Psychological Determinants of Abnormal Nutritional Habits and Obesity

Food Addiction Construct

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Obesity

P4-Neurocognition
Environmental and biological risk factors

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Dra. Frühbeck
Dr. Fernandez-Real
Dr. Pintó
Dr. Fernandez-Aranda
Dra. Fito/ Dr. De la Torre
Dr. Serra-Majem
Dr. Tinahones
Food Addiction Topic
Historical remarks

Jiménez-Murcia, Dublin, 2019

- Food addiction to corn, wheat, coffee, milk, eggs, and potatoes (Randolph, 1956)
- Overeaters Anonymous
- Chocolate addiction (Bruinsma & Taren, 1999; Hetherington & Macdiarmid, 1993; Tuomisto et al., 1999)
- Animal models of sugar and fat bingeing (Avena et al., 2008; Johnson & Kenny, 2010)

- Addiction-like eating and addictive personality in bulimia (Feldman & Eysenck, 1986; de Silva & Eysenck, 1987)

- Anorexia as starvation dependence (Szmukler, 1984; Marrazzi & Luby, 1986)

- Brain imaging studies in obesity and BED (Wang et al., 2001)

- Assessment of food addiction (Gearhardt et al., 2009)

Meule, 2015
Food Addiction Topic
Publications’ Trend

Fernandez-Aranda, EEDR, 2018
Obesity and Addictive Processes

Jimenez-Murcia, Dublin, 2019

Transdiagnostic

Obesity

Compulsive

Impulsive

OCD
AN-R
AN-BP
BN/BED
Kleptomania
Other ICDs
Compulsive buying
Gambling Disorder
Food Addiction
ADHD
SUD

Compulsive buying

Obesity and Addictive Processes

Jimenez-Murcia, Dublin, 2019
FA transdiagnostic construct

Jiménez-Murcia, Dublin, 2019

- FA
- AN
- BED
- BN
- OBE
- SUD
- OSFED
- GD
- HC

Prevalence studies:
- FA transdiagnostic construct
- FA
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Food Addiction Construct

Conceptual Flaws

Do we know exactly what we are talking about?
Biopsychosocial model of FA

Are trans diagnostic models of eating disorders fit for purpose? A consideration of the evidence for food addiction

Janet D'Onofrio | Monica Leslie | Karyn Chara | Fernando Fernández-Anadú

Abstract

Food addiction combines with food restriction to heighten the incentive salience of food cues. Chronic stress and problems in interpersonal relationships result in a paucity of other sources of reward. The intermittent consumption of high GI foods results in glucose flux. Glucose flux is exacerbated by purging and insulin omission. Over time, a stimulus-response association is formed between food cues and binging, thus entrenching the compulsive nature of binge eating.

1. Genetic susceptibility to food addiction combines with food restriction to heighten the incentive salience of food cues.
2. Chronic stress and problems in interpersonal relationships result in a paucity of other sources of reward.
3. The intermittent consumption of high GI foods results in glucose flux.
4. Glucose flux is exacerbated by purging and insulin omission.
5. Over time, a stimulus-response association is formed between food cues and binging, thus entrenching the compulsive nature of binge eating.
Food Addiction and ED/Obesity

Current Facts

Jiménez-Murcia, Dublin, 2019

- Neuroimaging studies suggest that similar neuronal circuits, modulated by dopamine, are activated in addiction and obesity.
- YFAS scale is the first validated tool, based on the 7 substance dependence criteria (3 out of 7).
- FA rarely in HC (2-12%) and mainly present in obesity, BN and BED.
- FA associated with higher ED severity and psychopathology.
- FA most likely improves when BN symptoms remit.
- However, food addiction remains a highly controversial and heavily debated issue.
DSM 5 Criteria for Substance Dependence

Jiménez-Murcia, Dublin, 2019

Substance use leading to 3 or more of the following:

1. Tolerance
2. Withdrawal
3. More substance taken than intended
4. Persistent desire or effort to cut down
5. Great deal of time spent acquiring, using or recovering from the effects of substance
6. Important activities given up because of use
7. Continued use despite persistent problems
Food Addiction Construct

Jiménez-Murcia, Dublin, 2019

- FA diagnosis according to a scale (YFAS and YFAS 2.0) based on SUD criteria (DSM-IV and DSM5).
- Collinearity of FA with other well established disorders (e.g. ED).
- FA associated with ED severity, higher psychopathology and BMI.
- Lack of internal validity when considering other abnormal eating patterns (emotional eating, grazing, hyperphagia).
- Lack of biomarkers and biological evidence.
Food Addiction and ED

Current Facts

Jiménez-Murcia, Dublin, 2019

Bar chart showing consumption of different foods by individuals with and without food addiction (FA). The chart includes data for chocolate, ice cream (Eis), biscuits, bread, and pasta. The categories are divided into two groups: FA (N=227) and Non-FA (108).
Food Addiction and ED

RESEARCH ARTICLE

Food Addiction in a Spanish Sample of Eating Disorders: DSM-5 Diagnostic Subtype Differentiation and Validation Data

Roser Granero¹,², Ines Hilker³, Zaida Agüera⁴, Susana Jiménez-Murcia²,³,⁴, Sarah Sauchelli², Mohammed A. Islam², Ana B. Fagundo²,³, Isabel Sánchez³, Nadine Riesco³, Carlos Dieguez²,⁵, José Soriano⁵, Cristina Salcedo-Sánchez⁶, Felipe F. Casanueva²,⁷, Rafael De la Torre²,⁸, José M. Menchón³,⁴,⁹, Ashley N. Gearhardt¹⁰ & Fernando Fernández-Aranda²,³,⁴*

Granero et al., European Eating disorders Review, 2014; 22-6

40 AN
54 BN
18 EDNOS
13 BED
82 HC
### Food Addiction and ED

#### Personality Traits Associated

<table>
<thead>
<tr>
<th></th>
<th>Adjusted means; SD</th>
<th>ANOVA (adjusted by age and ED subtype)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FA=negative n=70</td>
<td>FA=positive n=208</td>
</tr>
<tr>
<td>TCI-R: Novelty seeking</td>
<td>100.57 15.07</td>
<td>100.89 15.83</td>
</tr>
<tr>
<td>TCI-R: Harm avoidance</td>
<td>113.89 19.54</td>
<td>120.91 21.08</td>
</tr>
<tr>
<td>TCI-R: Reward dependence</td>
<td>99.44 16.89</td>
<td>101.82 15.62</td>
</tr>
<tr>
<td>TCI-R: Persistence</td>
<td>106.18 18.37</td>
<td>106.52 22.68</td>
</tr>
<tr>
<td>TCI-R: Self-directedness</td>
<td><strong>125.03 21.63</strong></td>
<td><strong>115.08 20.46</strong></td>
</tr>
<tr>
<td>TCI-R: Cooperativeness</td>
<td>136.71 17.33</td>
<td>134.28 16.24</td>
</tr>
<tr>
<td>TCI-R: Self-Transcendence</td>
<td>63.53 13.28</td>
<td>64.09 14.27</td>
</tr>
<tr>
<td>UPPS: lack premeditation</td>
<td>23.58 6.08</td>
<td>23.49 6.24</td>
</tr>
<tr>
<td>UPPS: lack perseverence</td>
<td><strong>21.39 5.45</strong></td>
<td><strong>23.49 5.96</strong></td>
</tr>
<tr>
<td>UPPS: sensation seeking</td>
<td>26.94 8.01</td>
<td>24.71 8.80</td>
</tr>
<tr>
<td>UPPS: positive UR</td>
<td>26.94 8.79</td>
<td>28.99 8.99</td>
</tr>
<tr>
<td>UPPS: negative UR</td>
<td><strong>29.50 6.70</strong></td>
<td><strong>34.20 6.56</strong></td>
</tr>
<tr>
<td>EDI-2: Total score</td>
<td>80.52 42.94</td>
<td>107.86 42.99</td>
</tr>
<tr>
<td>SCL-90R: PTSD score</td>
<td>2.04 0.55</td>
<td>2.42 0.58</td>
</tr>
</tbody>
</table>

FA: food addiction screening. ED: eating disorder. MD: mean difference. \( \eta^{2} \): Partial \( \eta^{2} \).

\(^{1}p\): includes Bonferroni-Finner correction for multiple statistical comparisons.

Bold: significant comparison (.05 level). *Bold: moderate (\(|d|>0.50\)) to high (\(|d|>0.80\)) effect size.

Wolz et al., Frontiers in Psychology, 2016
Food Addiction and ED

Current Facts

A comprehensive model of food addiction in patients with binge eating symptomatology: The essential role of negative urgency

Similarly to Beh. addictions
Gambling Disorder and Food Addiction

30% females vs. 6% males

N=458 GD
Food Addiction among ED and GD

Granero et al., Frontiers in Psychiatry, 2018
Psychoeducational GT for BN and Food Addiction

Structure and design

Jiménez-Murcia, Dublin, 2019

6 WEEKLY SESSIONS
90 MIN. DURATION
8-10 PATIENTS

Goals:
• General information about Bulimia nervosa, negative consequences
• Nutritional patterns and monitoring
• Self-management concerning binge eating and vomits
• Cognitive rationale
• Problem solving strategies
• Response prevention strategies

Results

Comparison pre-post average scores on FA criteria

N=66 BN


<table>
<thead>
<tr>
<th>FA: total criteria</th>
<th>Pre-therapy</th>
<th>Post-therapy</th>
<th>Pre-post comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td></td>
<td>6.13</td>
<td>1.13</td>
<td>5.02</td>
</tr>
</tbody>
</table>

*Note. SD: standard deviation. MD: mean difference/change pre-post.

*Bold: significant pre-post change. †Bold: moderate ([d]>0.50) to high effect size ([d]>0.80).
### Results

**Comparison pre-post average scores on FA positive scores and sub scales variation**

| Criteria                                                                 | Pre-treatment (%) | Post-treatment (%) | \( p \) | \(|d|\) |
|-------------------------------------------------------------------------|-------------------|--------------------|--------|-------|
| Substance taken for longer period than intended                         | 81.3              | 60.4               | .021\(^{+}\) | 0.50\(^{+}\) |
| Persistent desire or repeated unsuccessful attempts to quit             | 100.0             | 95.8               | .500   | 0.29  |
| Much time/activity to obtain, use, recover                             | 93.8              | 75.0               | .006\(^{+}\) | 0.53\(^{+}\) |
| Important social-occupational-recreational activities reduced           | 92.2              | 77.1               | .039\(^{+}\) | 0.43  |
| Use continues despite knowledge of adverse consequences                 | 73.4              | 50.0               | .006\(^{+}\) | 0.50\(^{+}\) |
| Tolerance                                                               | 84.4              | 81.3               | .999   | 0.08  |
| Characteristic withdrawal; substance taken to relieve withdrawal        | 89.1              | 68.8               | .013\(^{+}\) | 0.51\(^{+}\) |
| Food addiction: positive diagnosis                                      | 90.6              | 72.9               | .012\(^{+}\) | 0.50\(^{+}\) |

*Note:* Exact McNemar test  
\(^{+}\)Significant pre-post change.  
\(^{+}\)Moderate \(|d| > 0.50\), high effect size \(|d| > 0.80\). \((n = 55)\).

<table>
<thead>
<tr>
<th>Criteria</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>( p )</th>
<th>OR</th>
<th>95% CI (OR)</th>
<th>( R^2 )</th>
<th>AUC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Being into the good-responder group</td>
<td>-0.619</td>
<td>0.440</td>
<td>1.98</td>
<td>.159</td>
<td>0.54</td>
<td>0.23 (1.28)</td>
<td>.077</td>
<td>.604</td>
</tr>
<tr>
<td>Abstinent binges/vomits</td>
<td>-0.622</td>
<td>0.28</td>
<td>4.85</td>
<td>.018</td>
<td>0.54</td>
<td>0.31 (0.93)</td>
<td>.146</td>
<td>.682</td>
</tr>
<tr>
<td>Dropout from treatment</td>
<td>-0.043</td>
<td>0.276</td>
<td>0.02</td>
<td>.877</td>
<td>0.96</td>
<td>0.56 (1.65)</td>
<td>.001</td>
<td>.500</td>
</tr>
</tbody>
</table>

*Note:* \( R^2 \): Nagelkerke's \( R^2 \) coefficient. AUC, area under the receiver operating characteristic curve; 95% CI, 95% confidence interval; OR, odds ratio; B, estimated logistic regression coefficient; S.E., standard error.  
Bold: significant predictive capacity (.05 level).  
Good responders: change to a lower severity group after treatment. \((n = 55)\).

Food Addiction and EWL in BS patients

Guerrero et al., EEDR, 2018

Bar graph showing the percentage of FA present and FA absent in patients with different levels of weight loss:
- FA present:
  - Lack response: 55.0%
  - Mild: 42.4%
  - Success: 32.2%
- FA absent:
  - Lack response: 45.0%
  - Mild: 57.6%
  - Success: 67.8%
**Sample.** Initial sample included $n=165$ participants who met criteria for positive FA score in the YFAS-2 scale. Males were excluded ($n=18$). The final sample comprised $n=47$ women [53 with Bulimia nervosa (BN), 30 with Binge Eating Disorder (BED), 36 with Other Specified Feeding or Eating disorder (OSFED) and 28 with obesity (OBE)]. All ED were diagnosed according to DSM-5 criteria (APA, 2013).

**Statistical analysis.** Two-step cluster (SPSS)

- **Food Addiction Scale (YFAS-2.0)**
  (Gearhardt et al., 2016; Granero et al., 2018)
- **Symptom Checklist-90 Items-Revised (SCL-90-R)**
  (Derogatis, 1990)
- **Temperament and Character Inventory–Revised (TCI-R)**
  (Cloninger, 1999)
- **Eating Disorders Inventory (EDI-2)**
  (Garner et al., 1991)
• **Cluster 1 (n=46).** Functional cluster, was characterized by a high prevalence of obese subjects (without ED) and BED, both with low levels of ED severity and general psychopathology. Patients were older and with higher BMI.

• **Cluster 2 (n=50).** Moderate cluster, was less functional than Cluster 1, showed a high prevalence of BN and OSFED, and moderate levels of ED severity and an intermediate position in psychopathology levels compared to Clusters 1 and 3.

• **Cluster 3 (n=51).** Dysfunctional cluster, was characterized by the highest prevalence of BN and OSFED and highest scores in ED severity and general psychopathology and more dysfunctional personality traits.
FUTURE CHALLENGES

e-ESTESIA: EMOTIONAL REGULATION APP

2016-2018

PSI2015-68701R

GOBIERNO DE ESPAÑA
MINISTERIO DE ECONOMÍA, INDUSTRIA Y COMPETITIVIDAD

ciberobn

European Union
European Regional Development Fund
Future Research
Jiménez-Murcia, Dublin, 2019

Cognitive and neuroadjuvant strategies for unhealthy eating and obesity: Systematic review and discussion of neurocognitive mechanisms
Laura Torroella*, Fernando Mati**, Rafael de la Torre**, Antonio Verdú-Carrió**

Future Research
Steward, 2017 Current Neuropharmacology

BMI
Beh. Addict
EE/FA

Blood

Neurocognition
Conclusions

• To conclude, the association of environmental factors such as easy access, types of food, portions and psychological factors such as stress, boredom, impulsivity, together with a biological predisposition could explain FA.

• However, further research about biomarkers in FA is needed.

• In short, we need to analyze other explanatory models of obesity, such as the addictive one, in order to try to improve prevention, treatment and social and health policies.
Thank you!