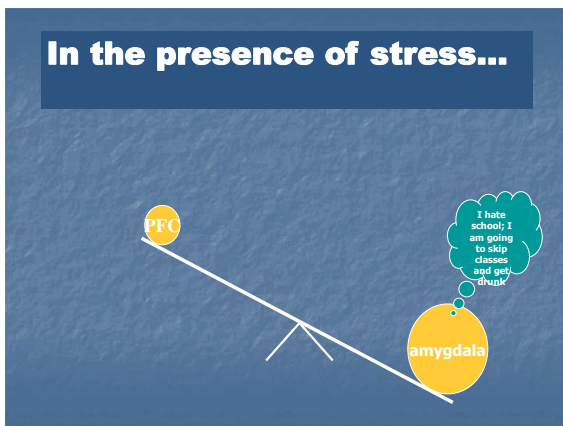
- Personality factors? (predisposing to concern about potential harm, social disapproval, attraction to new experiences)
- Metabolic factors? (e.g., increased risk to individuals with decreased subjective response to drugs or alcohol)

Developmental Biology

- Addiction generally starts in young adulthood.
- Environmental and genetic influences - vulnerability to and expression of addictive disorders
- Changes in brain structure and function during adolescence might influence the motivation to engage in risk-taking behaviors.



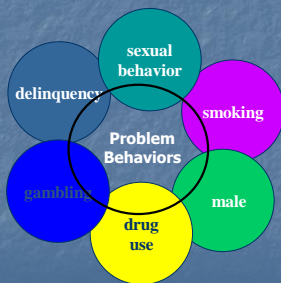




Role of Trauma

- Neglectful parenting style
- Substance users more likely to report histories of
 - physical neglect
 - emotional abuse
 - Sexual abuse

Youth Problem Behaviors



ADHD: What Role Does It Play?

Link of ADHD and drug abuse

Among children with ADHD (some with CD also),
compared to comparison...
SUD \rightarrow OR= 1.8 - 3.2

Elevated alcohol use
Elevated marijuana use
Elevated tobacco use \rightarrow OR= 2.2 - 4.6

ADHD and Gambling

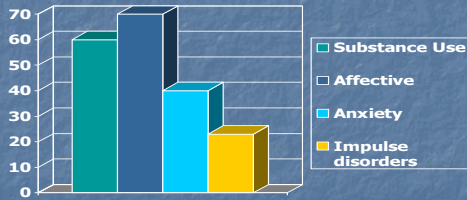
The ADHD - PG connection: adult data

	PG	non-PG
Rate of <u>childhood</u> ADHD	15-36%	4-8%

Comorbidity

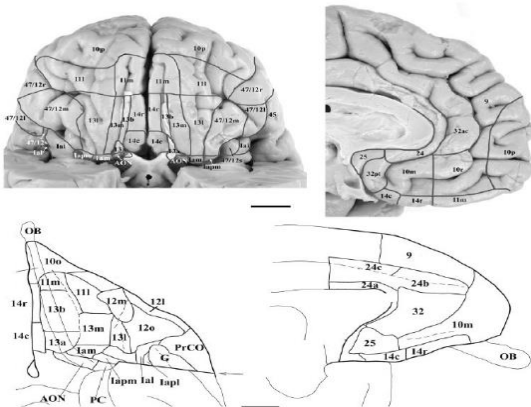
- Co-existence of 2 (or more) illnesses within the same individual
- Can be concurrent or lifetime
 - Primacy of onset can influence treatment and disease classification
- Study of comorbidity can be complicated by "secular trends" in availability (e.g Prohibition)

Co-Occurring Disorders in Pathological Gambling



Motivational Neural Circuits

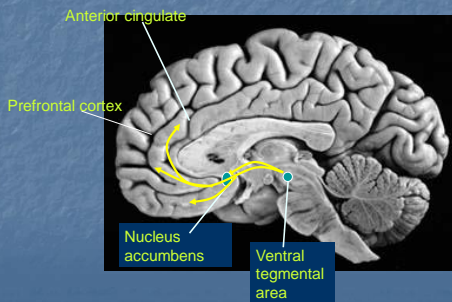
- Multiple brain structures underlying motivated behaviors.
- Motivated behavior involves integrating information regarding internal state (e.g., hunger, sexual desire, pain), environmental factors (e.g., resource or reproductive opportunities, the presence of danger), and personal experiences (e.g.,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



Dopamine and Impulsive Behaviors in Parkinson's

- Alcohol, gambling, sex, spending - Reported in Association with Parkinson's Disease
- Association Linked to Dopamine Agonist Treatment
- Prior impulse behavior and family history of addiction

Mesocorticolimbic Pathway



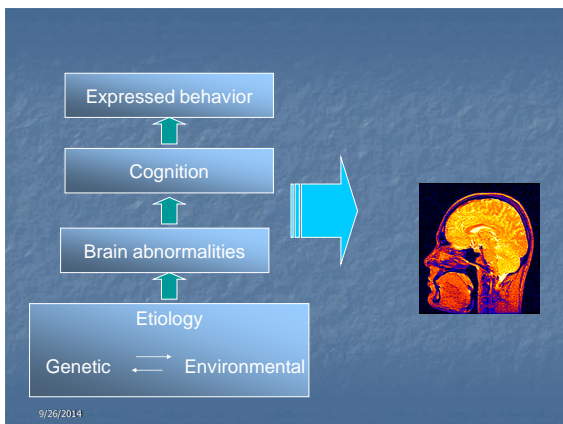
Neurocognition in Addicted Individuals

- Executive function deficits, including planning, cognitive flexibility, and inhibition greater compared to controls.
- Individuals with SUDs Discount Rewards Rapidly Over Time
- Behavioral Measures of Reward Discounting Are Associated with SUD Treatment Outcome

Genetics

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, was accounted for by risk for alcoholism.
- Additionally, 64% of the co-occurrence between gambling and alcoholism appears to be attributable to genes that simultaneously influence both disorders.



Impulsivity

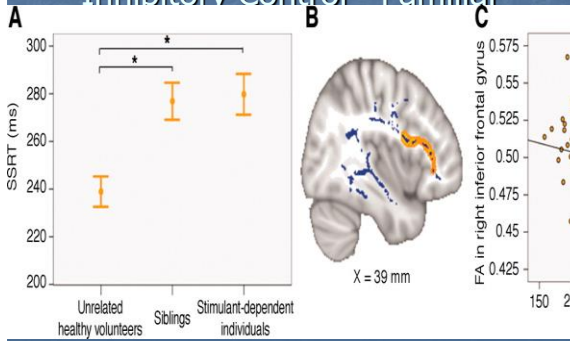
- A predisposition toward rapid, unplanned reactions to stimuli without regard to the negative consequences
- Choosing smaller immediate reward over larger delayed reward
- Impulsivity as an Endophenotype

Cognition: Early Symptom?

Comparison of No Risk (n=53) with Low-Risk (n=40) Recreational Gamblers

	No Risk	Low Risk	<i>p</i>	
CGT Overall proportion bet	0.49 ± 0.14	0.54 ± 0.13	0.093	
CGT Quality of decision making	0.97 ± 0.04	0.94 ± 0.08	0.024	*
CGT Risk adjustment	2.18 ± 1.33	1.55 ± 0.86	0.011	*

Inhibitory Control - Familial



Impulsivity as an Endophenotype

- **Impulsivity Across Psychiatric Groups**
 - Substance use disorders, impulse disorders, ADHD, bipolar disorder, personality disorders, suicidality, SIB
- **Behavioral Measures of Impulsivity**
 - Risk/Reward Assessment & Decision-Making Paradigms (Monetary Reward/Punishment, Discounting, Gambling Tasks)
 - Response Disinhibition/Attentional Paradigms (Go/No-Go, Stroop)

Implications for Treatment

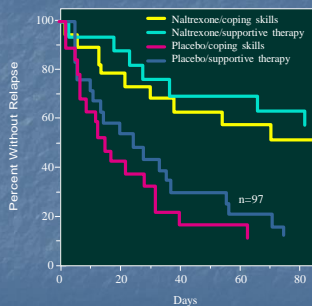
Motivation to Quit Gambling

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

Opioid Antagonists

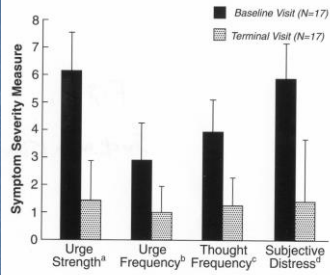
- The mu-opioid system:
 - underlies urge regulation through the processing of reward, pleasure and pain, at least in part via modulation of dopamine neurons in mesolimbic pathway through GABA interneurons.

Rates of Never Relapsing According to Treatment Group (n=97)



O'Malley et al, Arch of Gen Psychiatry, Vol 49, Nov 1992

**Figure 1. Baseline and Terminal Visit
Gambling Symptom Ratings**
(Carry Forward Paired t-test)



^a 0=None, 2-Mild, 4-Moderate, 6-Severe, 8-Extreme. Significantly different ($p=0.001$).

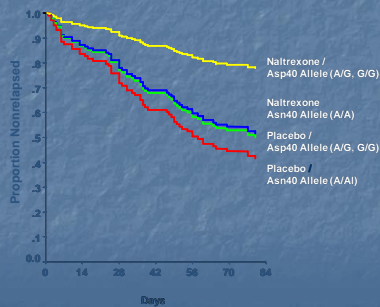
^b 0=None, 1=Once a day, 3=Three times a day, 5=Five times a day, 6=More than five times a day. Significantly different ($p=0.001$).

^c 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 ($p=0.001$).

^d 0=None, 2-Mild, 4-Moderate, 6-Severe, 8-Extreme. Significantly different ($p=0.001$).

* Bonferroni corrected

Relapse Rate by Genotype



Analysis of Maximum Likelihood Estimates (N=282)

Variable	Parameter Estimate	Standard Error	Chi-Square	Pr>ChiSq	Hazard Ratio
FH-AUD	0.55	0.24	7.53	0.006	1.74

Baseline urges were significantly associated with response to higher doses of opiate antagonists (parameter estimate = 1.77; SE= 0.84; Wald $\chi^2 = 4.41$; $p = .036$; HR= 5.86; HR 95% CI=1.12-30.6

Psychotherapy

- Cognitive therapy
- Imaginal desensitization
- Family/couples therapy

Cognitive Behavioral Therapy

- Cognitive aspects: psychoeducation, increased awareness of irrational cognitions, and cognitive restructuring.
- Behavioral techniques: identification of gambling triggers, development of non-gambling sources to compete with the reinforcers associated with gambling.

Special Issues

- Depression and suicidality
- Bipolar disorder
- Schizophrenia

Conclusions

- Disordered Gambling and Addictions may all share core biological aspects
- Data suggest pharmacotherapy and psychotherapy often helpful.
- Cognition, genetics, imaging – may assist in subtyping to further refine treatment approaches.

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