What If We Ignore The Food Addiction Question?

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Food Addiction
Why discuss Food Addiction?

• Food Addiction is a large contributing factor on obesity and has profound impact on personal well-being and on the demand for health care.

• Obesity has reached pandemic levels.

• It is critical to understand food addiction, and how the brain interacts with an obesogenic environment.

• Fast-growing consensus that obesity might be understood within the same neurobiological framework as addiction.

• Research, investigation and treatments for obesity should be shaped according to theory for food addiction.

• Food addiction presents in multiple populations, shapes, sizes, etc.
Overeating and Food Addiction has increased the incidence of Obesity. Currently, there exists a global epidemic of obese individuals; this affects children, adolescents and adults.

- 1960 women ages 20 – 29 averaged 128 lbs.  BMI 21.3
- 1960 women ages 40 – 49 averaged 142 lbs.  BMI 23.6
- 2013 women ages 20 - 29 averaged 166 lbs.  BMI 27.6
- 2013 women ages 40 – 49 averaged 178 lbs.  BMI 29.6
Children

- Childhood obesity has more than doubled in children and quadrupled in adolescents in the past 30 years.

- The percentage of children aged 6–11 years in the United States who were obese increased from 7% in 1980 to nearly 18% in 2012.

- Similarly, the percentage of adolescents aged 12–19 years who were obese increased from 5% to 21% over the same period.

- In 2012, more than one third of children and adolescents were overweight or obese.
Food Addiction: Health Care Implications
What’s the Matter With Our Diet?

Depression

• Other Mood Disorders
• Autoimmune Diseases
• Nutrient Deficiencies
• Increased Cravings
• $60 Billion diet industry guaranteed return clients
What’s Happening?

• There is a direct correlation between the rise in prevalence of overweight and obesity and the aggressive marketing and increased availability and consumption of refined foods over the same period.

• This phenomenon is similar to that observed when tobacco use was coupled with reduced prices and aggressive advertising.
Normal Appetite/Weight Regulation

Physiologic Response

- Brain receives incoming signal of energy levels which fluctuate throughout the day.
  - Grehlin: increases to allow us to eat
  - Leptin/Insulin: decrease our appetites
Normal Appetite/Weight Regulation
Hedonic Response

- Hedonic (Pleasure/Reward Based System):
- Designed to ensure that there is a continued drive to consume food—a motivation/desire to eat.
- A desire to search and seek foods for survival
  - Encourages us to eat palatable foods
  - Attentional Bias—Rewarding stimuli and rewarding foods.

- Activates our Dopamine/Pleasure Reward System
Food Intake

- **Physiologic**
  - Grehlin
  - Leptin-Insulin
  - Opioids and Cannabinoids
  - Dopamine

- **Hedonic**
  - Palatable Foods
    - “Bliss Chemicals” (Endogenous)

- Dopamine
Chemical Dependency

• Drugs of abuse and Alcohol “highjack” the brain.
• These drugs and Alcohol do not become addictive until they are extracted and concentrated by modern industrial processes.
• Examples: Cocoa leaves - Cocaine
              Distilled grains, fruits, potatoes - Alcohol
              Dried Tobacco - Nicotine
Unnatural and Excessive Brain Reward

- Highly Processed Foods.
- High in Fats.
- High in Sugars.
- Salty Snacks.
  - Desserts, chips, bread and butter, pasta, fast foods

Avena et al., 2009
Portion Distortion

20 Years Ago

- 270 calories 5 cups
- 500 calories
- 390 calories 1 ½ cups

Today

- 630 calories 11 cups
- 850 calories
- 790 calories 3 ½ cups
Hungry For Change

- http://www.youtube.com/watch?v=3MvAM97VDE8&feature=youtu.be
What Foods are Most Addicting?

Those that raise dopamine levels the highest or fastest. (the most seductive!)

Sugar and other refined sweeteners, soft drinks
Other refined carbohydrates such as flour, refined breakfast cereals, frozen potatoes
Fat
Salt
Caffeine
Maximizes Hedonic Value of Foods

- High concentration of potent ingredients.
- Combining ingredients to ensure maximum consumption...
  Bliss Point. (extreme pleasure and desire to consume)
- Multisensory. Soft, crunchy, creamy, sour, layering of foods and spices and flavors and textures
- Large Portions – portion distortion-encourage people to eat more.
- Marketing Magic. .Color, Variety, Shapes, $Add Ons

- Kessler 2009, The End of Overeating
Food Industry

Examples?

Comments?
Food Addiction

• Consumption of palatable foods induces the release of Bliss Chemicals (opioids and cannabinoids that work in concert with dopamine to activate the brain’s reward system, producing powerful reinforcement.

Obesity, by Elliott Blass
Food Addiction:
a proposed cause of obesity

Food Addiction Theory

This theory proposes that people can become addicted to food, in ways similar to the way some people are addicted to drugs.

Food addiction can lead to overeating, which can result in an increase in body weight or obesity in some individuals.

Clinical accounts in which self-identified food addicts use food to self-medicate.

Eat to self-regulate.

Eat to fill a basic human need they are deprived of.
View 1- Certain foods operate like addictive substances in that they engage brain systems and produce behavioral adaptations comparable to those engendered by drugs of abuse.

View 2- Food addiction is a behavioral phenotype that is seen in a subgroup of people with obesity and resembles drug addiction.
Addiction- a complex disorder

3 stages of food addiction model

Bingeing- a bout of intake in a relatively short period of time, typically following abstinence or deprivation.

Withdrawal- signs can become apparent when the abused substance is no longer available or chemically blocked.

Craving- occurs when the motivation to obtain a certain substance is enhanced, usually after a period of prolonged abstinence.
Criteria pertaining to substance abuse have been applied to food addiction.

Yale Food Addiction Scale

Clinical studies have shown (Avena, 2010) that food craving in normal weight and obese patients activates areas of the brain similar to those indicated in drug craving.
Evidence of Food Addiction

5 key pieces of evidence

1. Clinical similarities between obesity (BED, specifically) and drug addiction.

2. Evidence of shared vulnerability to both obesity and substance addiction.

3. Evidence of tolerance, withdrawal and compulsive food-seeking in animal models of overexposure to high-sugar and/or high-fat diets.

4. Evidence of lower levels of striatal dopamine receptors (like drug addiction patients) in obese individuals.

5. Evidence of altered brain responses to food-related stimuli in obese individuals compared with non-obese control in imaging studies.
<table>
<thead>
<tr>
<th>Comorbid Symptom/Diagnostic Criteria</th>
<th>Substance Dependence</th>
<th>Binge Eating Disorder/Food Addiction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Escalation of Use</strong></td>
<td>The substance is taken in larger amounts or over a longer period than intended</td>
<td>Eating large amounts of food when not feeling physically hungry.</td>
</tr>
<tr>
<td><strong>Loss of Control</strong></td>
<td>There is a persistent desire or unsuccessful effort to cut down or control substance use.</td>
<td>A sense of lack of control during the episodes, e.g., a feeling that one can’t stop eating or control what or how much one is eating.</td>
</tr>
<tr>
<td><strong>Social Consequences</strong></td>
<td>Important social, occupational, or recreational activities are given up or reduced because of use.</td>
<td>Eating alone because of being embarrassed by how much one is eating. Activities are given up due to a medical condition associated with obesity or fear of rejection because of obesity.</td>
</tr>
<tr>
<td><strong>Personal Distress</strong></td>
<td>The substance use is continued despite knowledge of having a persistent physical or psychological problem that is likely to have been caused or exacerbated by the substance.</td>
<td>Feeling disgusted with oneself, depressed, or feeling very guilty after overeating; marked distress regarding binge eating; eating until feeling uncomfortably full.</td>
</tr>
<tr>
<td><strong>Tolerance</strong></td>
<td>Increasing amounts of drug are required to reach intoxication</td>
<td>Increasing amount of food are required to reach satiety.</td>
</tr>
<tr>
<td><strong>Withdrawal</strong></td>
<td>On drug discontinuation, includes dysphoria and autonomic symptoms such as shakes and sweats.</td>
<td>Distress and dysphoria during dieting.</td>
</tr>
<tr>
<td><strong>Time</strong></td>
<td>A great deal of time is spent on getting the drug, using the drug or recovering from it.</td>
<td>A great deal of time is spent eating</td>
</tr>
<tr>
<td><strong>Continued Use Despite Consequences</strong></td>
<td>Substance use is continued despite knowledge of having a persistent or recurrent physical or psychological problem caused or exacerbated by the drug.</td>
<td>Overeating is maintained despite knowledge of adverse physical and psychological consequences caused by excessive food consumption.</td>
</tr>
</tbody>
</table>
Well let’s compare it to another form of addiction...

Let’s first take a look at the DSM Criteria for Substance Abuse and Dependence...
A. A maladaptive pattern of substance use leading to clinically significant impairment or distress, as manifested by one (or more) of the following, occurring within a 12-month period:
- recurrent substance use resulting in a failure to fulfill major role obligations at work, school, or home
- recurrent substance use in situations in which it is physically hazardous
- recurrent substance-related legal problems
- continued substance use despite having persistent or recurrent social or interpersonal problems caused by or exacerbated by the effects of the substance

B. The symptoms have never met the criteria for substance dependence for this class of substance.
A maladaptive pattern of substance use leading to clinically significant impairment or distress, as manifested by **three (or more)** of the following, occurring within a 12-month period:

- **Tolerance**, as defined by either of the following:
  
  - a. a need for markedly increased amounts of the substance to achieve intoxication or desired effect
  
  - b. markedly diminished effect with continued use of the same amount of the substance

- **Withdrawal**, as manifested by either of the following:
  
  - a. the characteristic withdrawal syndrome for the substance (refer to Criteria A and B of the criteria set for opioid dependence)
  
  - b. the same (or a closely related) substance is taken to relieve or avoid withdrawal symptoms

- The substance is often taken in larger amounts or over a longer period than was intended.

- There is a persistent desire or unsuccessful efforts to cut down or control substance use.

- A great deal of time is spent in activities necessary to obtain the substance, use the substance, or recover from its effects.

- Important social, occupational, or recreational activities are given up or reduced because of substance use.

- The substance use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by the substance.

- **Specify if:** With Physiological Dependence: evidence of tolerance or withdrawal

- Without Physiological Dependence: no evidence of tolerance or withdrawal
Addiction and Food

"I suffer from overeating and manic depression."

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Okay.... So how are they related?

Let’s first break it down into the Disease Model...
The Disease Concept: Applied to Substance Abuse

- Primary, progressive, chronic disease
- Family disease
- Dependence and withdrawal symptoms
- Complex etiology: bio-psycho-social-spiritual
- Relapsing course is common
- Some effects of the disease are irreversible (Cirrhosis – can prevent further damage but cannot reverse; “Wet Brain” deficiency of thiamine which is also known as vitamin B1 related to alcohol abuse)
- Potentially Fatal
- Full and sustained recovery is real and possible for the patient and the family (through treatment and therapy)
The Disease Concept: Applied to Eating Disorders/ Food Addiction

- Primary, progressive, chronic disease
- Family disease
- Dependence and withdrawal symptoms (??)
- Complex etiology: bio-psycho-social-spiritual
- Relapsing course is common
- Some effects of the disease are irreversible (osteoporosis, scarring)
- Potentially Fatal—significant morbidity/mortality: AN mortality rate of 5% per decade of illness, with 50% of deaths occurring by suicide (Sullivan 1995)
- Full and sustained recovery is real and possible for the patient and the family, also through treatment and therapy
National Center on Addiction and Substance Abuse (CASA)

• At Columbia University
• Constructed one of the first comprehensive studies on the link between SA and ED
  - Reveals that up to **50% of individuals with EDs also abuse alcohol or illicit drugs**, compared to 9% of the general population.
  - Up to **35% of alcohol or illicit drug abusers have eating disorders** compared to 3% of the general population.
Parallels Between Chemical Dependency and Food Addiction

In an article by Carolyn Ross, MD MPH, she stated “8 surprising parallels between food and drug addiction”

1. Effect on the Brain’s Reward System
2. Intense Cravings
3. Tolerance and Withdrawal
4. Denial
5. Repeated Attempts to Quit Unsuccessfully
6. Stigma
7. Continuing Behavior in Spite of Negative Consequences
8. Prevalence of Co-Occurring Disorders
Effects on the Brain Reward System:

- The American Society of Addiction Medicine (ASAM) continues to broaden their definition of addiction, now including “process addictions” such as sex, gambling and food, due to the impact these have on the brain.
- Drugs, food and behaviors can flood the brain with dopamine causing increased pleasure and less self-control.
- Over time the structure of the brain can actually change, impacting the body's natural functioning on dopamine release and/or uptake.
  - Making things less enjoyable, but more desirable.
- Certain foods high in fat and sugar release endogenous opioids.
Parallels Between Chemical Dependency and Food Addiction

Intense Cravings

• Due to brain changes, compulsive eaters may have cravings for junk food (salty, high calorie processed foods) for their next “high” – similar to addicts
  - In rat studies the animals showed tendencies to binge of sugary drinks when available.

• Brain Imaging
  - Pleasure and reward system ‘light-ups’ in both cocaine addicts and food addicts
  - fMRI
Tolerance and Withdrawal

• More visible in drug addiction (shakes, tremors, DT, nausea, vomiting, etc...)
• Rat studies show the animal having strong desire for larger amounts of sugary or fatty foods...
• They also exhibited anxiety and tremors when these foods were withheld
• Commonly seen in humans → Irritability, agitation, anxiety.
  - **more seen with heavy processed foods with high sugar and fat content.
Parallels Between Chemical Dependency and Food Addiction

Denial

• While many drug addicts stay in denial in the form of “it’s not that bad...” or “I can stop when I want.”
• Many food addicts will say “I just like to eat...” or “it’s not that much food anyways...”
• Research shows that Americans continue to underestimate the number of calories they eat and how much they weigh
• BOTH require a change in behaviors and routines to see results
Parallels Between Chemical Dependency and Food Addiction

Multiple Unsuccessful Attempts to Quit or Cut Down

- Both have significant tendencies for relapse
  - ~95% of people who lose weight will gain it back!
  - Ex. Gastric Bypass
- Relapse happens not only in use of substance (food or drug) but through **behavioral changes** as well!
  - Hiding, manipulating, defenses, etc.
Parallels Between Chemical Dependency and Food Addiction

Stigma

• Coming from many sources:
  - Society
  - Media
  - Family & Friends

• Leads to secrecy, guilt, shame, embarrassment

• Medical providers do not have the education or training on how to properly intervene

• Drug abuse carries a strong stigma but weight bias is prevalent in schools, health-care and work!
Parallels Between Chemical Dependency and Food Addiction

Continued Use Despite Negative Consequences

- Can have many consequences but the person may not be able to stop... loss of control!
- Drug addiction: legal issues, family and relationship, loss of job
- Food addiction: heart disease, diabetes, obesity, relationship issues, high cholesterol or blood pressure, lower immune system
Parallels Between Chemical Dependency and Food Addiction

Prevalence of Co-Occurring Disorders

- Approx 50% with drug addiction/ substance dependence also have co-occurring issues, such as depression, anxiety, ADD/ADHD
- Toronto York University found that it is common for compulsive eaters to also have depression and/or ADD/ADHD
- New research also finds that social anxiety and eating disorders have higher co morbidity rates.
What about other commonalities?
Shared Risk Factors

- Occur in times of transition or stress
- Common brain chemistry
- Common family history
- Low self esteem
- Depression, anxiety, impulsivity
- History of sexual abuse, physical abuse and/or neglect
- Unhealthy parental behaviors and low monitoring of children's activities
- Unhealthy peer norms and social pressures
- Susceptibility to messages from media
Other Similarities...

- Trauma history is common in women with eating disorders and those with substance abuse
- Body dissatisfaction
- Spiritual void/emptiness
  - Great deal of time spent thinking about or engaging in the behavior
- Withdrawal symptoms including HA, irritability, restlessness, insomnia, depressed mood, SI
- Need for increased amounts of the substance or behavior

- Addiction model: “trigger” foods, compulsive exercise, compulsive restricting/starving, adrenaline/endorphin release associated with starvation and with purging
- Limited affect tolerance and affect regulation skills
Similarities--Cortical Hypofrontality:

- Reduced baseline activity of several regions of frontal cortex, as inferred from brain imaging studies in substance abuse and eating disorders
- Clinical manifestations of brain changes in prefrontal cortex:
  - Problems with working memory, attention and behavioral inhibition
  - Impulsivity (acting on sudden urges to take a drug/food/behavior)
  - Compulsivity (driven by irresistible inner forces to take a substance/repeat a behavior)
  - Frame shifting difficulties

**Remember our frontal lobe area is utilized for decision making/problem solving, rational thinking, and impulse control...and motor functioning.**

But aren't there differences too?
Differences

- Definition of abstinence requires a high level of clinical sophistication—we all need to eat
- Individualized and flexible definition of abstinence from ED behaviors
- Individualized boundaries around food behaviors, food types, meal plans
- Body image distortions more extreme
- More of an impact of media/culture of development of eating disorders
- Greater female to male prevalence ratio
Differences

• More stigma, particularly for the obese and for males
• Less recognition of ED and Food Addiction as brain diseases with genetic and biochemical components:
  – “They just need to eat”
  – “They just need to stop eating so much”
  – “They just need to stop throwing up.”
• More denial around impairment on social, emotional, cognitive and spiritual functioning of patients with active eating disorders
• Different physical signs and symptoms (but multi-organ impairments in each)
• Less availability of 12 step support groups for Food and Mood issues (OA, EDA, ABA)
Mediators of Energy Balance and Body Weight

Physical Environment
- Food Access
- Access to Physical Activity

Food Environment
- Availability
- Palatability
- Portion Size
- Energy Density

Energy Expenditure
- Physical Activity

Environmental Influences
- Advertising
- TV watching
- Parental and societal influences
- Media

Appetite and satiety
- Impaired satiety signaling
- Insensitivity to hunger and fullness
- Eating rate

Individual Personality, Predispositions, Reward Circuitry
- Early Developmental Programming
- Genetic factors
- Reward Sensitivity
- Impulsivity
- Abnormal Eating
- FOOD ADDICTION
Multidisciplinary Approach to Obesity Treatment

- Biopsychosocial
- Behavioral Health
- Nutrition
- Physical Activity
- Medicine
Multidisciplinary Approach to Obesity Treatment

• Nutrition:
  – Healthy meal planning
  – Nutrient Density
    • You are what you eat
  – Individualized
Multidisciplinary Approach to Obesity Treatment

Behavioral Health:

- Cognitive Behavioral Therapy
- Food as a metaphor
- Experiential Therapies
- 12-Step Program
Articles and Research!!

- Associated with both substance related disorder and eating disorder
- Many shared neural and hormonal pathways
- Distinct differences
- fMRIs of obesity and drugs of abuse show same characteristics
- Acquired drive with respect to motivation and incentive


- Shows researchers work is consistent with the suggestion of foods and drugs competing for reward sites in the brain
- Overeating and obesity may act as protective factors against drug reward and addiction
- We have found inverse relationship between obesity and alcohol use; also marijuana use; BMI goes up and use goes down
- Need more hypothesis-driven research

Questions?