



**Final report 61/04**

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## **Background**

Eating disorders (ED) are common and severe psychiatric conditions starting in early adolescence. Frontal lobe functional maturation extends throughout adolescence and into early adulthood, and therefore it is likely to be disrupted by these conditions. In an fMRI scanning study performed in our laboratory we found abnormal activations in the medial orbitofrontal cortex of ED patients in response to food stimuli. Nevertheless, no systematic functional assessment of the orbitofrontal cortex in ED has been reported so far. Therefore, in this study we use neuropsychological tasks known to be sensitive to orbitofrontal damage to examine the functional significance of orbitofrontal cortex involvement in the psychopathology of ED. The Iowa Gambling task (IGT) assesses participant's decision-making ability in the context of variable contingencies similar to real-life situations; this task is known to depend on medial orbitofrontal areas.

Previous research also found that there is a connection between Gambling Task performance and genes, in particular the dopamine (DRD4) and serotonin (5HT2) genes. These genes may also be linked with personality traits such as impulsivity and perfectionism, which affect participants' performance on the IGT.

The results of this study will (a) contribute to the neurobiological model of ED, (b) provide an assessment of decision-making abilities important for real-life functioning, (c) thus contribute to the cognitive model of ED used in treatment and provide a basis for improved and more targeted interventions for anorexia nervosa.

## **Final report**

### **Participants:**

- 1) Thirty female patients with Anorexia Nervosa (FAN), 25 females with Bulimia Nervosa and 10 male Anorexia Nervosa patients have been tested. These were recruited from the Eating Disorder Unit at the Maudsley and Royal Bethlem Hospitals.
- 2) Fifty-three healthy females (HF) and 31 healthy males were recruited from the local community (total n =84) as controls. Healthy control participants were screened to rule out any current or recent psychiatric history. SCID based on DSMIV criteria was used to check clinical characteristics.
- 3) Nonsuitable participants were not included in this study (e.g. 2 had brain injury, 2 had current emotional problems, one had a past history of binge eating disorder and one met criteria for an Eating Disorder not Otherwise Specified (EDNOS)(Total n=12). We only excluded participants after the clinical interview.

In total, we have recruited 149 clinical and non clinical participants who completed the study.

4) In addition 26 recovered AN people were tested.

Total number of those who took part in this project was 175.

So far we believe it is the largest study using this methodology on psychiatric population. In ED similar study on smaller group was conducted in Italy (69 participants).

The subject groups are not significantly different with regard to age; ethnicity, education level, and premorbid IQ assessed by the National Adult Reading Test (NART) (see Table 1).

Data collection is successfully completed. We have results regarding:

1. Behavioural performance on IGT ( Figures 1 & 2)
2. Skin Conductance measurement (Figures 3 & 4)
3. DNA (SWAB sample we already collected majority of sample 62 and rest is underway)

## **Results:**

Overall the results of our study will be separated into three different parts: Behavioural, Physiological and Genetics. We will also report in peer review journals about difference between healthy controls, AN and recovered AN groups to discuss state trait characteristics of DM.

We will also compare different subgroups of ED healthy, AN and BN. We will describe AN female and male population in context of DM. (In above mentioned, papers we will focus on behavioural and skin conductance measurements in the light of somatic marker hypothesis).

After completion of DNA sample we will explore association between gene allele types (serotonin (5HT) allele: short short, short long, long long) and behavioural outcomes (Good learning vs. Bad learning).

The behavioural results indicate that compared to healthy controls the ability of women with anorexia nervosa to make good decisions is impaired. The healthy controls made significantly more low risk (advantageous) decisions, (i.e. picked significantly more cards from the low risk decks). This phenomenon will be investigated further after the completion of the physiological results (skin conductance) and genetic analysis.

All highlighted results will be reported in peer-reviewed publications. The support of the *Bial Foundation* will be acknowledged in each of them.

So far we have acknowledged *Bial Foundation* support on our website (<http://www.iop.kcl.ac.uk/IoP/Departments/PsychMed/EDU/DecisionStudy.shtml>), five Eating Disorders Newsletters (disseminated to several hundred people on our research volunteer register), two abstracts at the Eating Disorders Research Society conferences in Amsterdam and Toronto, preliminary findings were also presented in Vienna at the Biological Psychiatry congress, at the London Eating Disorders Network BABCP meeting in Warwick and Port Douglas EDRS conference.

**Published papers acknowledging the BIAL foundation are:**

**Davies H, Tchanturia K. (2005)** Cognitive Remediation Therapy as an intervention for acute Anorexia Nervosa: A Case Report. *European Review of Eating Disorders*. 13, 311-316

**Tchanturia K, Campbell I, Morris R, Treasure J. (2005)** Neuropsychological Studies in AN. *International Journal of Eating Disorders, Special Issue ANOREXIA NERVOSA 37:572-576*

**Southgate L, Tchanturia K, Treasure J, (2005)** Building a model of the aetiology of eating disorders by translating experimental neuroscience into clinical practice. *Journal of Mental Health* 14 (6) 1-14

**Tchanturia K, Whitney, J, Treasure J (in press)** Can cognitive exercise help to treat anorexia nervosa? Case report. *Weight and Eating Disorders*

**Paper under revision in Journal of International Neuropsychological Society:**  
**Tchanturia K, Liao T, Uher R, Lawrence N, Treasure J, Campbell I.** An investigation of decision making in people with anorexia nervosa using Iowa Gambling task and skin conductance measurements (JINS)

**We have also completed cognitive exercise book for patients with anorexia.**

Our preliminary findings were presented in number of prestigious national and international scientific meetings and conferences for example:

International ED Conference (VII) in London

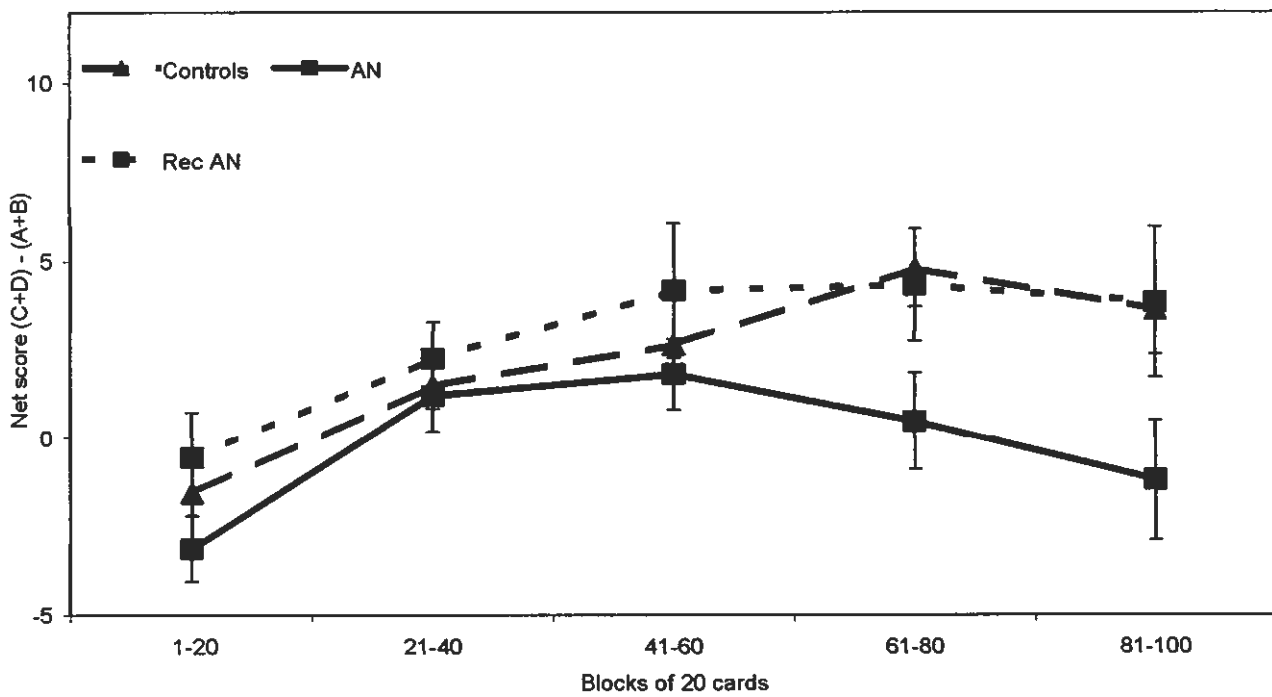
Toronto EDRS  
Amsterdam EDRS  
Vienna Biological Psychiatry Congress  
Port Douglas EDRS  
Barcelona AED  
Research meetings in the IoP in Ed research group and Social Genetic and  
Developmental Psychiatry Department

Part of this data will be used in T.Liao's PhD and Bial generous contribution will be  
acknowledged as appropriate.

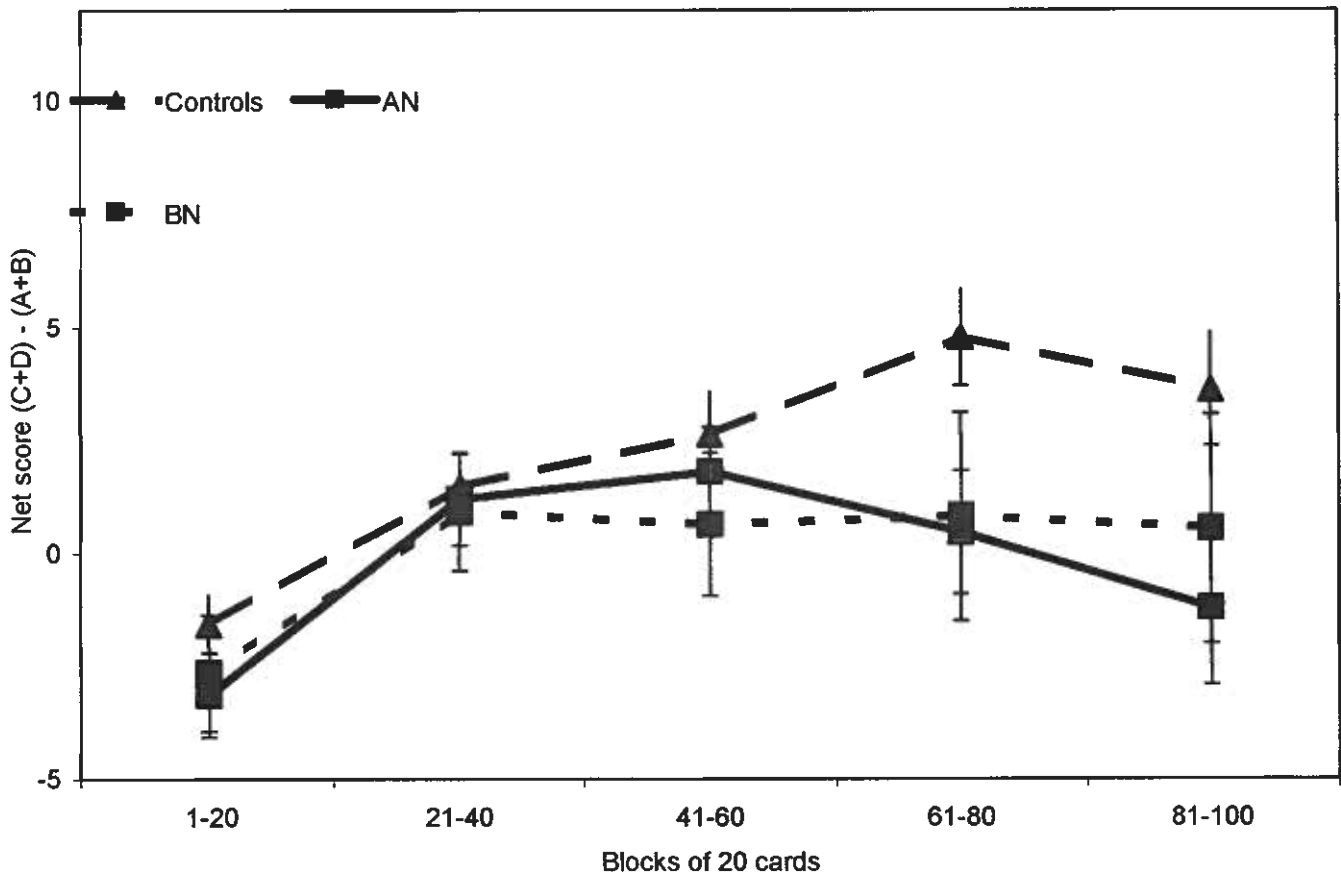
**Table 1 : Baseline and demographic data on eating disorder and control subjects**

	Healthy Males N=30	Healthy Females N=52	AN Females N=29	AN Males N=8	BN Females N=15	RecAN Females N=20	F	P
<b>Age Mean (SD)</b>	28.5 (10.3)	29.3 (9.8)	26.7 (7.9)	28.0 (9.8)	28.4 (6.3)	27.9 (7.0)	.425	.830
<b>Years of Education Mean (SD)</b>	14.9 (3.7)	15.1 (3.0)	15.3 (3.1)	12.8 (2.8)	15.9 (4.1)	16.3 (2.3)	1.579	.169
<b>Estimated IQ - NART Mean (SD)</b>	113.7 (10.0)	112.4 (6.3)	114.0 (9.3)	109.5 (9.0)	114.3 (4.5)	116.5 (5.6)	1.238	.294
<b>SCID Scores Mean (SD)</b>	88.9 (5.2)	87.1 (6.2)	37.9 (11.5)	62.8 (23.3)	74.3 (5.4)	78.3 (9.5)	141.24	.000
<b>BMI (kg/m<sup>2</sup>)</b>	23.6 (3.3)	22.8 (3.5)	15.5 (1.3)	15.5 (1.7)	22.6 (4.9)	20.7 (2.8)	31.31	.000

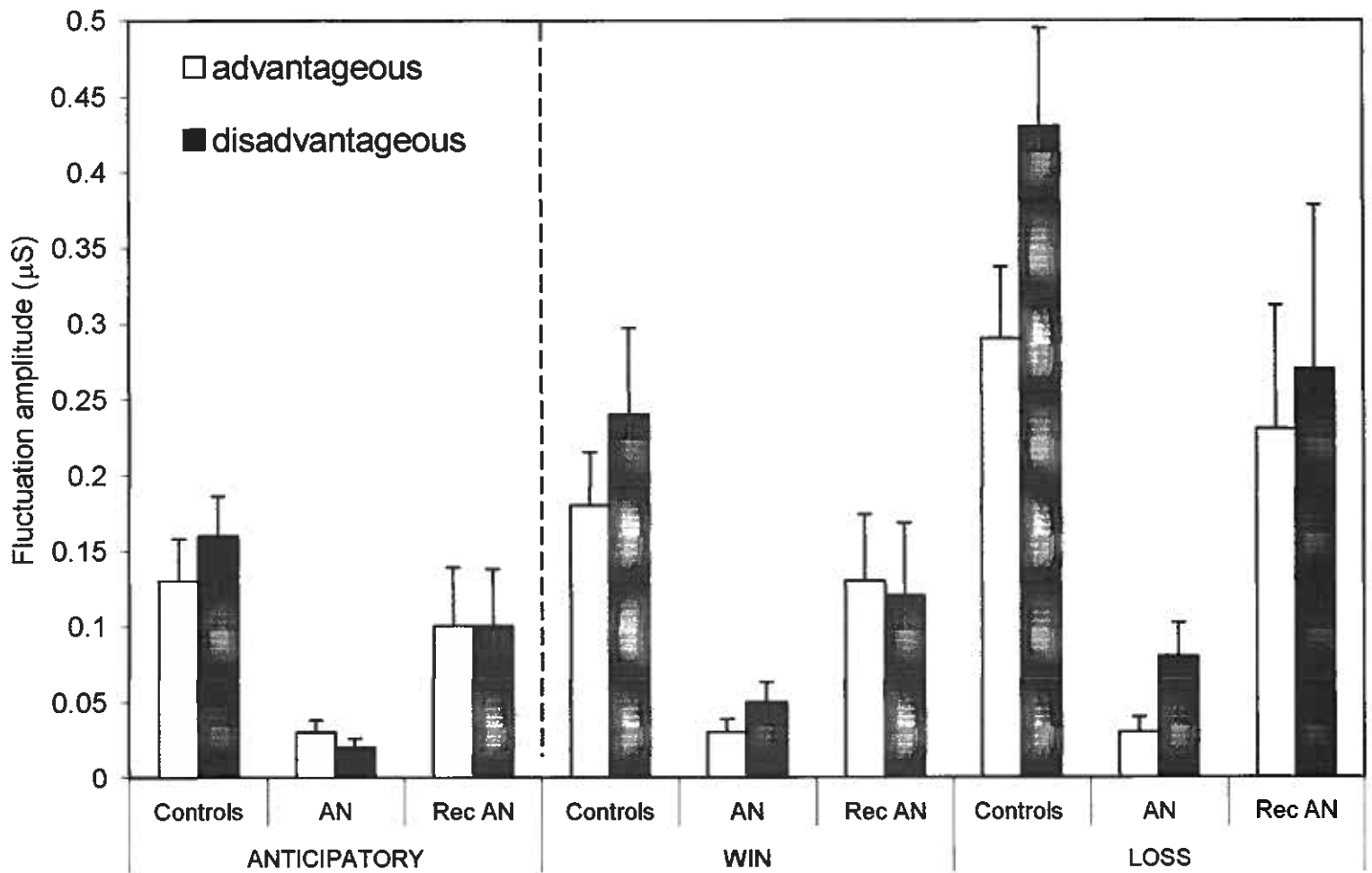
**Figure 1. IGT performance in HC, AN and long term recovered AN**



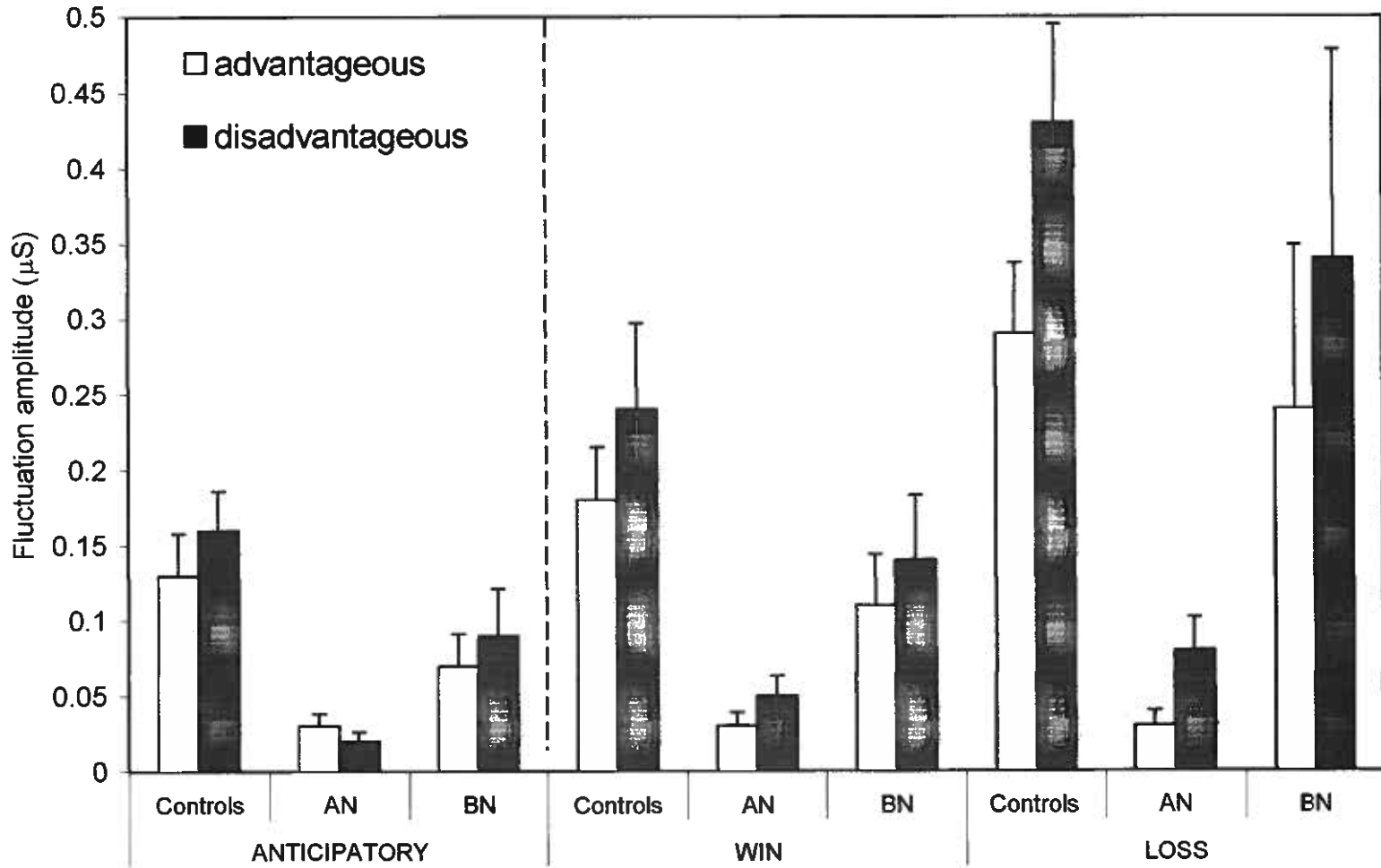
**Figure 2. IGT performance in HC, AN, Bulimia Nervosa (BN) and long term recovered AN**



**Figure 3. Skin Conductance Response (Anticipatory and Response) when won/lose money in HC, AN and recovered AN**



**Figure 4. Skin Conductance Response (Anticipatory and Response) when won/lose money in HC, AN and BN**



To conclude:

We believe that after successful recruitment and acceptable dissemination of the obtained results, number of the international expert discussions on scientific conferences we are in a strong position to publish several further publications on conducted research kindly sponsored from BIAL.

I would like to take this opportunity to thank again from all our research group for financial support. These research findings were very stimulating for our further research.

On behalf of the group  
Dr. K. Tchanturia