Gambling and Other Addictive Disorders

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

Disclosure Information

- I have the following financial relationships to disclose:
  - My research is supported by NIMH and the NCRG
  - Grant/Research support from: Forest and Roche Pharmaceuticals
  - 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?
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

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).

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

<table>
<thead>
<tr>
<th>Disorder</th>
<th>Past Year Rates (%) for All Ages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anorexia</td>
<td>0.1</td>
</tr>
<tr>
<td>Schizophrenia / schizophreniform</td>
<td>1.1</td>
</tr>
<tr>
<td>Panic Disorder</td>
<td>1.3</td>
</tr>
<tr>
<td>Anti-social Personality</td>
<td>1.5</td>
</tr>
<tr>
<td>Social Phobia</td>
<td>1.7</td>
</tr>
<tr>
<td>Obsessive Compulsive</td>
<td>2.1</td>
</tr>
<tr>
<td>Depresnia</td>
<td>2.5</td>
</tr>
<tr>
<td>Drug Use Disorder</td>
<td>2.9</td>
</tr>
<tr>
<td>Cognitive Impairment</td>
<td>2.9</td>
</tr>
<tr>
<td>Gambling addiction</td>
<td>3.0</td>
</tr>
<tr>
<td>Major Depression</td>
<td>3.8</td>
</tr>
<tr>
<td>Alcohol Use Disorder</td>
<td>7.3</td>
</tr>
<tr>
<td>Any Phobia</td>
<td>11.0</td>
</tr>
<tr>
<td>Any Anxiety</td>
<td>22.7</td>
</tr>
<tr>
<td>Any NCS disorder</td>
<td>28.0</td>
</tr>
</tbody>
</table>
Past Year Prevalence of DSM-IV Substance Use Disorders, 2007 NSDUH

<table>
<thead>
<tr>
<th>Group</th>
<th>Percentage</th>
<th>Range</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult</td>
<td></td>
<td>&lt;1 - 2%</td>
<td>0.9%</td>
</tr>
<tr>
<td>Adolescent</td>
<td></td>
<td>1 - 9%</td>
<td>6%</td>
</tr>
<tr>
<td>Adolescent-Drug Tx</td>
<td></td>
<td>9 - 13%</td>
<td>11%</td>
</tr>
</tbody>
</table>

Estimates of Problem Gambling—Past Year

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.
Notice: Judgment is last to develop!

Age 24

In the presence of stress...

I hate school; I am going to skip classes and get drunk.
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...

- Elevated alcohol use: OR = 1.8 - 3.2
- Elevated marijuana use: OR = 2.2 - 4.6
- Elevated tobacco use

ADHD and Gambling
The ADHD - PG connection: adult data

- ADHD - PG: non-PG
- Rate of childhood ADHD: 15-36% vs. 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

- Anterior cingulate
- Prefrontal cortex
- Nucleus accumbens
- Ventral tegmental area

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?

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

<table>
<thead>
<tr>
<th>Treatment Group</th>
<th>Days</th>
<th>Percent Without Relapse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naltrexone/coping</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Placebo/coping</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Naltrexone/supportive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Placebo/supportive</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Baseline urges were significantly associated with response to higher doses of opiate antagonists (parameter estimate = 1.77; SE = 0.84; Wald χ² = 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.

jongrant@uchicago.edu