

## The challenge of impulsivity in eating disorders; research and practical management approaches



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# Summary

- Introduction about ED
- ED Management in Spain and our Unit
- ED and Impulse related disorders
- Current therapy limitations
- New challenges and goals in the field
- Conclusions

# Prevalence of ED

## INVITED REVIEW

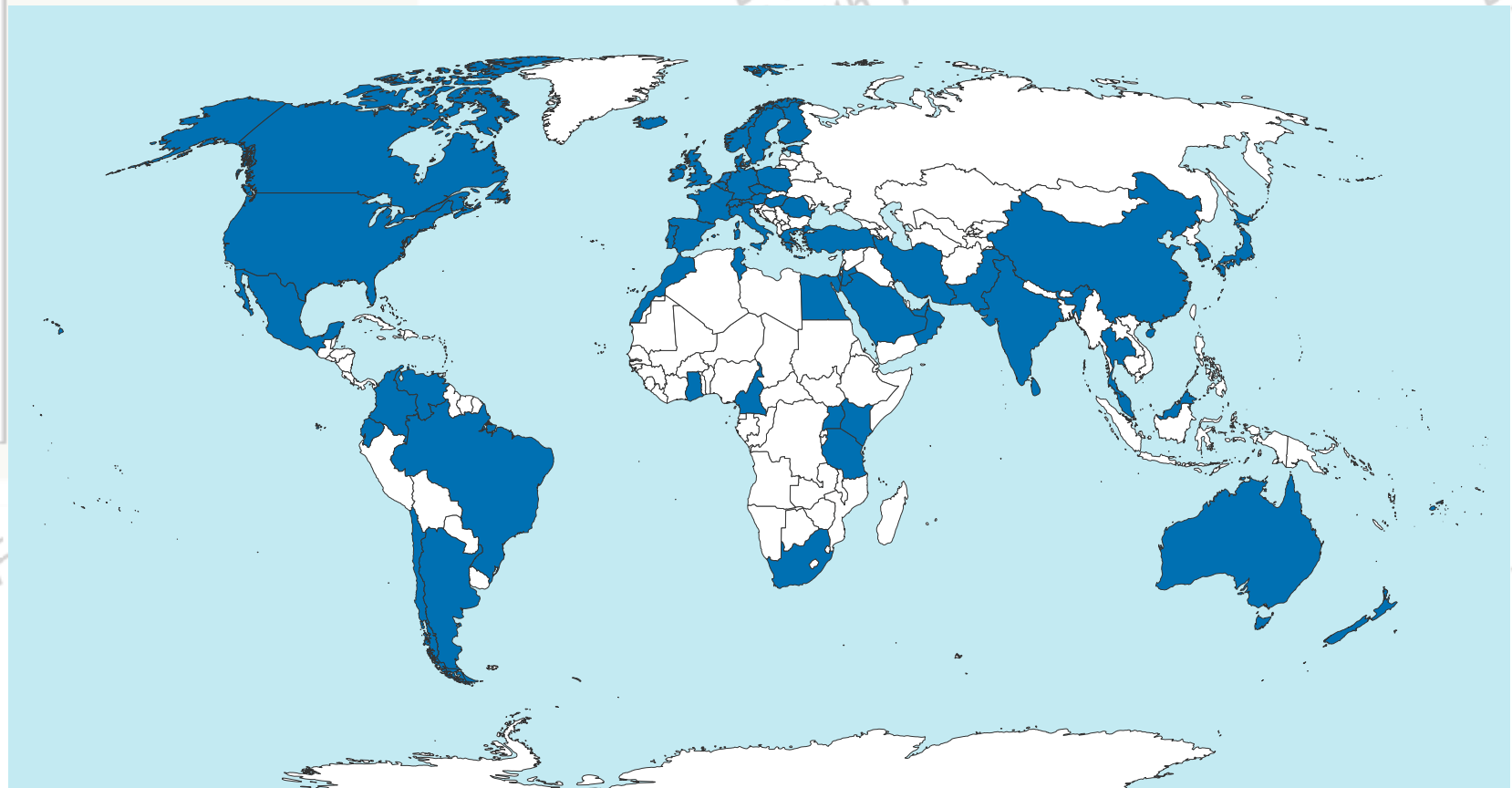
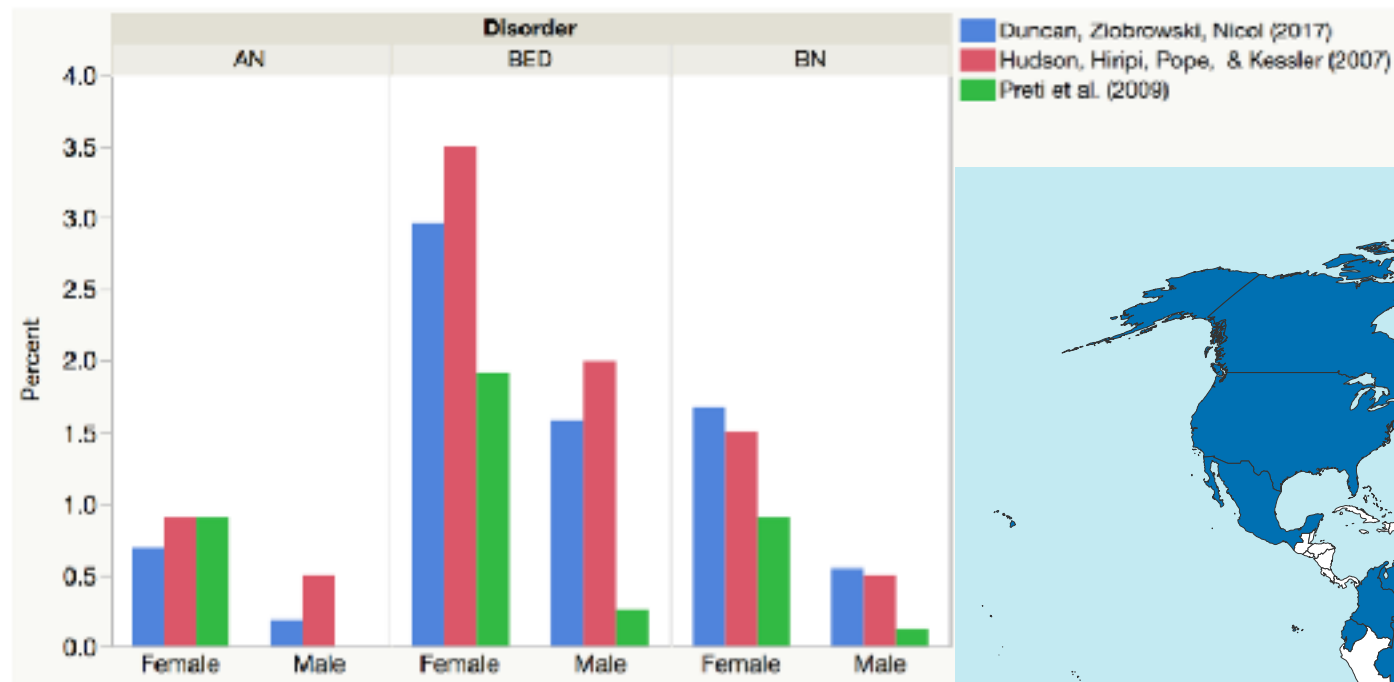
### The Science Behind the Academy for Eating Disorders' Nine Truths About Eating Disorders

Katherine Schaumberg<sup>1</sup>, Elisabeth Welch<sup>2</sup>, Lauren Breithaupt<sup>2,3</sup>, Christopher Hübel<sup>2,4</sup>, Jessica H. Baker<sup>1</sup>, Melissa A. Munn-Chernoff<sup>1</sup>, Zaynep Yilmaz<sup>1</sup>, Stefan Ehrlich<sup>5,6</sup>, Linda Mustelin<sup>1,7</sup>, Ata Ghaderi<sup>8</sup>, Andrew J. Hardaway<sup>1</sup>, Emily C. Bulik-Sullivan<sup>9</sup>, Anna M. Hedman<sup>2</sup>, Andreas Jangmo<sup>2</sup>, Ida A.K. Nilsson<sup>10,11</sup>, Camilla Wiklund<sup>2</sup>, Shuyang Yao<sup>2</sup>, Maria Seidel<sup>5,6</sup> & Cynthia M. Bulik<sup>1,2,12\*</sup>

<sup>1</sup>Department of Psychiatry, University of North Carolina at Chapel Hill, Chapel Hill, NC, USA

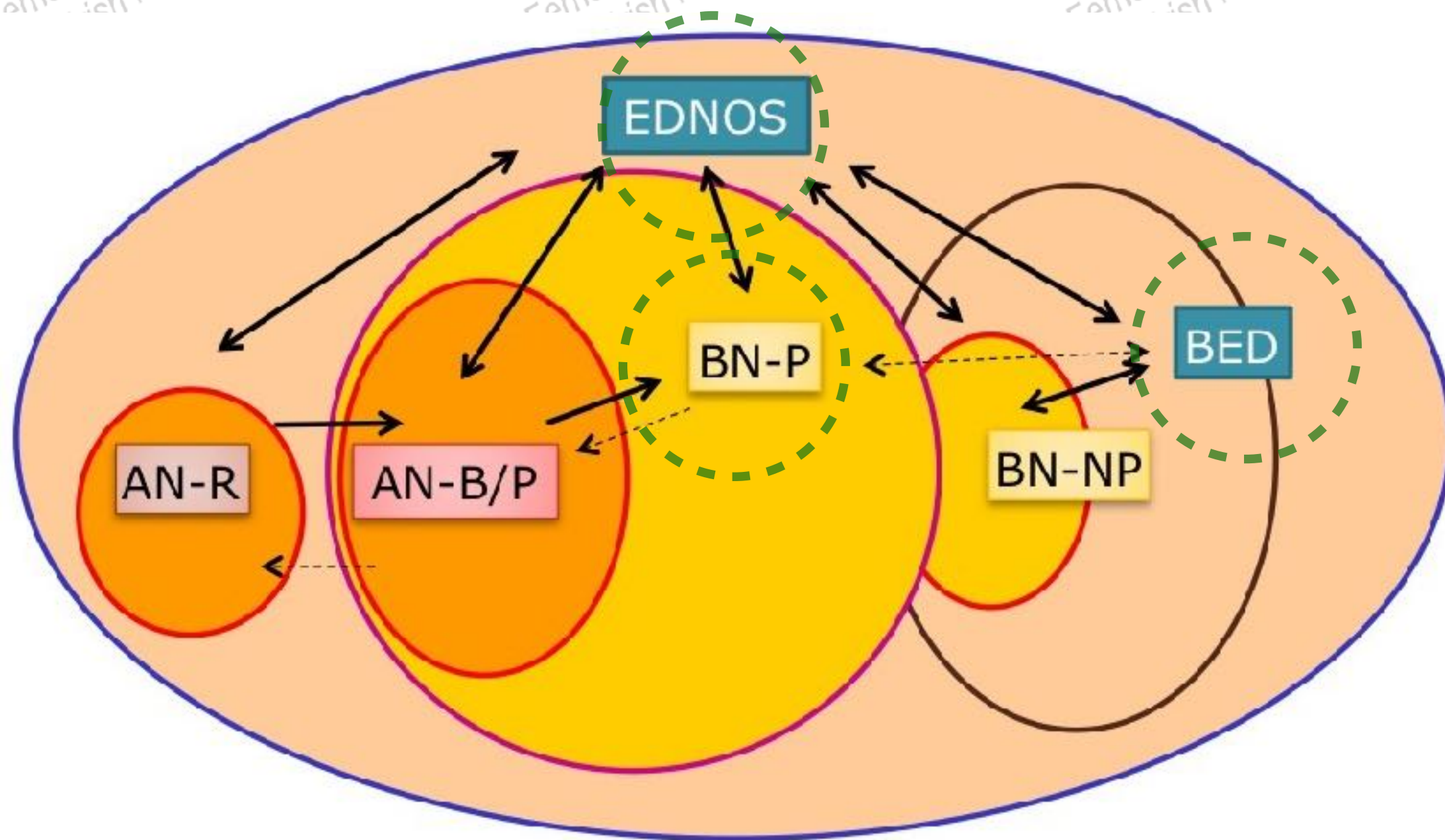
<sup>2</sup>Department of Medical Epidemiology and Biostatistics, Karolinska Institutet, Stockholm, Sweden

<sup>3</sup>Department of Psychology, George Mason University, Fairfax, VA, USA






# Eating Disorders Cross-diagnostic




Weight

Duration of the disorder



Bellvitge  
Hospital

 Institut Català  
de la Salut

# EATING DISORDERS

## Etiopathological/ Risk Factors involved

### General factors



**Living Western Society**

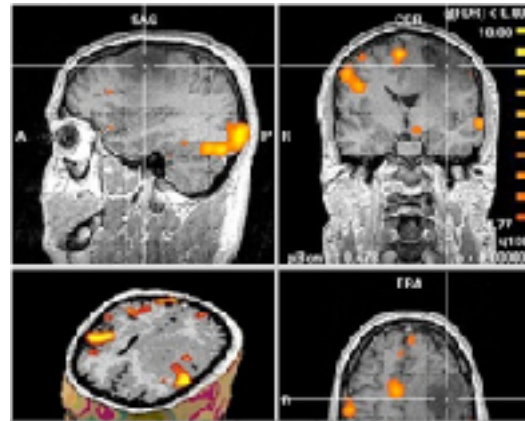


**Adolescence/peers influence  
female**



**Eating styles**

### Individual-specific factors



**Brain**

*Genetic/biological vulnerabilities*

*Neuronal pathways*

*Reward system*

*Emotional regulation*



**Family**

*Adverse parenting / Dieting*

*Eating disorder of any type  
Depression*

*Obesity  
Substance misuse*



**Premorbid experiences/  
characteristics**

*Traumatic experiences*

*Teasing /stress*

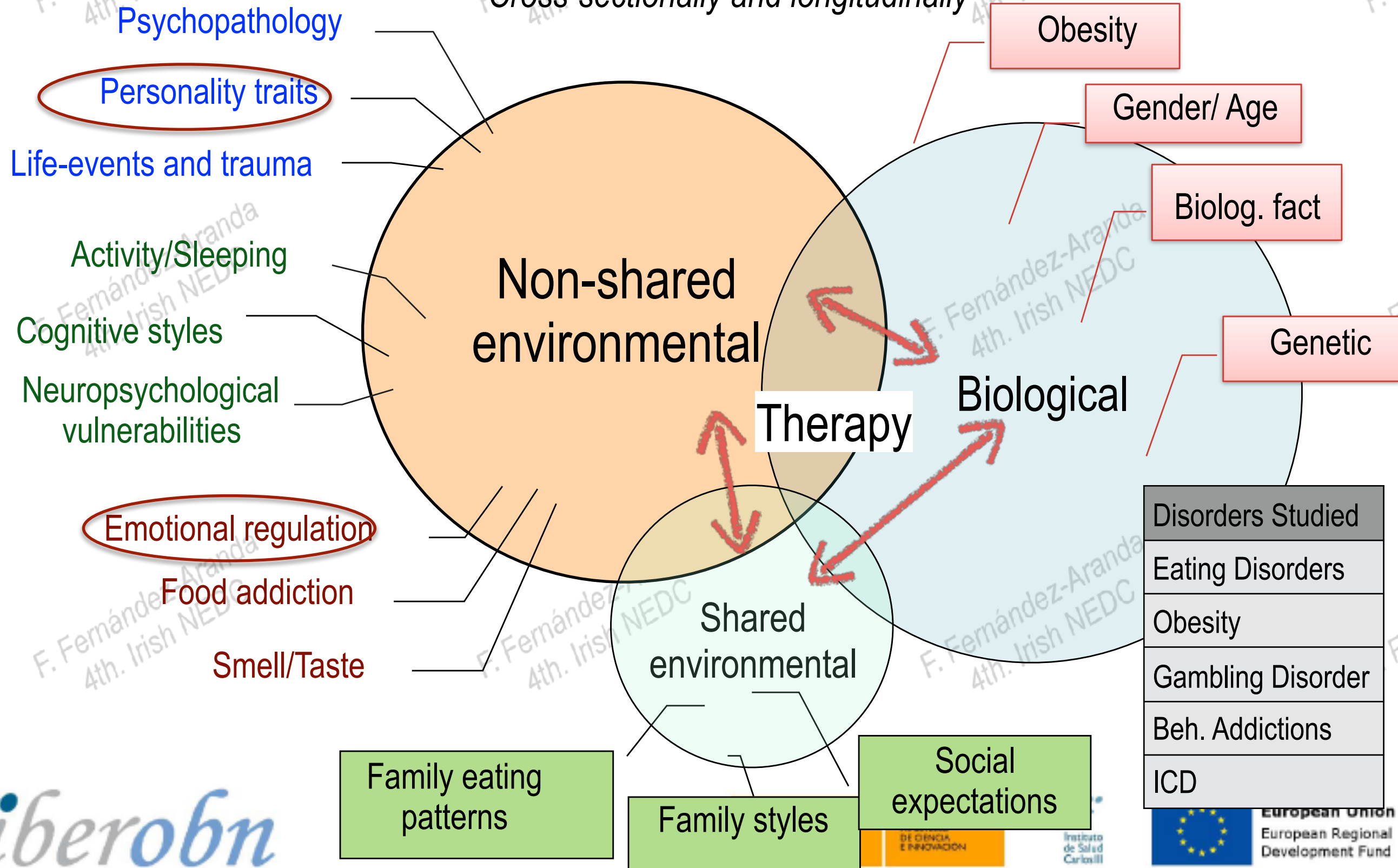
*Perfectionism*

*Impulsivity*



# Risk factors Explored in Obesity and related Eating Disorders

Cross-sectionally and longitudinally



# Management of Eating Disorder

- Multidisciplinary **team**
- Five levels of **intervention**: general practitioner or primary care pediatrician; specialist outpatient therapy; intensive outpatient therapy or day center; hospital intensive rehabilitation.
- Definition of **protocols** for collaboration with child/adolescent psychiatry and other services,
- **Partnership** with associations of carers and planning of **training** programmes for the staff of reference centers.

# Eating Disorders Unit

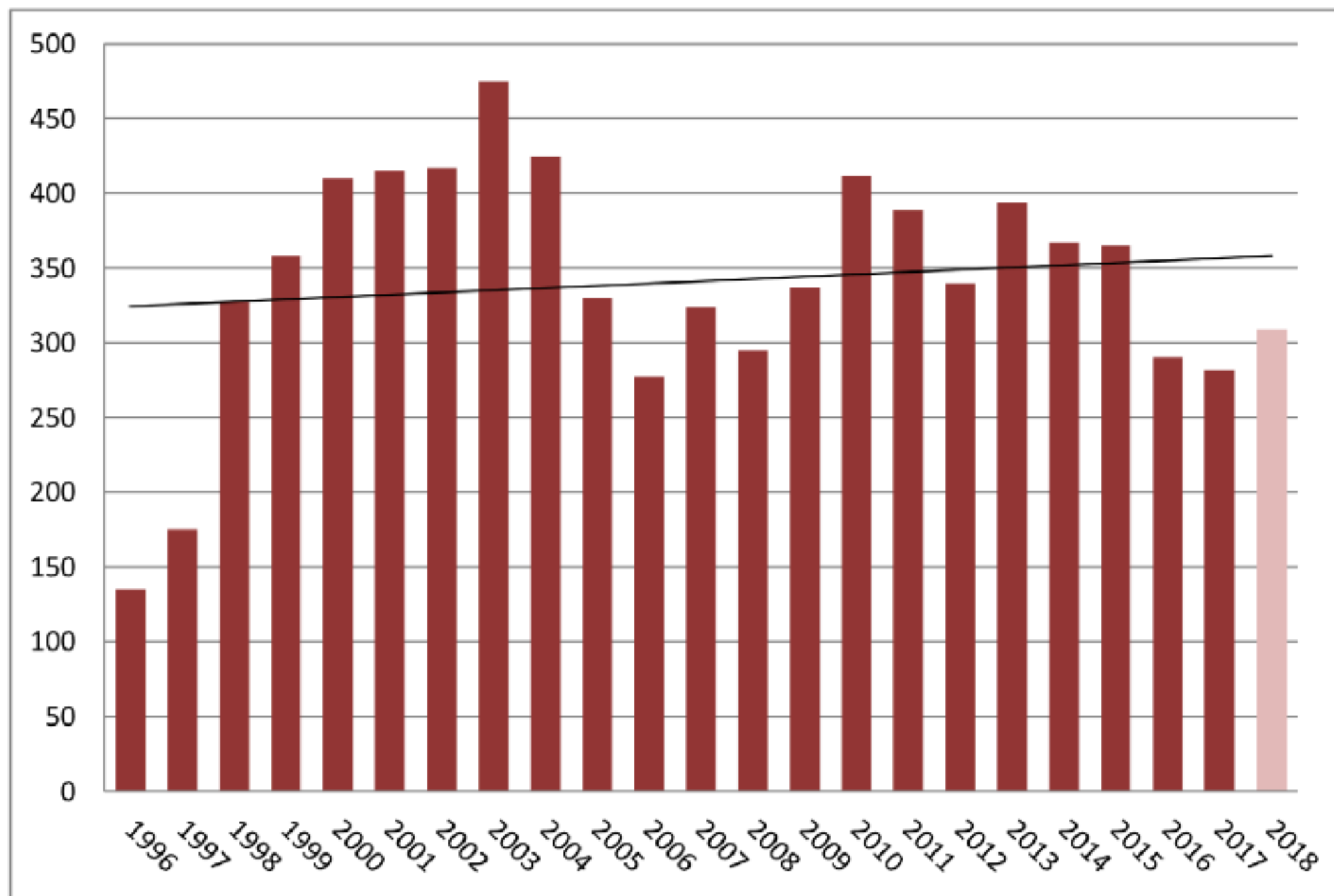
## Therapy Settings





# First New Referrals per Year

> 8.000 ED



# State of the Art - Diagnosis

## DSM 5 criteria

- **Anorexia Nervosa (subtypes AN-R, AN-BP):**

Extreme weight loss-control. Intense fear gaining weight even though significant low weight. Disturbance weight/shape. Diet/ Purging/Binge eating behaviours.

- **Bulimia Nervosa:**

Binge eating episodes, inappropriate compensatory behaviours (self-induced vomiting, laxatives, diuretics or excessive exercise). Overvalued shape/weight. Once a week for three months

- **Binge Eating Disorders:**

Binge eating episodes, without compensatory behaviours. Once a week for three months

- **Other Specified Feeding or ED (OSFED)**

All criteria are met for either AN or BN (except for current weight is in the normal range or binge eating/compensatory behaviours occur less than one a week for less than 3 months); Sub-threshold disorder (At-AN; At-BN-low BED; Purging Dis.; NES).

- **Others:**

PICA, Rumination Disorder; Avoidant/Restrictive Food Intake Disorder (ARFID), UFED



Fernández-Aranda  
4th Irish NEDC



R. Fernández-Aranda  
4th Irish NEDC

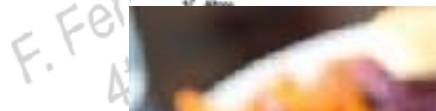
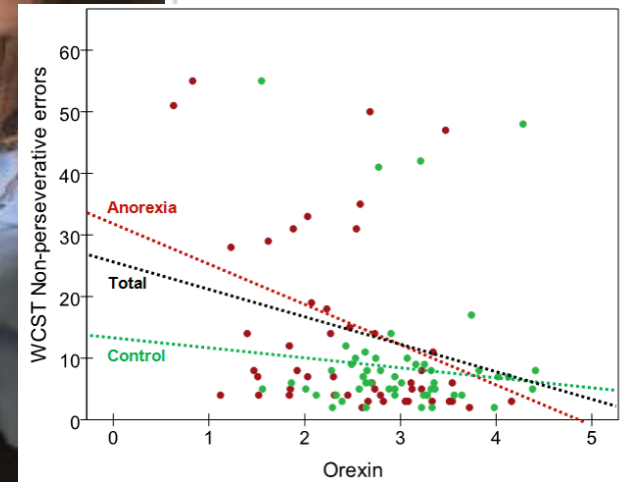
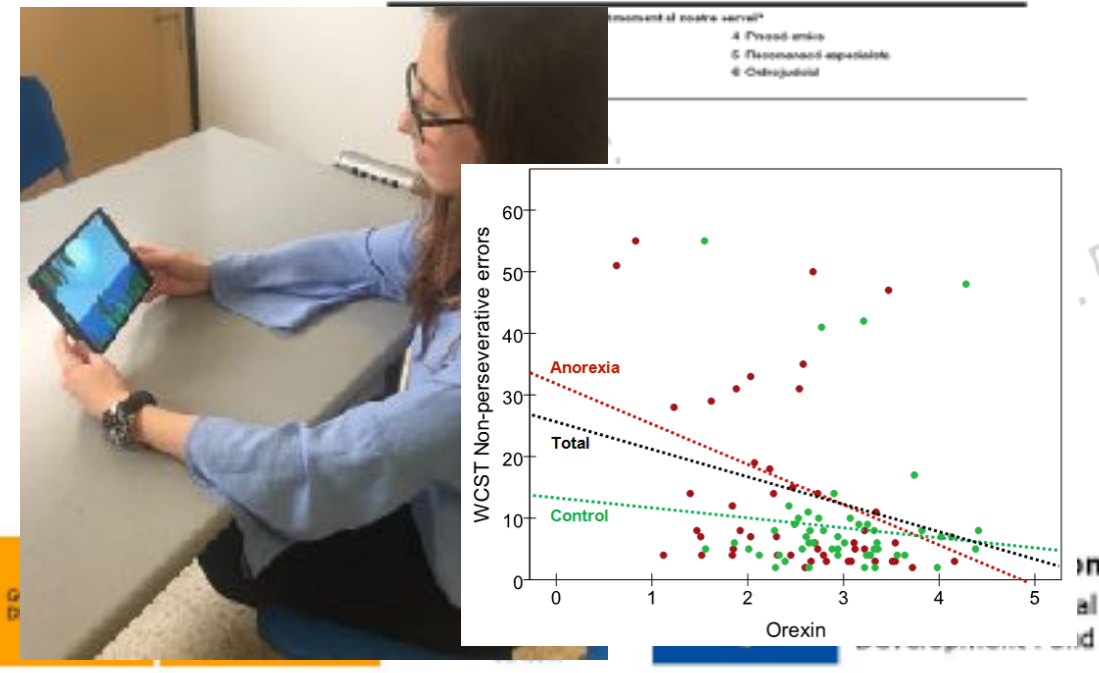
A photograph showing three PCR tubes and a pipette tip. On the left is a small tube with an orange cap and a white label. In the center is a larger tube with a purple cap and a white label featuring a barcode. On the right is another tube with a blue cap and a white label. A clear plastic pipette tip lies between the orange and purple capped tubes.

Figure 2 displays brain maps showing significant differences in gray matter volume between AN patients and HC. The figure includes a 2x4 grid of brain slices (axial, sagittal, coronal) for HC and AN patients, and a detailed view of the precuneus region with labels for dPCC and vPCC. A color scale indicates volume differences from -4 to 4.



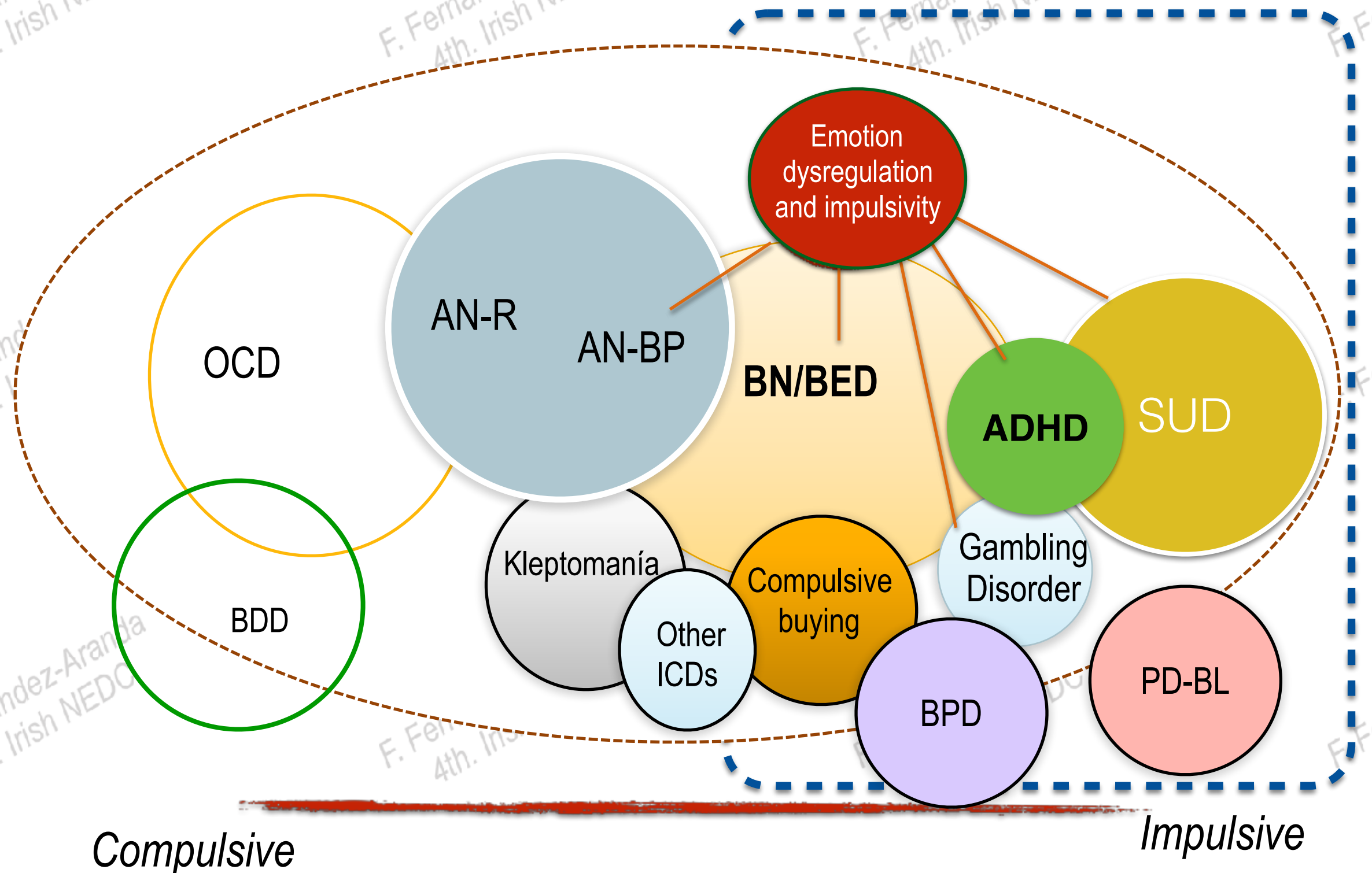
*ciberobn*

# Current Research Lines

- **Risk Factors** Associated with Eating Disorders and Obesity (neurocognition, hormones, clinical personality, sensorial aspects, brain activity, DNA-GWAS)
- Common and differential factors in **extreme weight conditions**.
- Eating disorders and behavioral addictions / Disorders related to **impulsivity**.
- **Food Addiction** and Therapeutic Implications
- Response to **treatment** and new technologies
- Nutrition and Cognition (**Predimed-Plus**)



# Emotion Dysregulation a Transdiagnostic Factor



# Impulse related disorders and Eating disorders

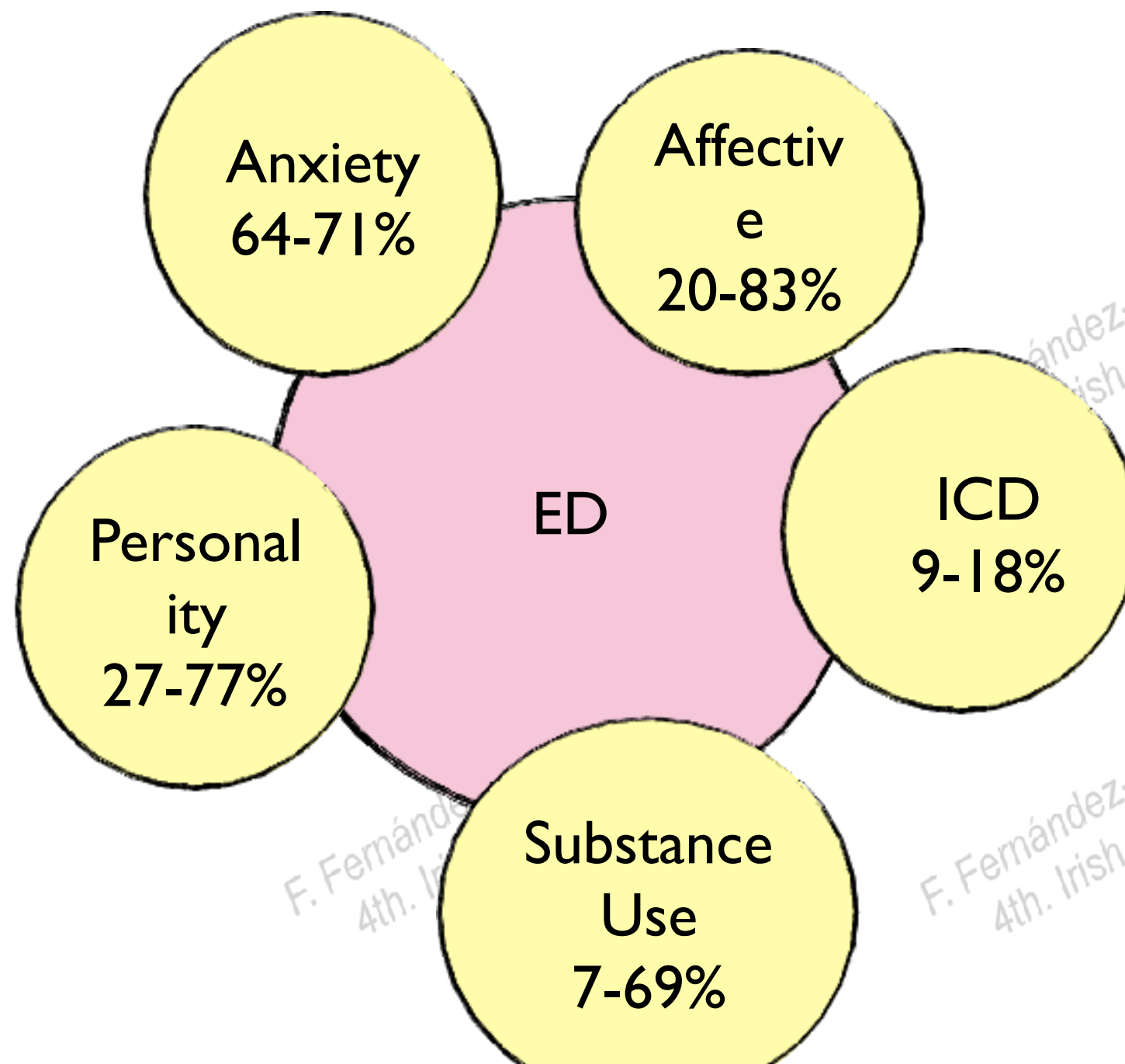
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In individuals with IRD and ED, higher impulsivity has been associated with:

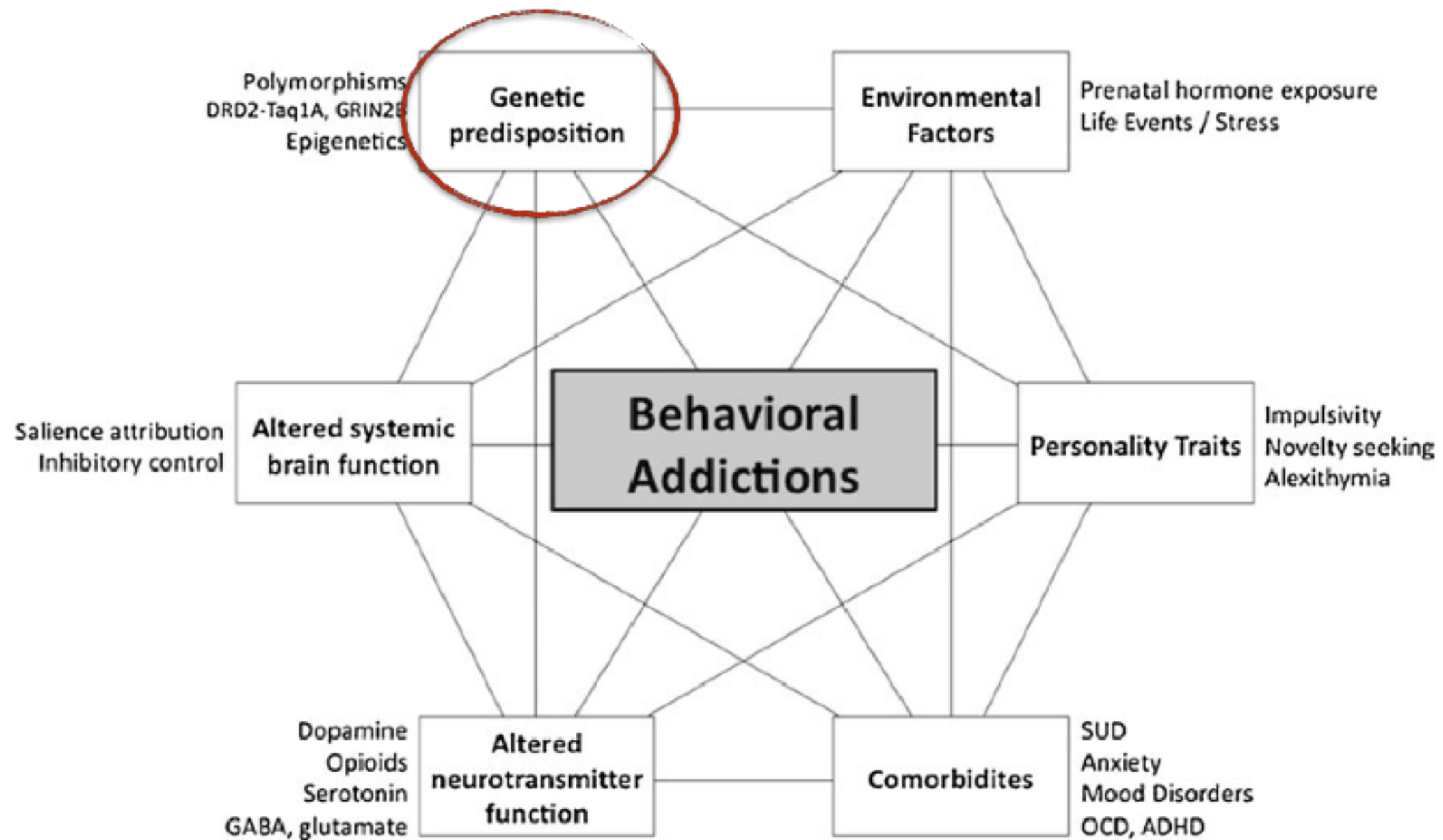
- Specific disorder subtypes
- Severity of symptoms
- Greater comorbidity
- Genetic and biochemical factors
- Poorer psychological functioning
- Altered executive functions
- Less effective coping strategies
- Poorer treatment outcome



# Comorbidity and Eating Disorders



# Impulse related disorders and Shared Vulnerabilities



Probst & van Eimeren: Curr Neurol Neurosci Rep (2013) 13:386



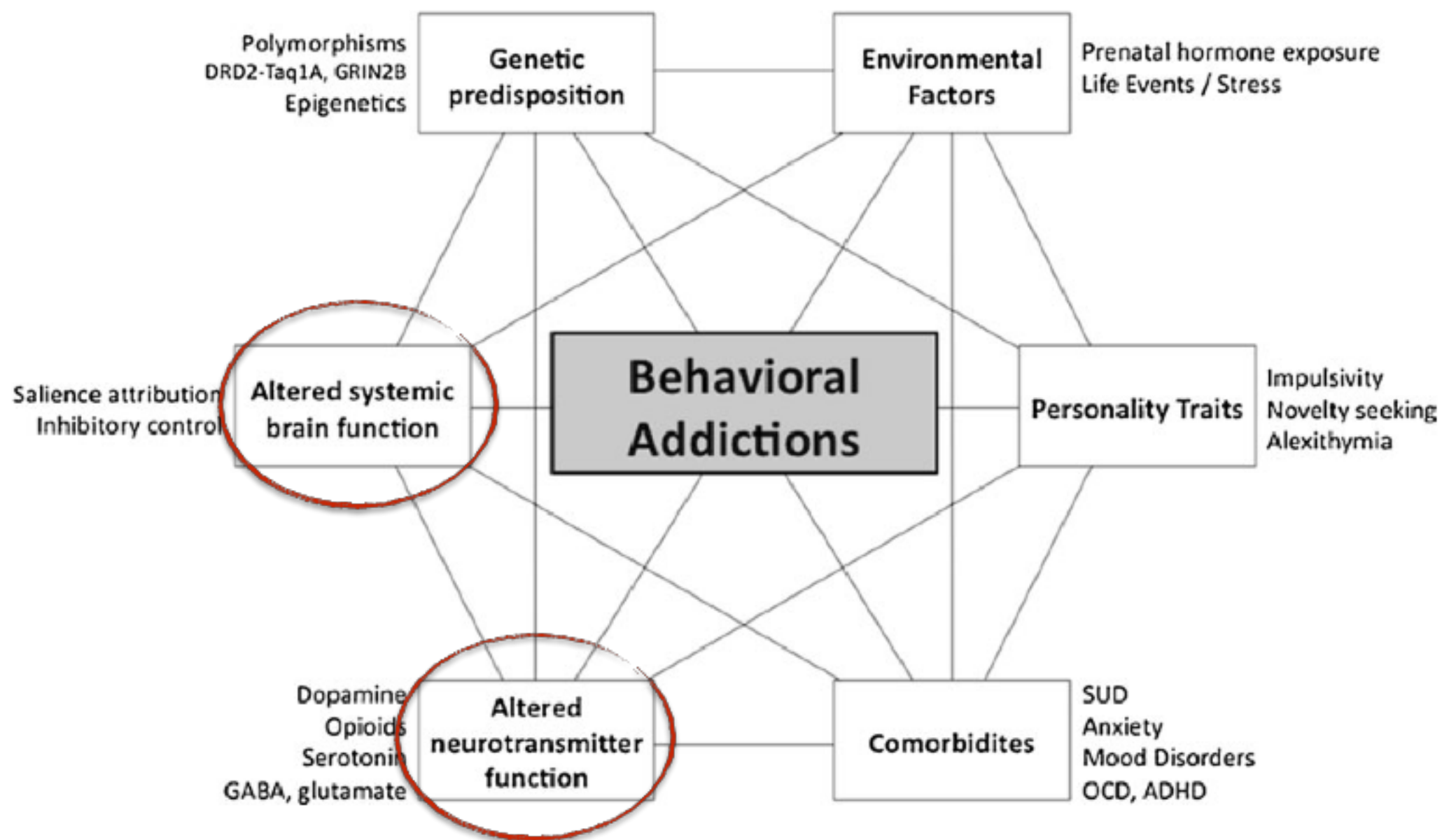
F. Fernández-Aranda  
4th Irish NEDC

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# Impulse related disorders and Shared Vulnerabilities



Probst & van Eimeren: Curr Neurol Neurosci Rep (2013) 13:386



# Impulse related disorders and Shared Vulnerabilities

## BRIEF REPORT

### Delay Discounting of Reward and Impulsivity in Eating Disorders: From Anorexia Nervosa to Binge Eating Disorder

Trevor Steward<sup>1,11</sup>, Gemma Mestre-Bach<sup>1,2</sup>, Cristina Vinyà-Alcaraz<sup>2</sup>, Zaida Agüero<sup>1,2</sup>, Susana Jiménez-Murcia<sup>1,2,3</sup>, Roger Guzmán<sup>1,4</sup> & Fernando Fernández-Aranda<sup>1,2,3,4</sup>

<sup>1</sup>CIBER, Unidad de Investigación y Nutrición (CIBERON), Instituto de Salud Carlos III, Spain

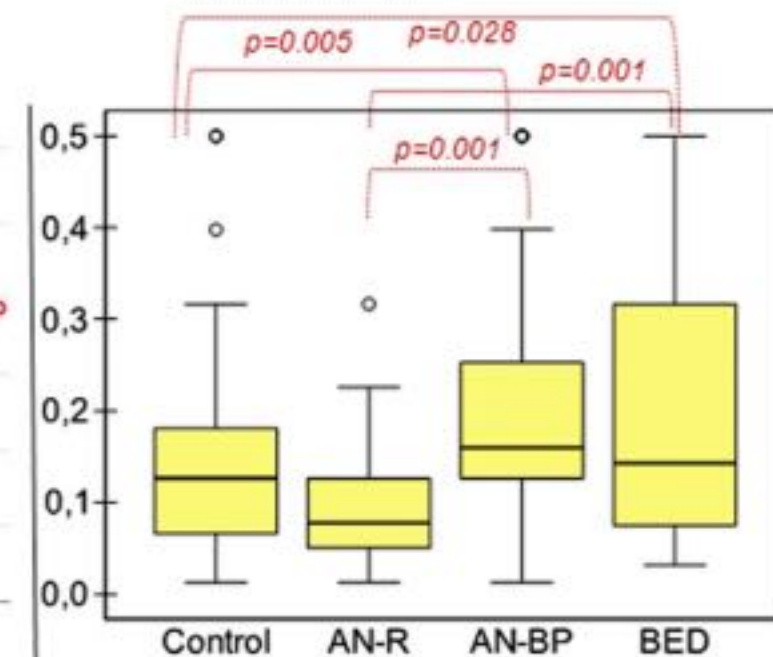
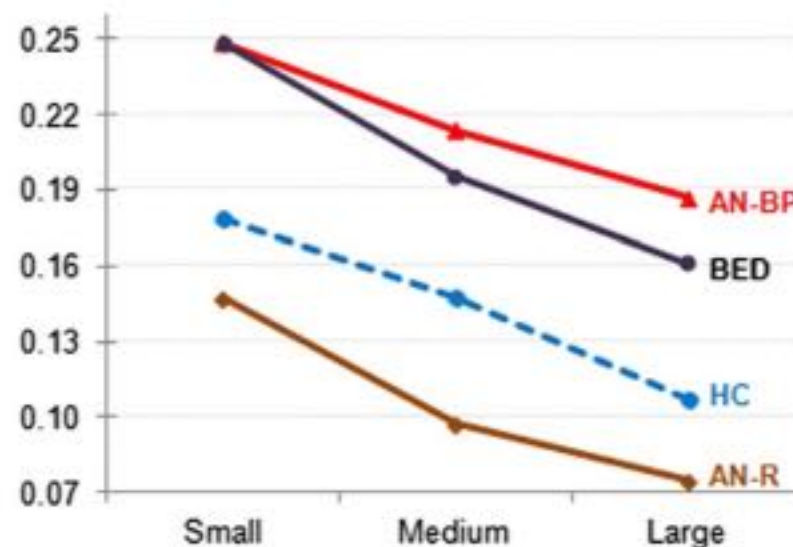
<sup>2</sup>Department of Psychiatry, Bellvitge University Hospital-IDIBELL, Spain

<sup>3</sup>Department of Clinical Sciences School of Medicine and Health Sciences, University of Barcelona, Spain

<sup>4</sup>Department of Psychology and Neuroscience, University of Zaragoza, Spain

#### Abstract

Evidence points to eating disorder patients displaying altered rates of delay discounting (i.e., degree of preference for immediate rewards over larger delayed rewards). Anorexia nervosa (AN) patients are believed to have an increased capacity to delay reward, which reflects their ability to override the drive to eat. Conversely, binge eating disorder (BED) patients are associated with a reduced tendency



Delay Discounting and EDs

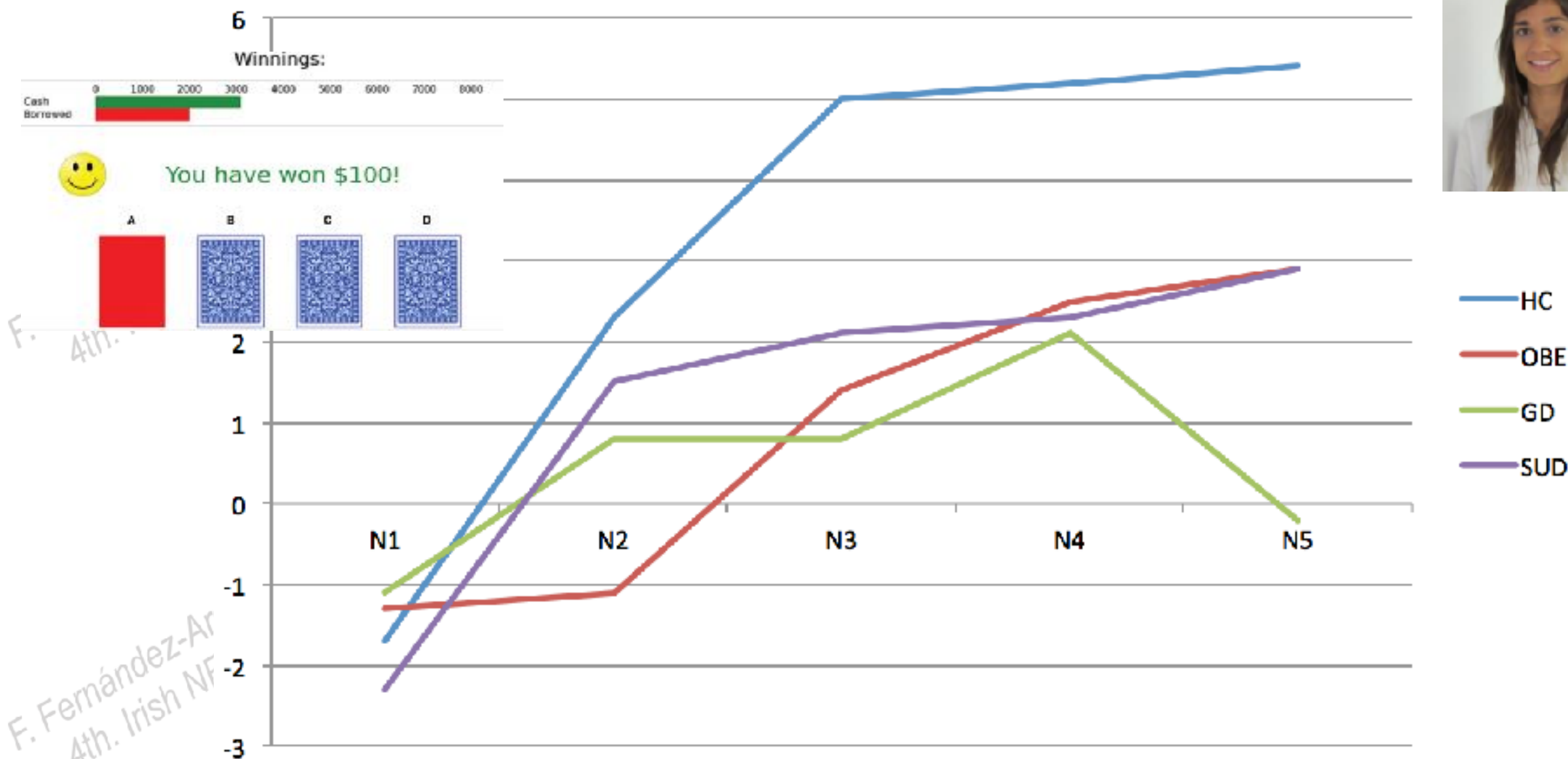
Table 2 Comparison of delayed discounting and UPPS-P impulsivity traits between groups: ANOVA

	Means and standard deviation								Pairwise comparisons											
	HC		AN-R		AN-BP		BED		HC vs AN-R		HC vs AN-BP		HC vs BED		AN-R vs AN-BP		AN-R vs BED		AN-BP vs BED	
	<i>n</i> = 80		<i>n</i> = 37		<i>n</i> = 19		<i>n</i> = 24		<i>p</i>	<i>d</i>	<i>p</i>	<i>d</i>	<i>p</i>	<i>d</i>	<i>p</i>	<i>d</i>	<i>p</i>	<i>d</i>	<i>p</i>	<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>												
<i>k</i> -small	0.179	0.116	0.147	0.109	0.249	0.136	0.248	0.160	.205	0.28	.029*	0.55†	.017*	0.52†	.004*	0.82†	.002*	0.74†	.995	0.01
<i>k</i> -medium	0.143	0.114	0.097	0.056	0.214	0.142	0.195	0.163	.031*	0.56†	.027*	0.51†	.079	0.34	.001*	1.03†	.002*	0.81†	.607	0.12
<i>k</i> -large	0.107	0.096	0.075	0.055	0.187	0.174	0.161	0.124	.129	0.41	.003*	0.57†	.030*	0.55†	.001*	0.87†	.002*	0.89†	.419	0.17
<i>k</i> -overall	0.139	0.100	0.101	0.065	0.218	0.149	0.194	0.139	.076	0.45	.005*	0.52†	.028*	0.51†	.001*	1.02†	.001*	0.86†	.476	0.16
Premedit	21.1	4.57	19.9	5.19	21.0	7.09	23.7	5.86	.225	0.26	.919	0.02	.037*	0.52†	.446	0.18	.006*	0.70†	.096	0.42
Persever	18.9	3.67	18.9	5.21	21.4	5.59	25.0	5.05	.958	0.01	.035*	0.51†	.001*	1.38†	.050*	0.51†	.001*	1.20†	.010*	0.67
Sensation S	28.0	7.16	24.1	6.47	24.4	7.59	21.8	7.74	.008*	0.56†	.049*	0.54†	.001*	0.83†	.888	0.04	.214	0.33	.234	0.54
Impulsivity	26.1	6.13	27.2	7.99	34.3	4.83	34.0	5.27	.363	0.16	.001*	1.48†	.001*	1.39†	.001*	1.05†	.001*	1.00†	.910	0.04
Nurgency	21.3	7.28	21.7	6.58	28.9	9.45	28.6	9.42	.800	0.06	.001*	0.90†	.001*	0.87†	.002*	0.88†	.002*	0.85†	.911	0.03





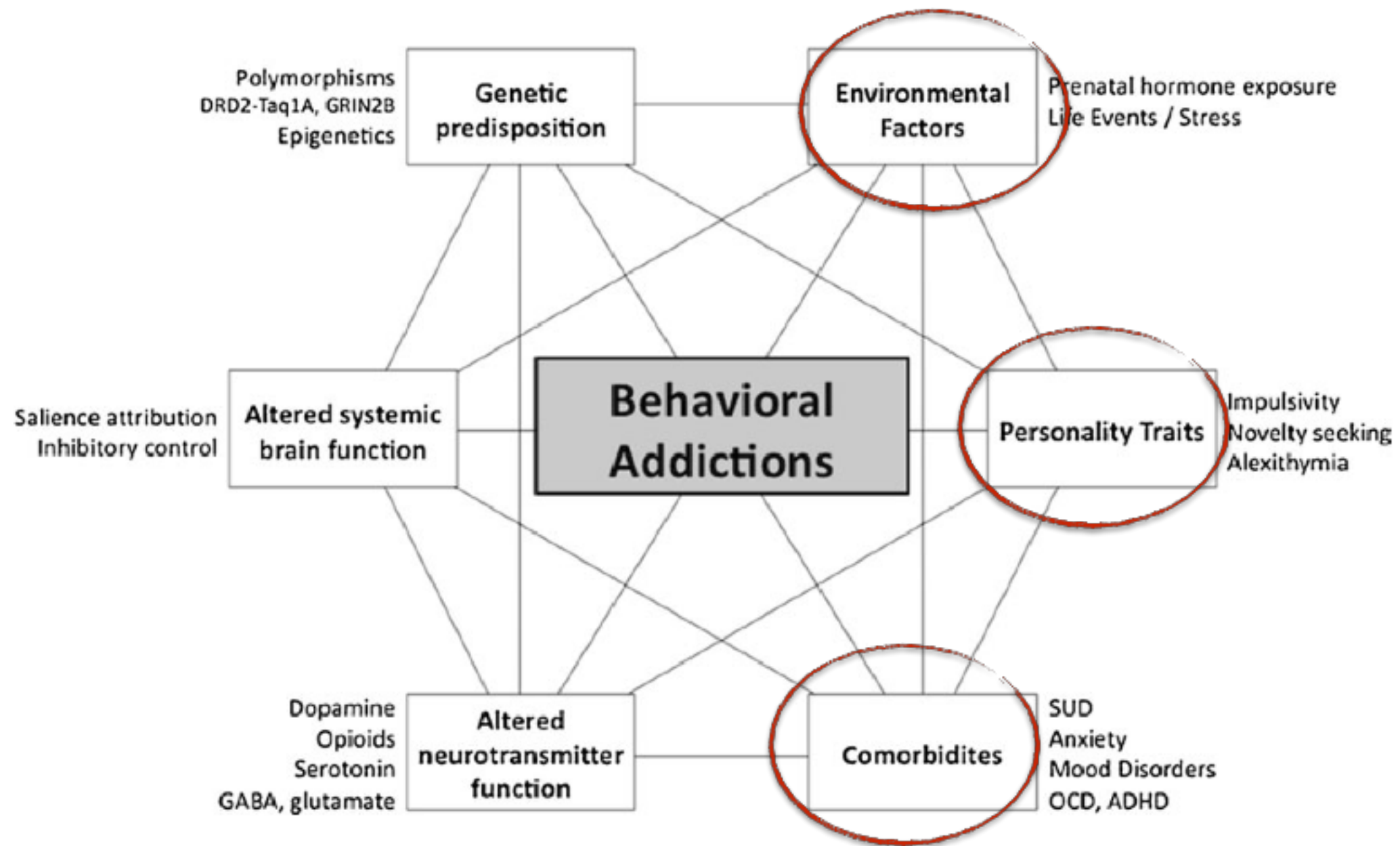
# Impulse related disorders and Shared Vulnerabilities



591 participants (194 HC, 178 GD, 113 OB, 106 SUD)

*Mallorqui-Bague et al., Plos One (2016), 30-09*

# Impulse related disorders and Shared Vulnerabilities



Probst & van Eimeren: Curr Neurol Neurosci Rep (2013) 13:386

# Impulse Control Disorders and Eating Disorders

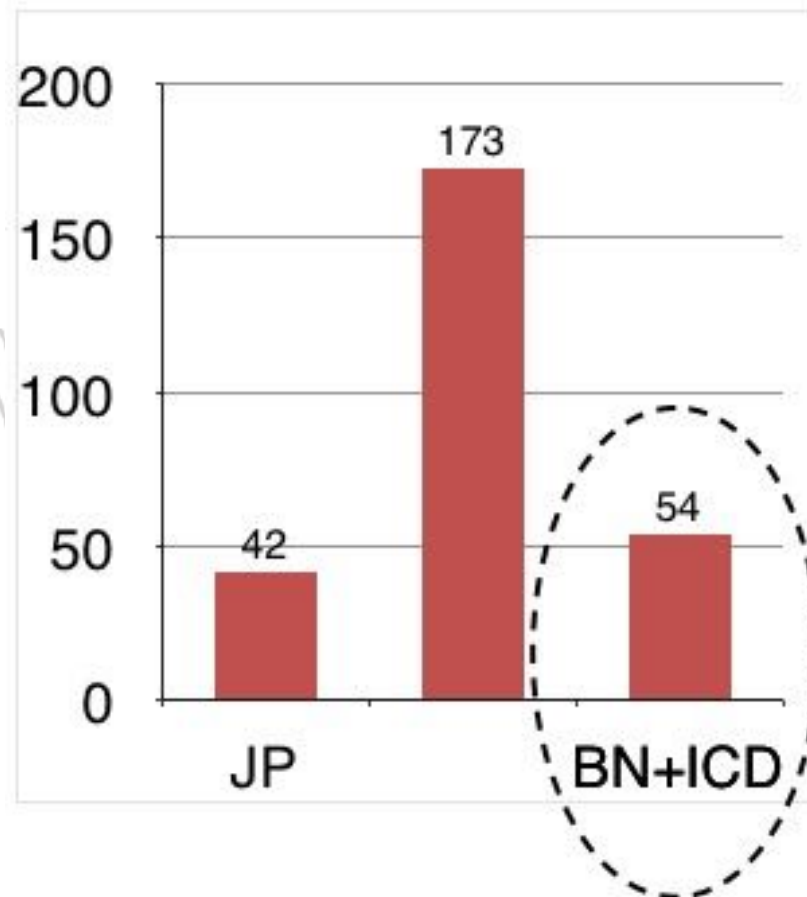


Table 1

Lifetime prevalence of ICD not elsewhere classified from 227 patients with BN

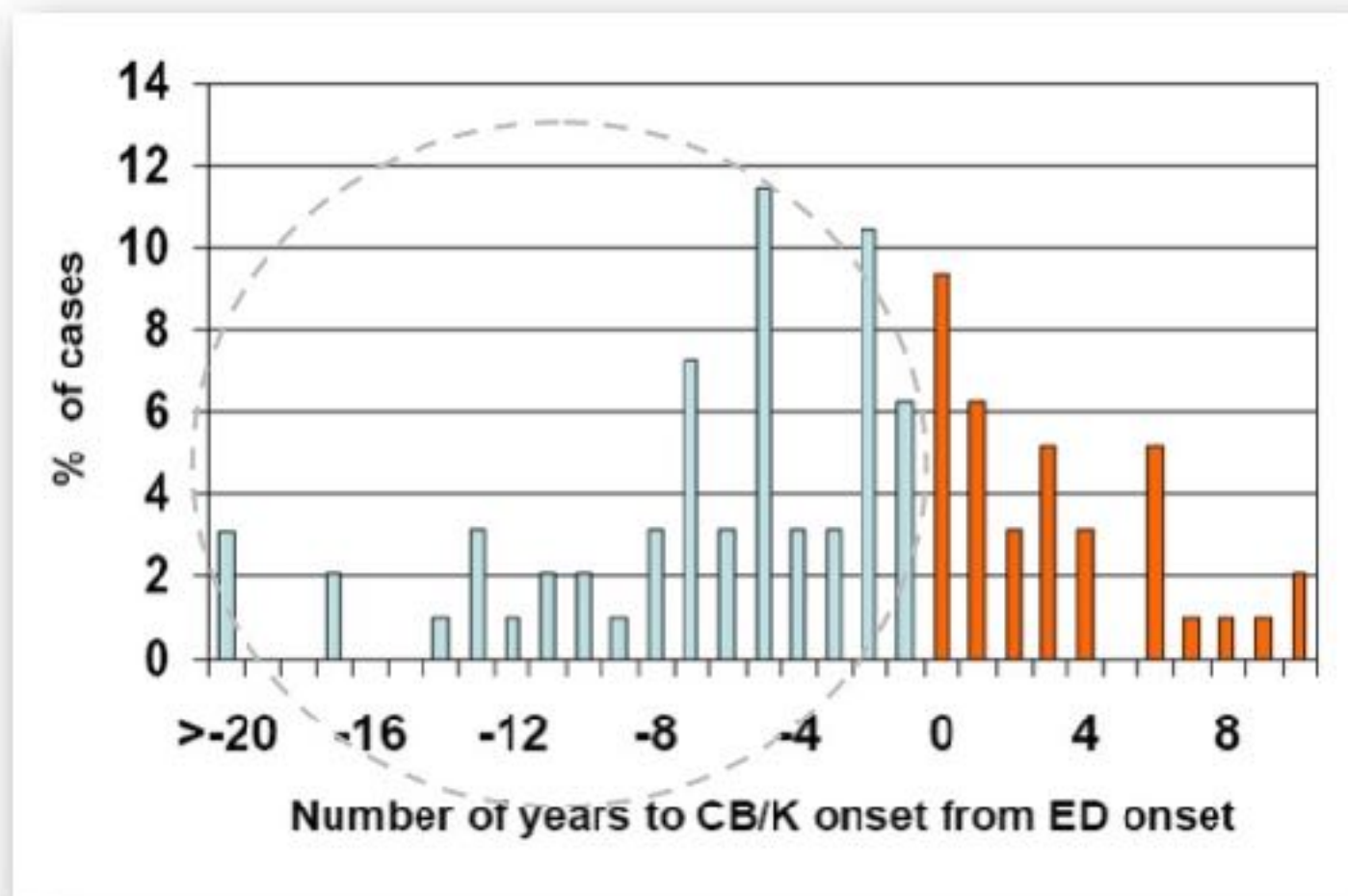
	n	Prevalence (%)	95% CI (%)
IED	30	13.2	8.81-17.6
Kleptomania	7	3.08	1.25-6.26
Pyromania	0	0.00	0.00-1.61
Pathologic gambling	2	0.88	0.10-3.14
Trichotillomania	2	0.88	0.10-3.14
Compulsive buying	40	17.6	12.7-22.6

**Fernández-Aranda, F., Jiménez-Murcia, S., Álvarez, E., Granero, R., Vallejo, J., y Bulik, C.M (2006) Impulse Control Disorders In Eating Disorders: Clinical and therapeutic implications. *Comprehensive Psychiatry*, 47, 482-488.**



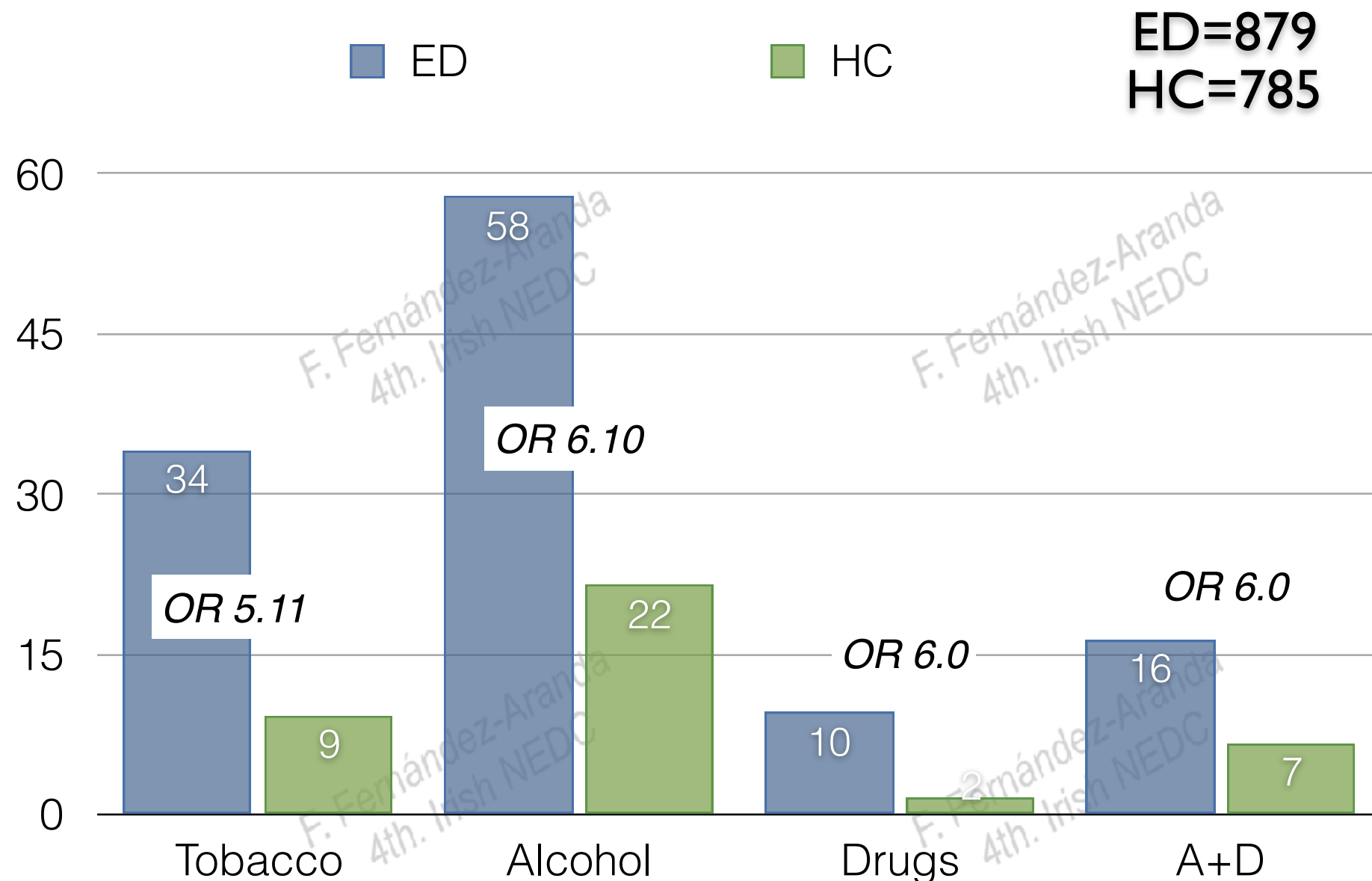
# Impulse control disorders in Eating Disorders

Relation of age of onset of compulsive buying disorder and or kleptomania (CB/K) to age of onset of ED



Fernando Fernandez-Aranda, A Pinheiro, LM. Thornton, WH. Berrettini, S Crow, MM. Fichter, KA. Halmi, AS. Kaplan, P Keel, J Mitchell, A Rotondo, M Strober, B Woodside, WH. Kaye, CM. Bulik (2006). Impulse control disorders in women with eating disorders. *Price Foundation*

# Prevalence for lifetime and current Substance use in European ED Instead of Eating

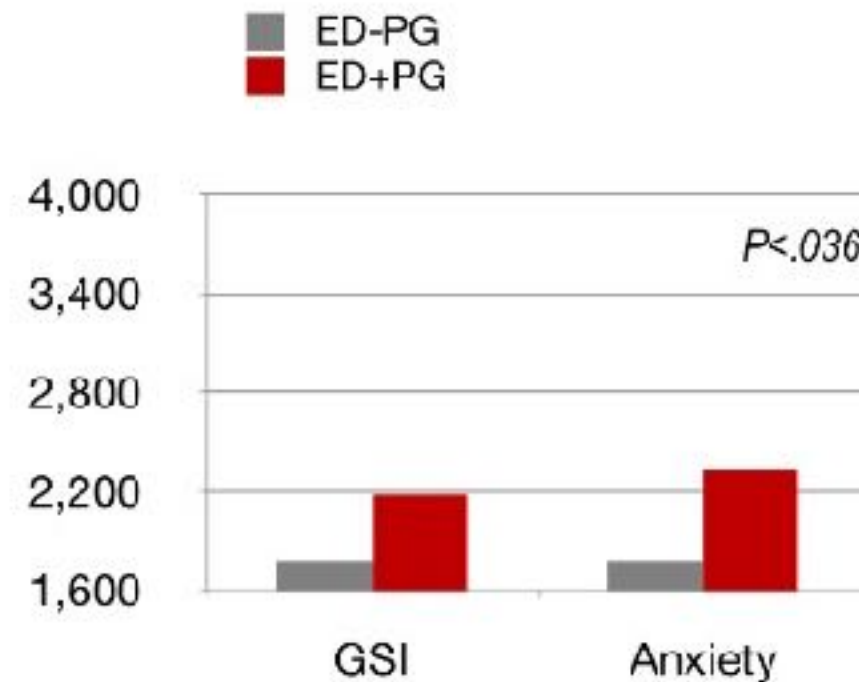
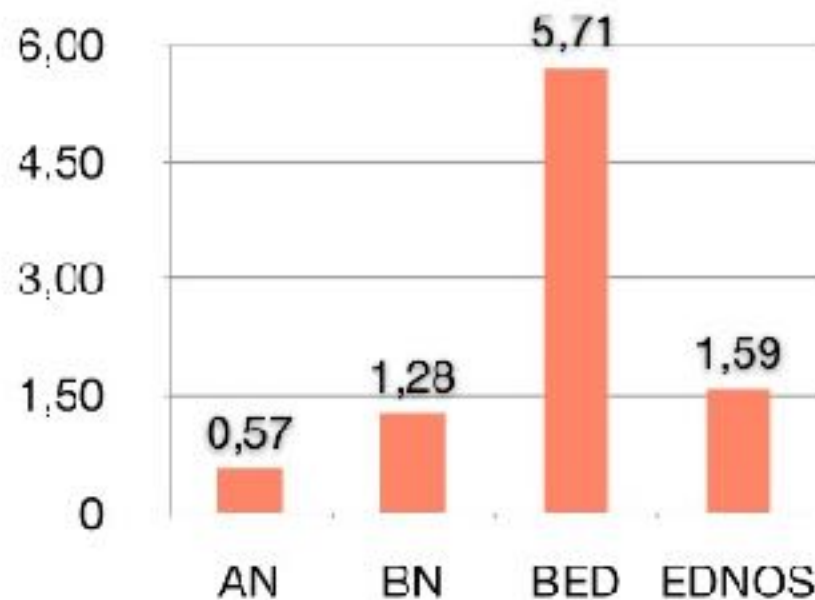


*Krug et al. Drug and Alcohol Dependence;2008;97: 169-179*

# Eating Disorders and Pathological Gambling

N=1.681

Total ED 1,49% (95% CI 1-2,19)



TOTAL ED (N=1681)	AN (N=354)	BN (N=783)	BED (N=105)	EDNOS (N=439)	p-value
1.49%	0.57%	1.28%	5.71%	1.59%	.003
(1.00; 2.19)	(0.15; 2.04)	(0.70; 2.33)	(2.65; 11.9)	(0.77; 3.25)	

Table includes prevalences in percentages (in brackets, 95% confidence intervals).

Jimenez-Murcia. *Comprehensive Psychiatry*;2013; 1053-1060

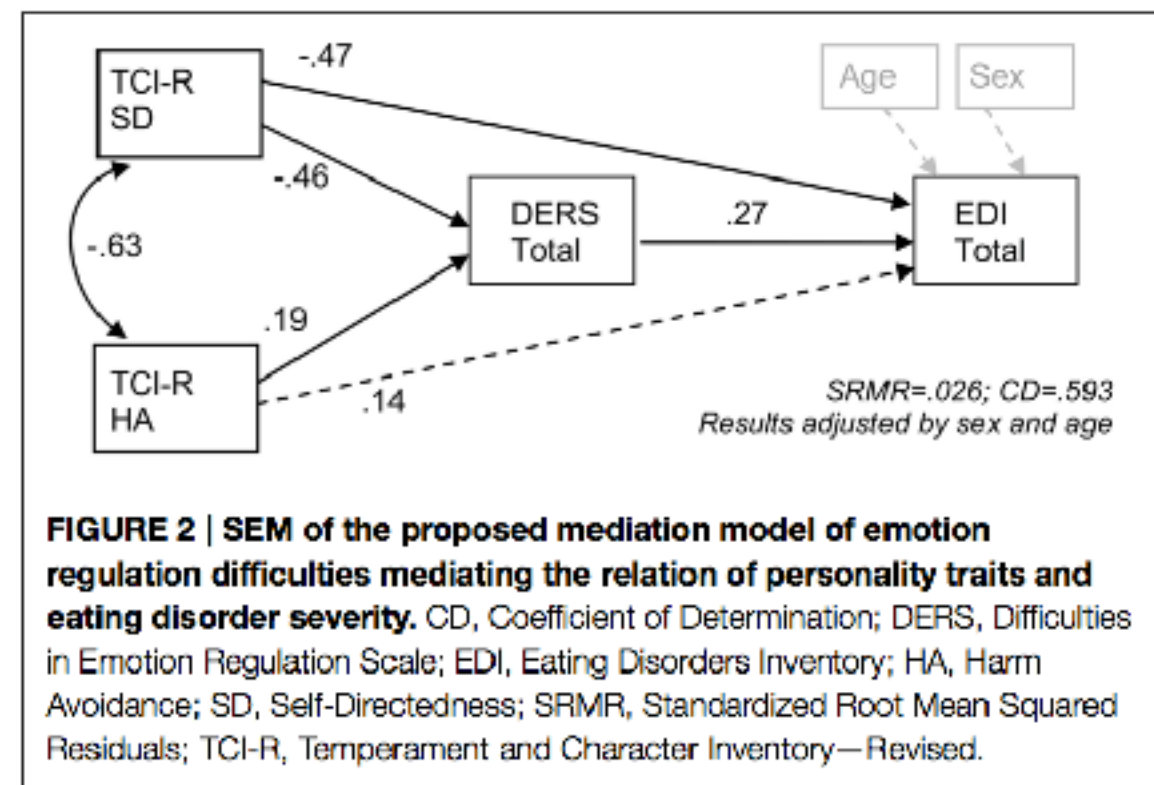
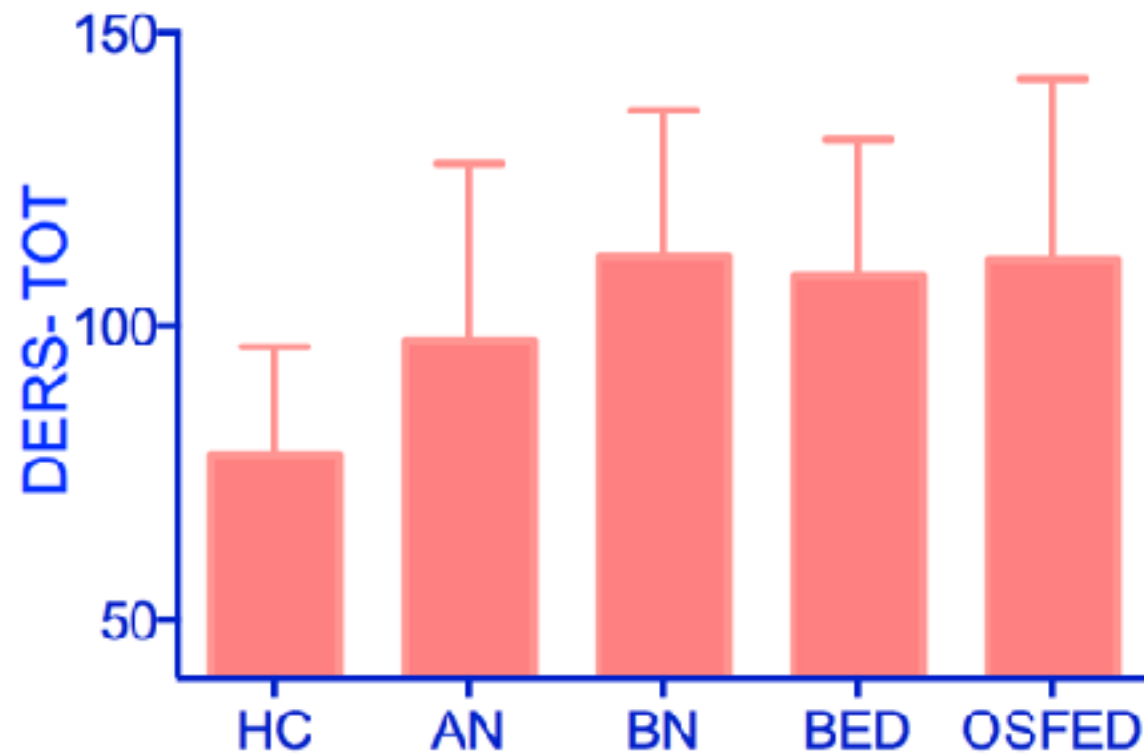


# Emotion Regulation and ED



Difficulties in Emotion Regulation Scale (**DEERS**; Gratz and Roemer, 2004)

(Hervas & Jodar Clínica y Salud, 2008, vol. 19 n.º 2 - Págs. 139-156)



Wolz et al., Front. Psychol., 30 June 2015

# Emotion Regulation and ED

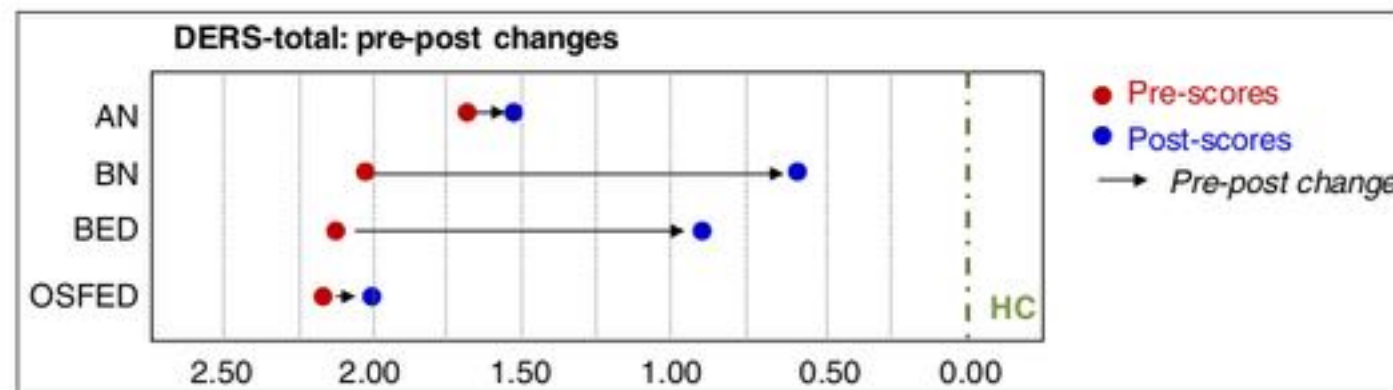
## RESEARCH ARTICLE

### Emotion Regulation as a Transdiagnostic Feature Among Eating Disorders: Cross-sectional and Longitudinal Approach

Núria Mallorquí-Bagué<sup>1,2\*</sup>, Cristina Vintró-Alcaraz<sup>2</sup>, Isabel Sánchez<sup>1,2</sup>, Nadine Riesco<sup>1,2</sup>, Zaida Agüera<sup>1,2</sup>, Roser Granero<sup>1,2</sup>, Susana Jiménez-Murcia<sup>1,2,4</sup>, José M. Menchón<sup>1,4,5</sup>, Janet Treasure<sup>6</sup> & Fernando Fernández-Aranda<sup>1,2,4\*</sup>

<sup>1</sup>CIBER Fisiopatología Obesidad y Nutrición (CIBEROBN), Instituto de Salud Carlos III, Spain

<sup>2</sup>Department of Psychiatry, Bellvitge University Hospital-IDIBELL, Spain



	ED participants						Comparison between participants with good outcome versus bad outcome											
	Observed pre-post treatment				p	d	Observed pre-post treatment				p	d	RCI					
	Pre-treatment		Post-treatment				Good		Bad				Good		Bad			
	M	SD	M	SD			M	SD	M	SD			M	SD	M	SD		
DERS scales																		
Non-acceptance emot. responses	19.59	7.05	16.99	6.78	.012*	0.38	6.22	6.50	-2.69	6.44	8.91	.009*	1.38 <sup>‡</sup>	7.74	-3.32	7.20	.009*	1.44 <sup>‡</sup>
Difficulties directed behaviour	17.62	5.15	15.90	5.41	.005*	0.33	2.24	4.19	-0.63	4.59	2.87	.107	0.65 <sup>†</sup>	6.65	-0.66	7.92	.103	0.59 <sup>†</sup>
Impulse control difficulties	17.30	6.58	14.03	6.13	<.001*	0.51 <sup>†</sup>	3.17	6.47	1.49	4.24	1.67	.233	0.31	7.90	1.98	5.52	.177	0.51 <sup>†</sup>
Lack of emotional awareness	18.23	5.72	16.87	5.65	.031*	0.24	1.01	5.28	2.34	4.06	-1.33	.512	0.28	7.88	3.35	6.50	.565	0.25
Limited access emot. regul. strat.	25.30	7.83	22.80	8.56	.004*	0.31	3.72	6.47	-2.28	7.53	6.00	.018*	0.85 <sup>‡</sup>	6.72	-1.93	7.43	.015*	0.83 <sup>‡</sup>
Lack access of emotional clarity	14.94	5.61	12.77	5.06	<.001*	0.41	3.01	3.86	2.79	5.34	0.22	.299	0.05	4.98	4.15	8.69	.274	0.02
Global scores	113.00	27.59	95.15	27.03	<.001*	0.51 <sup>†</sup>	19.37	22.34	1.02	23.62	18.34	.032*	0.80 <sup>‡</sup>	6.62	0.25	7.28	.034*	0.85 <sup>‡</sup>
ED severity: EDI-2																		
Total score	101.88	41.04	76.08	44.51	<.001*	0.60 <sup>†</sup>	27.60	31.28	11.84	21.14	16.56	.136	0.62 <sup>‡</sup>	5.82	1.97	3.85	.047*	0.64 <sup>‡</sup>
Psychopat. SCL-90-R																		
GSI score	1.72	0.76	1.23	0.80	<.001*	0.62 <sup>†</sup>	0.62	0.55	0.09	0.61	0.54	.034*	0.93 <sup>‡</sup>	5.94	0.98	6.34	.037*	0.89 <sup>‡</sup>

Note: ANOVA = analysis of variance; DERS = Difficulties in Emotion Regulation Scale; ED = eating disorder; EDI-2 = Eating Disorders Inventory-2; CSI = Global Severity Index; RCI = Reliable Change Index; SCL-90-R = Symptom Checklist-90 Revised; SD = standard deviation.

Good outcome is considered for complete remission and poor bad outcome for non-remission or partial remission.

p-values include Finner's procedure to account for increase in type I error due to multiple statistical comparisons.

<sup>†</sup>Moderate effect size ( $|d| > 0.50$ ) to

<sup>‡</sup>high effect size ( $|d| > 0.80$ ).

\*Significant comparison (.05 level).

e 2015

# Therapy strategies in ED with comorbid Impulse related disorders

- **Symptom oriented strategies:**
  - Transdiagnostic CBT (self-monitoring, behavioural management of symptoms, coping with irrational beliefs, problem solving strategies, cues exposure..)
  - CBT + pharmacological therapy
  - Dialectical Behavior Therapy
  - Motivational therapy
- **Non-symptom oriented strategies:**
  - Emotional regulation
  - Mindfulness/CFT
  - Neurocognitive training



# Techniques used in ED with high Impulsivity

- **Emotional regulation:**
  - Self-regulation skills (self-soothing, imagery, distracting, meditation, self-awareness).
  - Stress management and self-control strategies (relaxation, biofeedback, breathing techniques).
- **Behavioral/cognitive area:**
  - Delay of response
  - Planning skills
  - Cognitive remediation strategies

# CBT Outpatient GT

16 WEEKLY SESSIONS  
90 MIN. DURATION  
7-10 PATIENTS



## CBT- Group therapy:

- Learning self-monitoring and structured meal patterns.
- Motivational interviewing
- Awareness of the “binging-escaping from problems” vicious circle
- Cognitive restructuring
- Problem solving
- Achievement of behav. goals
- Response prevention strategies

# Group Therapy for Bulimia nerviosa/BED

Agüera et al. *BMC Psychiatry* 2013, **13**:285  
<http://www.biomedcentral.com/1471-244X/13/285>



## RESEARCH ARTICLE

## Open Access

### Cognitive behaviour therapy response and dropout rate across purging and nonpurging bulimia nervosa and binge eating disorder: DSM-5 implications

Zaida Agüera<sup>1,2</sup>, Nadine Riesco<sup>2</sup>, Susana Jiménez-Murcia<sup>1,2,3</sup>, Mohammed Anisul Islam<sup>1,2</sup>, Roser Granero<sup>1,4</sup>, Enrique Vicente<sup>2</sup>, Eva Peñas-Lledó<sup>5</sup>, Jon Arcelus<sup>6</sup>, Isabel Sánchez<sup>2</sup>, Jose Manuel Menchon<sup>2,3,7</sup> and Fernando Fernández-Aranda<sup>1,2,3\*</sup>



#### GROUP OUTPATIENT CBT

Weekly Sessions

90 min duration

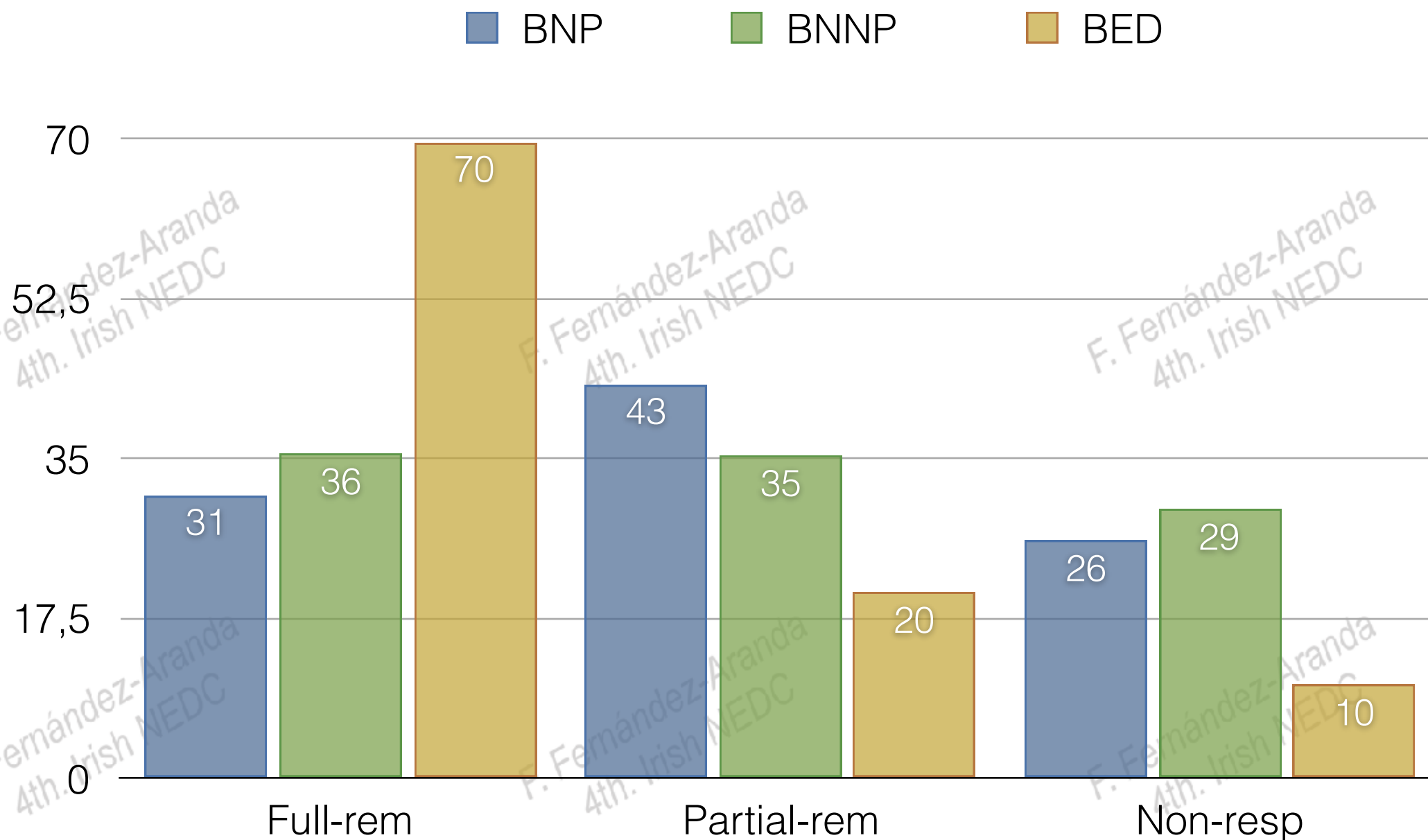
7-10 duration

BN-P: 327  
BN-NP: 40  
BED: 87



# Results

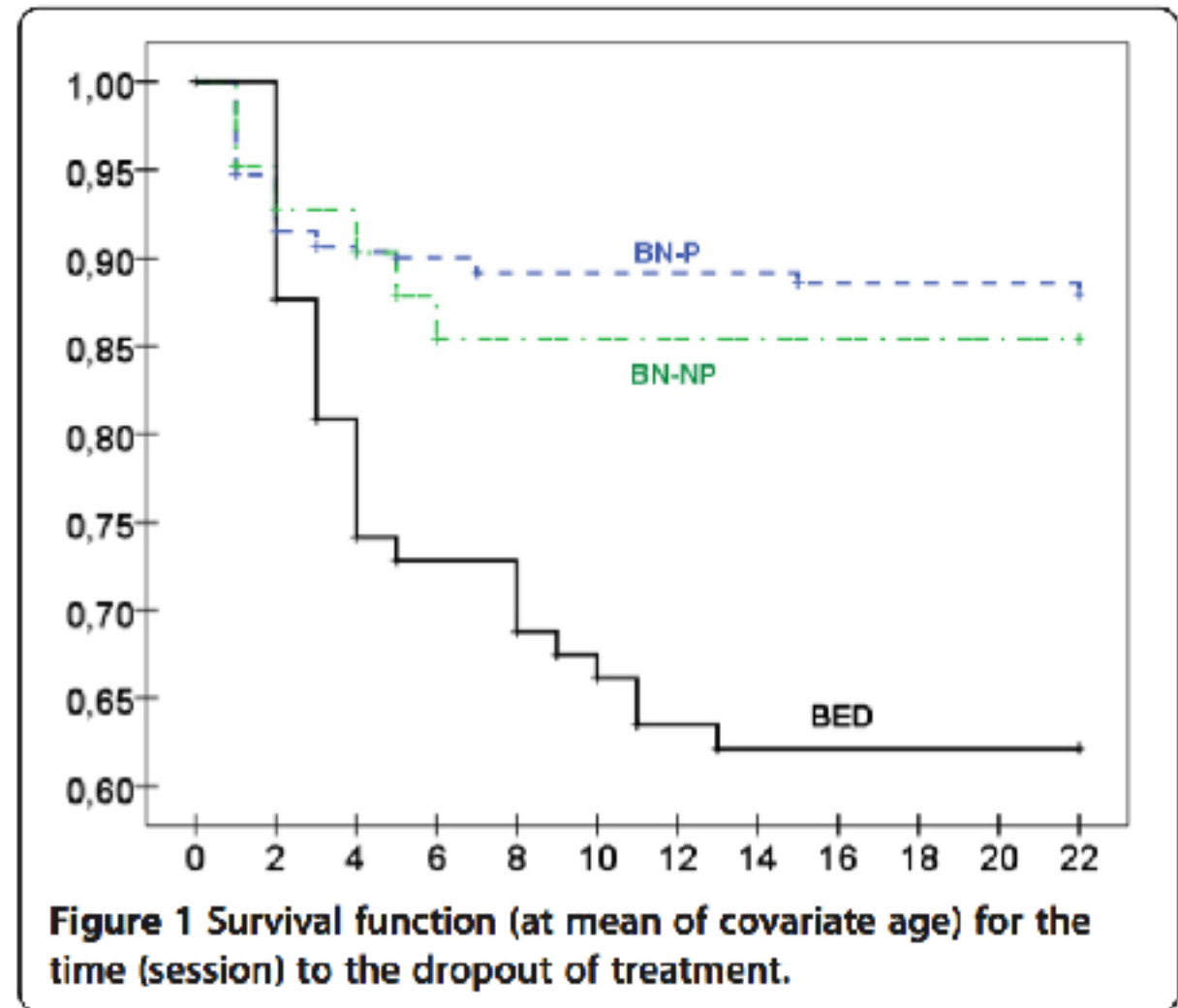
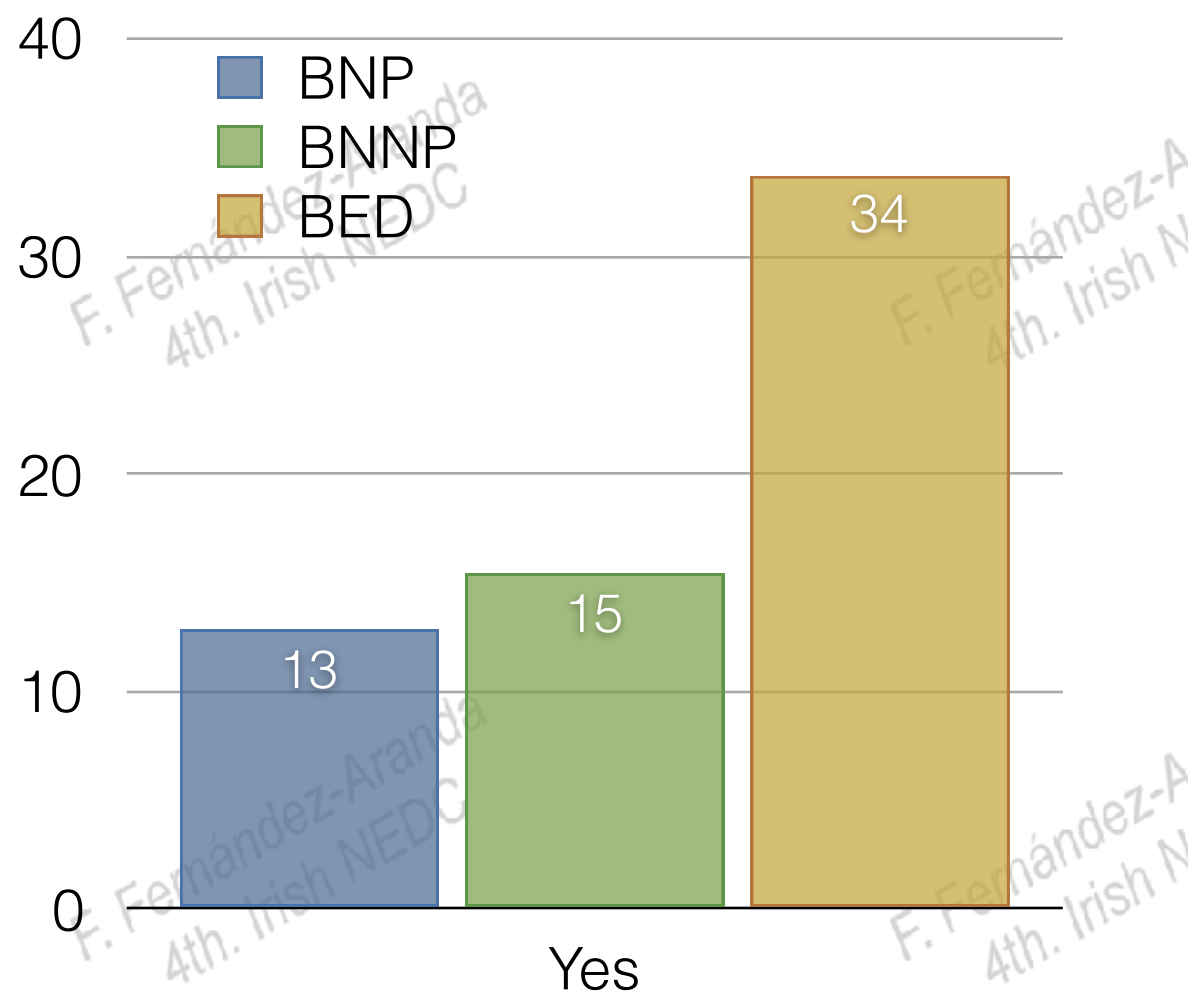
## Response to treatment (completers)



Agüera et al., 2013. BMC Psychiatry.

# Results

## Dropout from treatment



# Limitations of Therapy in ED with comorbid Impulse related disorders

- Higher relapses and **drop-out** rates
- Lower **motivation** and therapy adherence
- Poorer **prognosis** (basically due to higher severity, dysfunctional personality traits and additional comorbid Axis I and II disorders).
- Lower social support and higher isolation.
- More medical complications and higher mortality rates.
- Impulsive traits seem to be difficult to be modified.





# ANTECEDENTES

## PlayMancer: A European Serious Gaming 3D Environment



*E. Kalapanidas*  
*C. Davarakis*

*T. Ganchev*  
*O. Kocsis*

*C. Breiteneder*  
*H. Kaufmann*

*J. Jacobsen*  
*J. Krabbe*



**UNIVERSITY OF TWENTE.**



*T. Lam*  
*T. Raguin*

*M. Vollenbroek*  
*R. Huis in 't Veld*

*Konstantas, D.*  
*M. Ben Moussa*



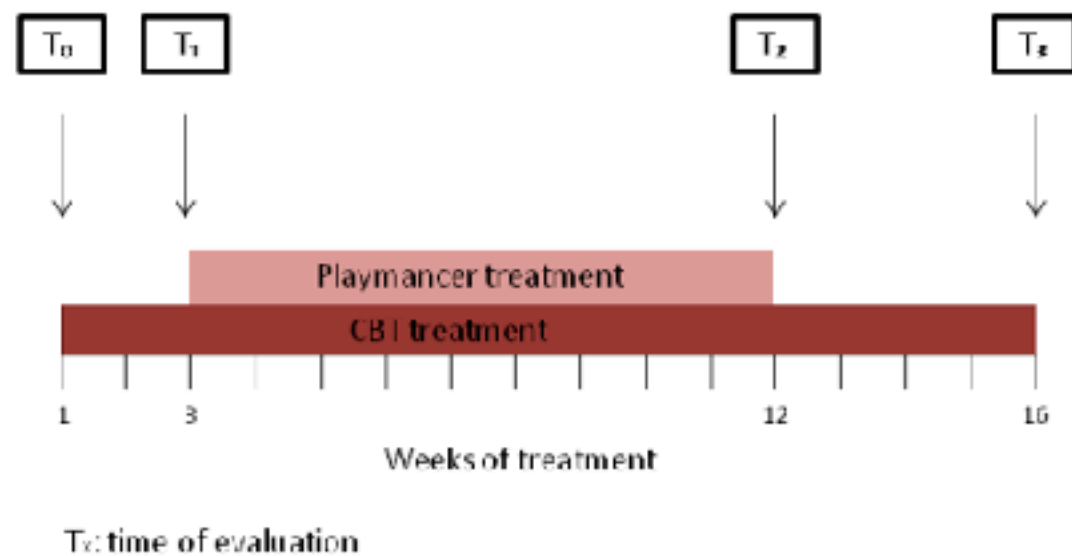
*S. Jimenez-Murcia*  
*K. Gunnard,*  
*J. Santamaría*  
*A. Soto*  
*F. Fernandez-Aranda*



**ICT - INFORMATION AND COMMUNICATION  
TECHNOLOGIES- FP7-ICT-2007-1**



# Enhanced CBT for BN (plus Serious Video Game)



**Figure 1.** Recording of facial expression and physiological activity during the Islands Video game session.

*Fernandez-Aranda y cols, 2012 Mental Health  
Fagundo et al., 2013 European Eat. Dis. Rev., 21:6  
Fagundo et al., 2014 JMIR, 2014,16(8):e183.21:6*



# Procedure and Islands demo



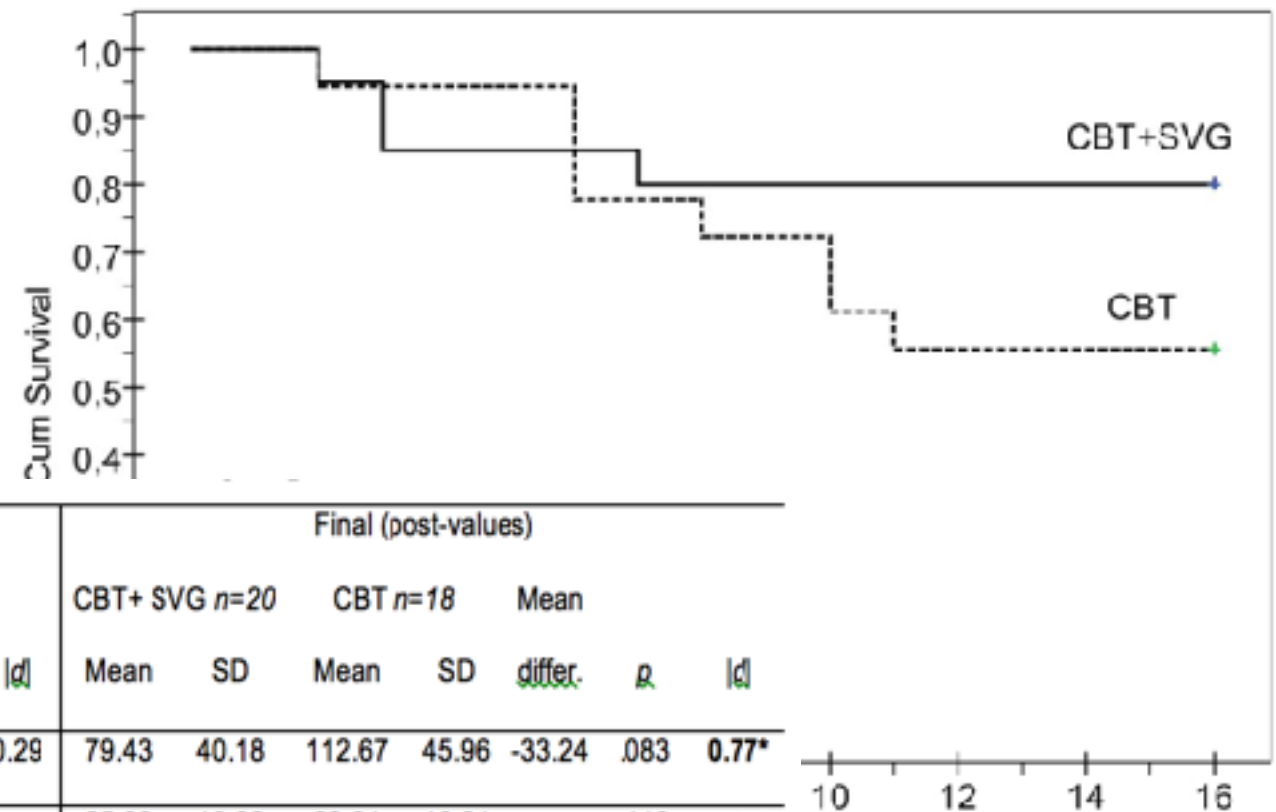
YouTube

Keywords: Bellvitge Playmancer  
**YouTube**



# Enhanced CBT for BN (plus Serious Video Game)

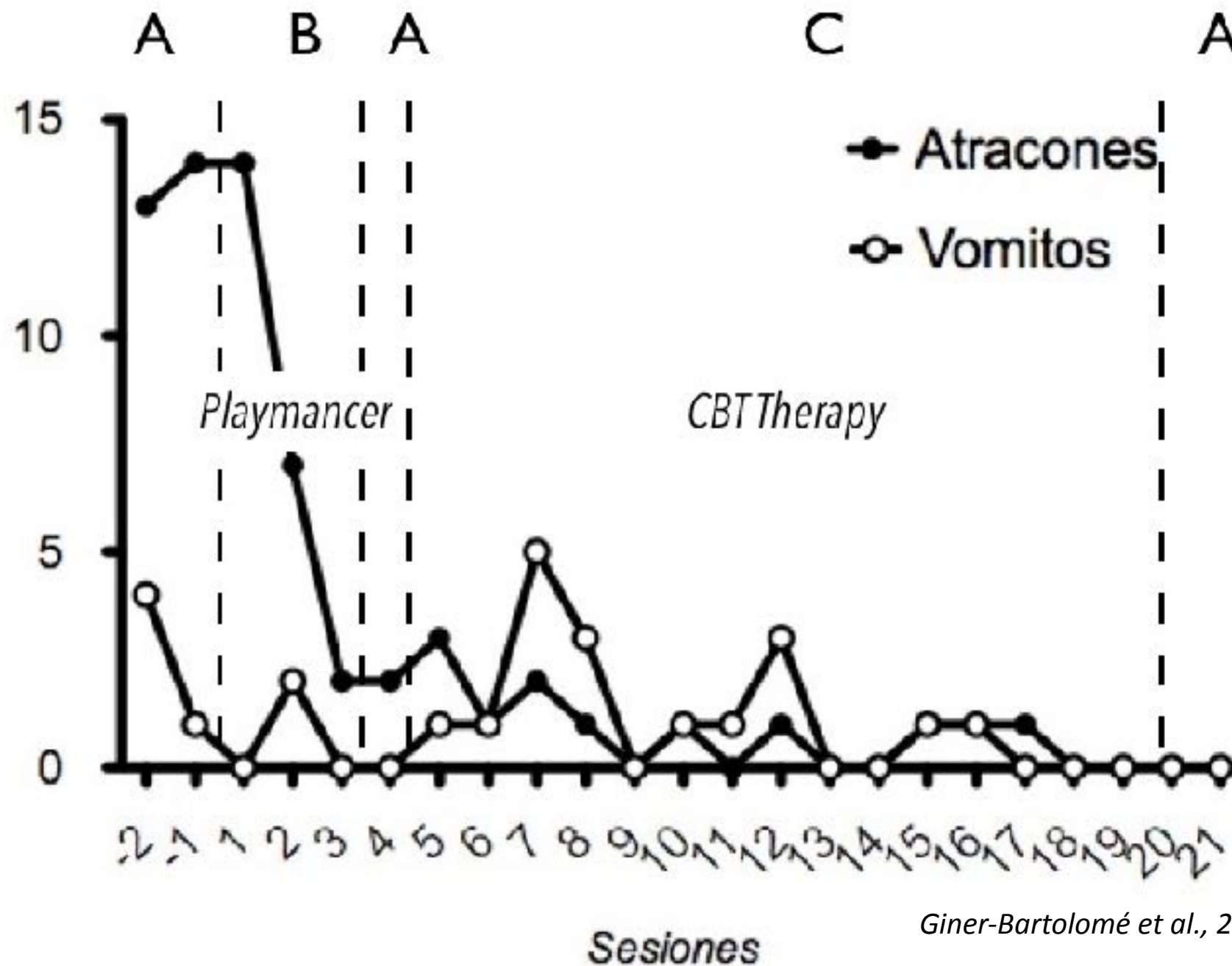
CBT+ SVG: 20  
CBT-SVG: 18



	Baseline (pre-values)							Final (post-values)						
	CBT+SVG n=20		CBT n=18		Mean			CBT+ SVG n=20		CBT n=18		Mean		
	Mean	SD	Mean	SD	differ.	p	d	Mean	SD	Mean	SD	differ.	p	d
EDI: total	106.80	41.05	117.67	34.10	-10.87	.633	0.29	79.43	40.18	112.67	45.96	-33.24	.083	<b>0.77*</b>
STAI: state	28.11	12.48	30.12	11.95	-2.01	.684	0.16	25.00	10.82	33.91	16.61	-8.91	.118	<b>0.64*</b>
STAI: trait	35.58	9.90	35.69	9.80	-0.11	.707	0.01	28.77	10.90	35.82	7.26	-7.05	.055	<b>0.76*</b>
STAXI: state	20.11	8.94	19.29	7.70	0.82	.546	0.10	18.79	8.35	23.70	11.40	-4.91	.154	0.49
STAXI: trait	24.17	7.33	25.59	6.79	-1.42	.613	0.20	22.64	7.08	25.50	6.29	-2.86	.341	0.43
STAXI: AEI	33.32	9.76	39.00	10.14	-5.68	.129	<b>0.57*</b>	28.07	10.09	38.40	13.53	-10.33	.138	<b>0.87*</b>
SCL-90: GSI	1.84	0.90	1.96	0.67	-0.12	.593	0.15	1.31	0.81	2.07	0.83	-0.76	.053	<b>0.93*</b>
SCL-90: PST	67.15	18.27	71.94	13.48	-4.79	.496	0.30	55.14	18.59	72.11	19.95	-16.97	.046	<b>0.88*</b>
SCL-90: PSDI	2.33	0.67	2.37	0.62	-0.03	.874	0.05	1.95	0.63	2.50	0.61	-0.55	.062	<b>0.88*</b>

Fernandez-Aranda et al., 2015 Cyberpsychology

# Treatment of VGT before CBT and influence on binge/vomiting episodes



Giner-Bartolomé et al., 2015 Frontiers Psychology



# Enhanced CBT for TRI (plus Serious Video Game)



## A Serious Videogame as an Additional Therapy Tool for Training Emotional Regulation and Impulsivity Control in Severe Gambling Disorder

Salomé Tárrega<sup>1</sup>, Laia Castro-Cameras<sup>2</sup>, Fernando Fernández-Aranda<sup>2,4,5</sup>, Roser Granero<sup>1,4</sup>, Cristina Giner-Bartolomé<sup>2,4</sup>, Neus Aymamí<sup>2</sup>, Mónica Gómez-Peña<sup>2</sup>, Juan J. Santamaría<sup>2</sup>, Laura Forcano<sup>2</sup>, Trevor Steward<sup>2,4</sup>, José M. Manchón<sup>2,6,7</sup> and Susana Jiménez-Murcia<sup>2,4,5\*</sup>

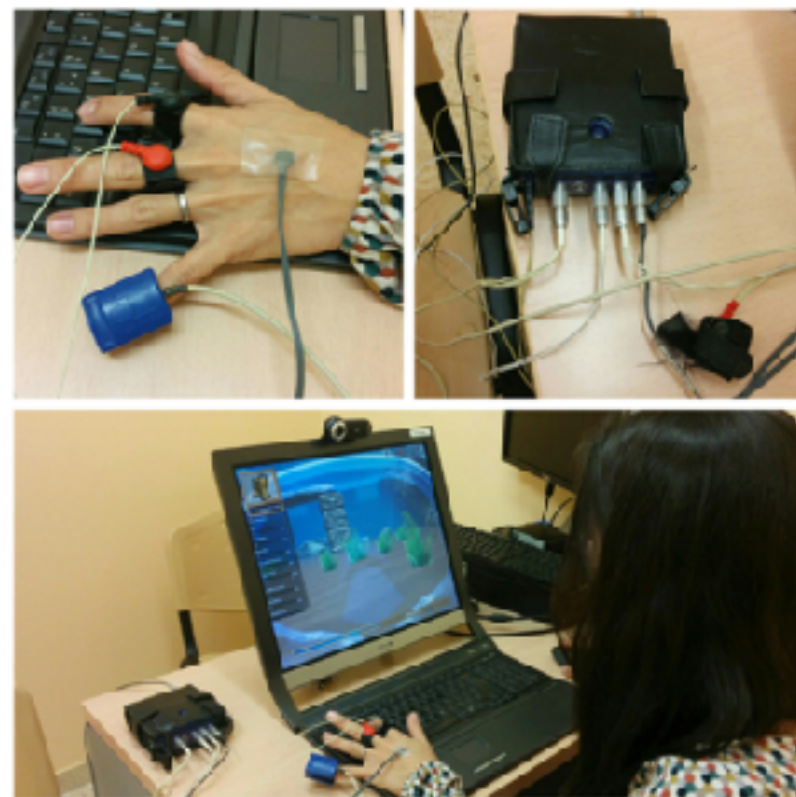


FIGURE 3 | Recording physiological activity during the Playmanor VG session.

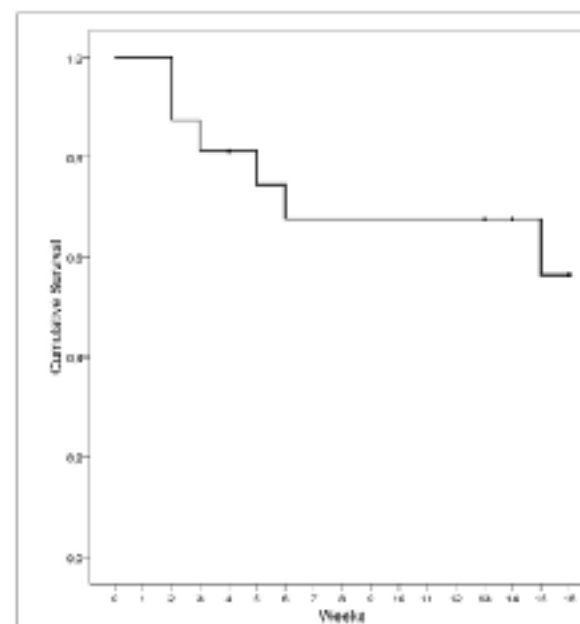
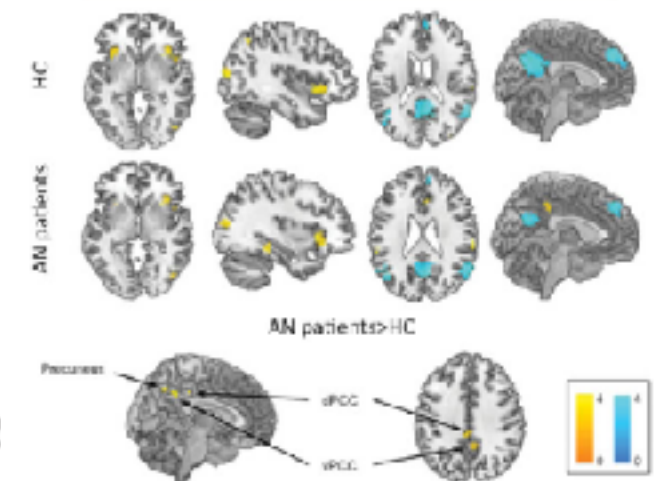


FIGURE 4 | Kaplan-Meier curve for the cumulative survival of relapse during treatment ( $n = 16$ ).

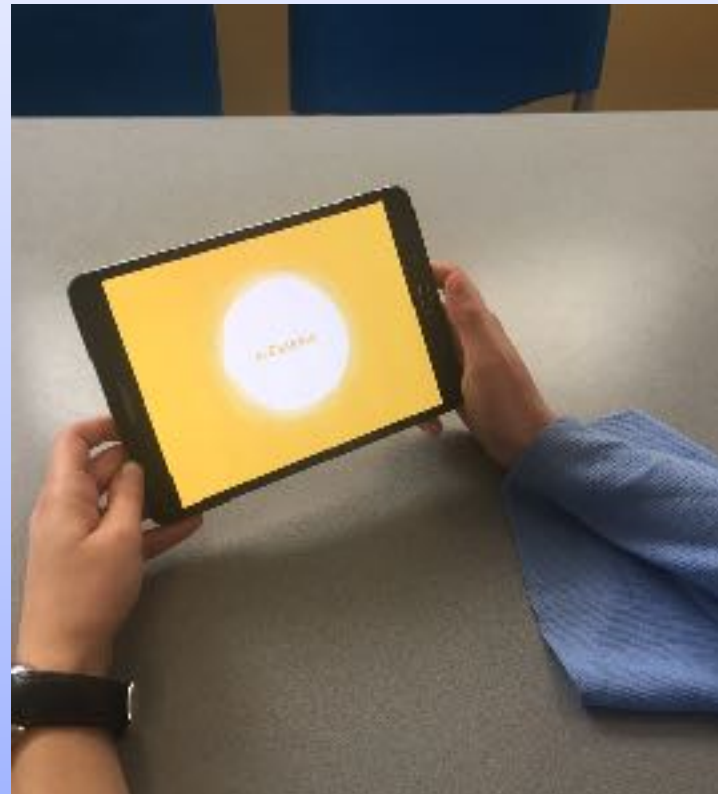
### (4) Main analyses – Body perception task



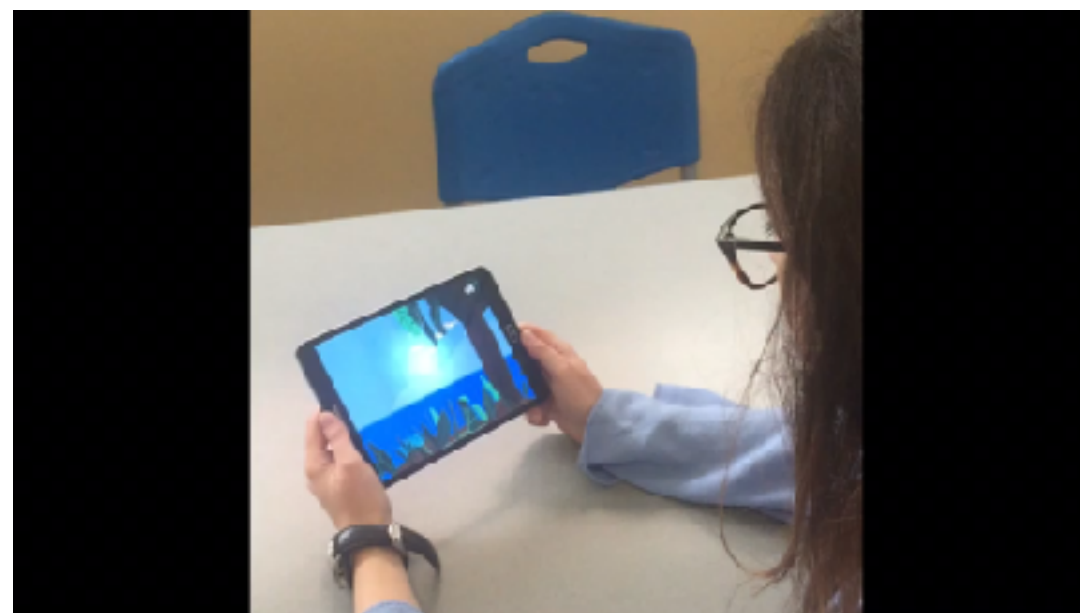


# RETOS FUTUROS

## e-ESTESIA: APP PARA REGULACION EMOCIONAL



ciberobn



2016-2018

PSI2015-68701R

101.035 Euros



European Union  
European Regional  
Development Fund

# Cognitive Impairment in OW/OBE and Role of DM

## Predimed-plus Study



Professionals and Public Learning how lifestyle, nutrition, genetics, and gut microbes contribute to mental health

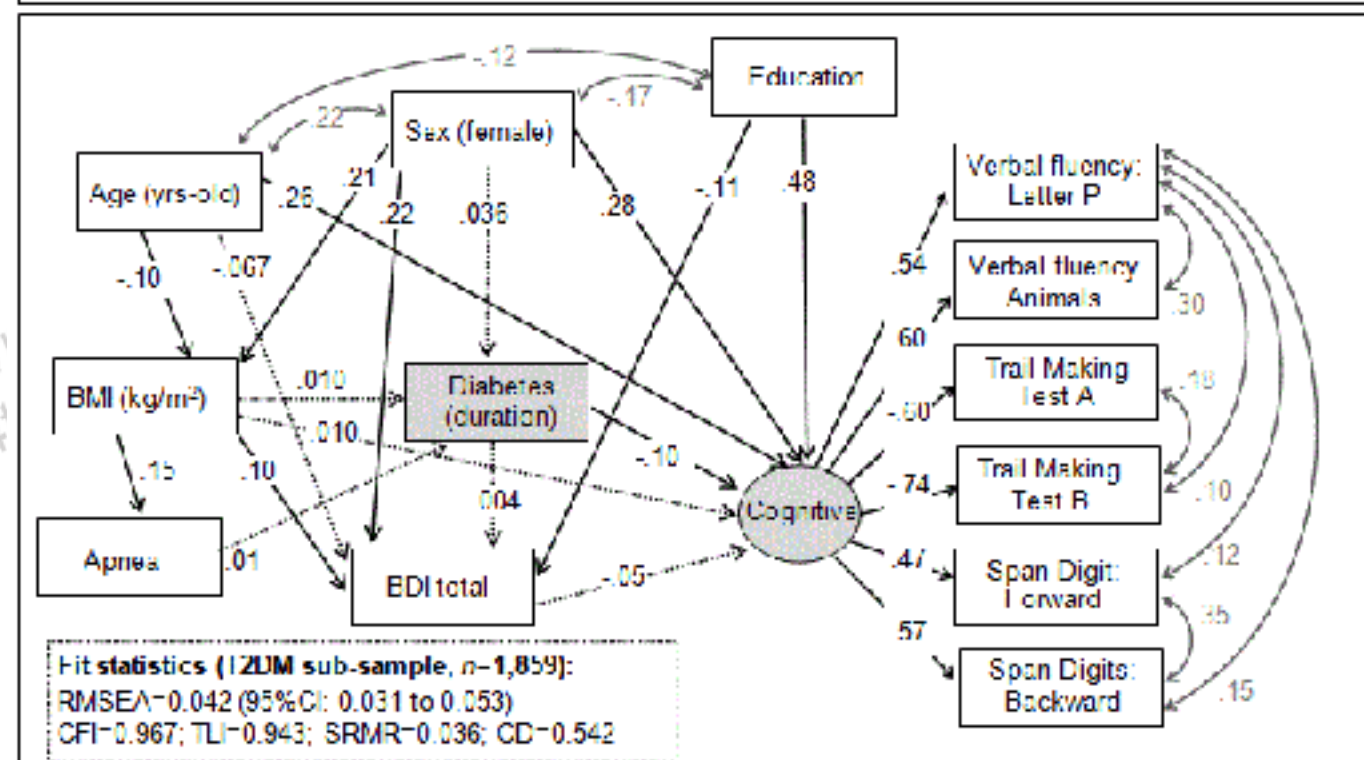
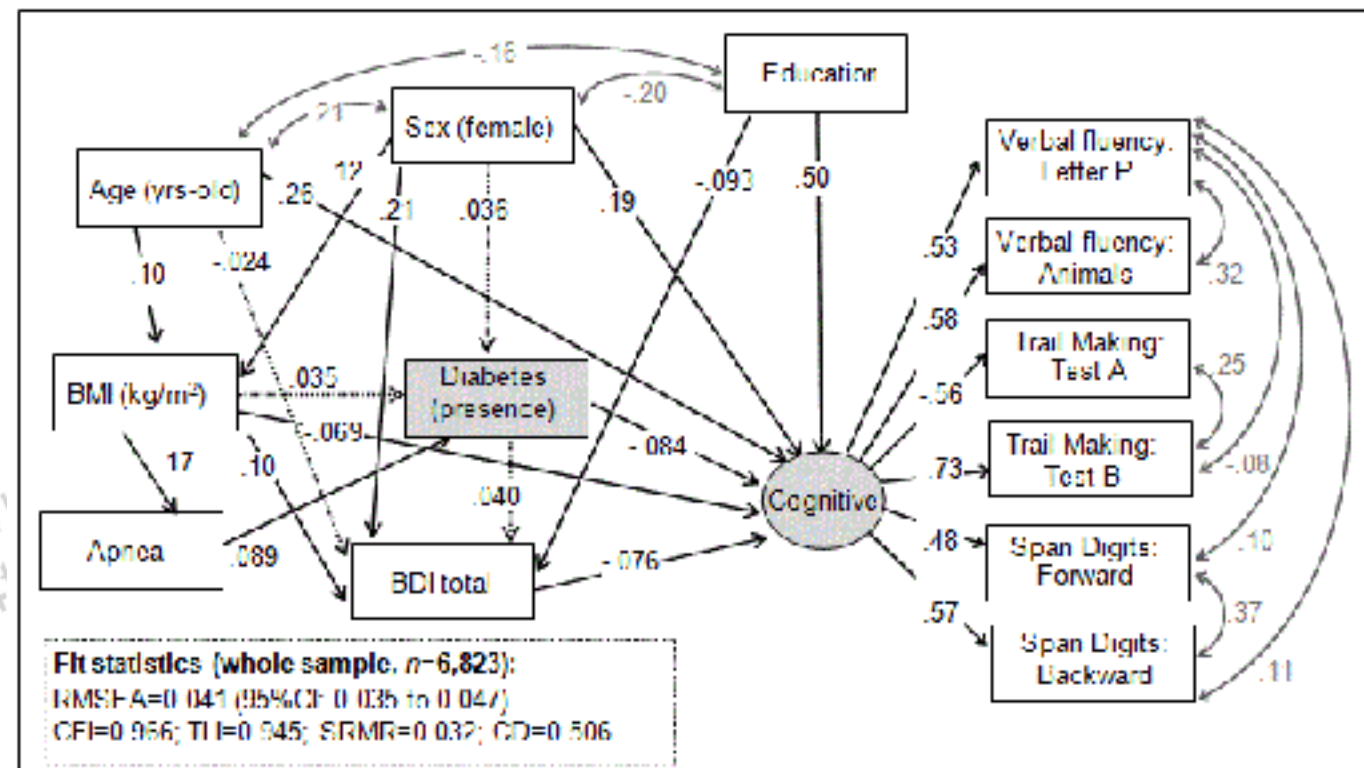
Home Organization New Brain Nutrition Updates About Contact



SCIENTIFIC REPORTS

**OPEN** Type 2 diabetes and cognitive impairment in an older population with overweight or obesity and metabolic syndrome: baseline cross-sectional analysis of the PREDIMED-plus study

Núria Mallorquí-Bagué<sup>1,2</sup>, María Lpezano-Madriz<sup>1,2</sup>, Estefanía Toledo<sup>1,2</sup>, Dolores Corella<sup>1,2</sup>, Jordi Salas-Savador<sup>1,2</sup>, Aida Cuenca-Royo<sup>1,2</sup>, Jesús Vioque<sup>1,2</sup>, Dora Bonaguera<sup>1,2</sup>, A. Alfredo Martínez<sup>1,2</sup>, Julia Wärnberg<sup>1,2</sup>, José López-Aranda<sup>1,2</sup>, Ramón Estruch<sup>1,2</sup>, Aurora Bueno-Cavallero<sup>1,2</sup>, Angel Alonso-Gómez<sup>1,2</sup>, Josep A. Tur<sup>1,2</sup>, Francisco J. Tinahones<sup>1,2</sup>, Lluís Serra-Majem<sup>1,2</sup>, Vicente Martín<sup>1,2</sup>, José Lapetra<sup>1,2</sup>, Cèlia de Vilanova<sup>1,2</sup>, Xavier Fito<sup>1,2</sup>, Josep M. Llach<sup>1,2</sup>, Lluís Ochoa<sup>1,2</sup>, José J. Guals<sup>1,2</sup>, Rocio Baragán<sup>1,2</sup>, Mónica Bulló<sup>1,2</sup>, Olga Castañer<sup>1,2</sup>, Rosa Granado<sup>1,2</sup>, Pilar Ruiz-Cosío<sup>1,2</sup>, Rocio Baragán<sup>1,2</sup>, Mónica Bulló<sup>1,2</sup>, Olga Castañer<sup>1,2</sup>, Mendi García-de-la-Hoz<sup>1,2</sup>, Aina M. Yáñez<sup>1,2</sup>, Itziar Navea<sup>1,2</sup>, Antonio García-Rosa<sup>1,2</sup>, Miguel Ruiz-Canela<sup>1,2</sup>, Andrés Díaz-López<sup>1,2</sup>, Susana Jiménez-Murcia<sup>1,2</sup>, Miguel A. Martínez-González<sup>1,2,3,4</sup>, Rafael de la Torre<sup>1,2,3,4</sup> & Fernando Fernández-Aranda<sup>1,2,3,4</sup>





# Challenges for the next decade in the management of Eating Disorder

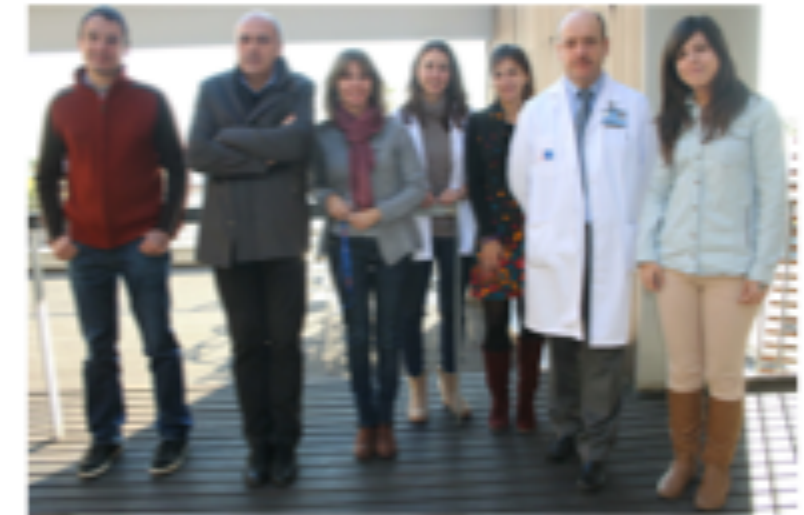
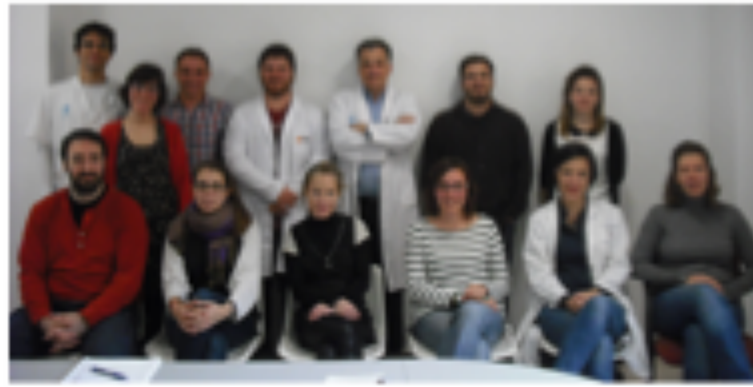
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- **Chronicity** and aging in ED
- Impulsivity and how to deal with **emotions and perfectionism**
- **SUD/Comorbidities** and ED: a comprehensive approach?
- Lifetime **obesity** and ED: categorical vs. dimensional
- How to deal with **drop-out**



# Thank you!

*ciberobn*  
Centro de Investigación Biomédica en Red  
Fisiopatología de la Obesidad y Nutrición



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European Regional Development Fund



**Go raibh maith agat!**

