IS OBESITY RESULT OF ADDICTION?

ANTON GRECH
OBESITY

2/3 of western population overweight or obese

Replaced smoking as leading cause of preventable death (less life expectancy by 6 – 7 years)

? Physiological and psychological underpinning of obesity
Is overeating and addiction analogous to drug abuse, where individuals become dependent:

a) psychologically, and/or
b) physically

On foods high in fat and sugar
PARALLELES

- BEHAVIOURAL SIMILARITIES
- WITHDRAWALS
- CRAVING
- THINKING PROCESSING
BEHAVIOURAL SIMILARITIES

Escalation of Use:

Drugs:

• The substance is taken in larger amounts or over a longer period than intended.

Food:

• Eating large amounts of food when not feeling physically hungry.
BEHAVIOURAL SIMILARITIES

Loss of Control

• **Drugs:**
  • There is a persistent desire or unsuccessful effort to cut down or control substance use.

• **Food:**
  • 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.
BEHAVIOURAL SIMILARITIES

Social Consequences:

• **Drugs:**
  • Important social, occupational, or recreational activities are given up or reduced because of use.

**Food:**

• Eating alone because of being embarrassed by how much one is eating.
BEHAVIOURAL SIMILARITIES

Personal Distress:

Drugs:
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.

Food:
Feeling disgusted with oneself, depressed, or feeling very guilty after overeating; marked distress regarding binge eating; eating until feeling uncomfortably full.
WITHDRAWALS

• To prevent negative feelings

Leads to

• Feeling high

And continue in circular way
WITHDRAWALS: RODENTS EXPERIMENTS

• In rodents withdrawals of opiates and depletion of sucrose are similar: anxiety, depression, tremor, teeth chattering, head shaking

• Availability of opiates or sucrose after 12 hours:
  Similar behaviour
  Binge
WITHDRAWALS

• Animals deprived of food, being given highly palpable food result in taking 58% of their 24 hour calorie need within one hour

• While in humans no physical withdrawal symptoms reported, dysphoria is present after removing sugar from food, showing potential of psychological withdrawal
CRAVING

Definition:
• To seek substance despite a goal to remain abstinent

In animals:
• Sugar or drugs removal in animals: tolerate aversive measures with aim of seeking substance
CRAVING

Humans:

1. Diets: craving, especially carbohydrates

2. Ex heroin addicts: craving and binges on sweets, and food hoarding behaviour
COSIDERATIONS

• Food is a necessity for energy, growth and survival:
  Thus contrary to drugs it is influenced by much more areas than the pleasure pathways

• Withdrawals of food not strong
• Dopamine is much stronger with drugs
THINKING PROCESSING

• Are there similarities in thinking processes of addicts and persons who binge food?
Decisinal Impulsivity in Obesity

Francesca Falzon Aquilina, Anton Grech, Daniela Strelchuk, Nuria Donamayor, Mark Agius, Valerie Voon

Abstract
Introduction: Elevations in impulsivity have been clearly shown in various psychiatric conditions, especially in those of addiction. Evidence does suggest some overlap between the pathological use of food and drugs but no clear evidence to date has been made available with regards to obesity. In this study we hypothesise that obese subjects would have relatively more impulsive profiles when compared to healthy volunteers.

Method: Delayed discounting is also studied by means of the Monetary Choice Questionnaire, also hypothesizing impairments in this subtype of impulsivity.

Results: Obese subjects sought less evidence prior to making a decision when compared to healthy controls. Greater delayed discounting was also evident in this cohort of subjects as compared to healthy ones. Premature responding was not shown to be a significant feature.

Conclusion: Obesity is therefore characterized by impaired reflection impulsivity and greater delayed discounting. Both suggest a deficit in deciding on the basis of future outcomes that are more difficult to represent. This evidence could suggest possible therapeutic domains which need targeted interventions on the aspects of decision making deficits.

Key words
Impulsivity, Obesity, Addiction

Introduction
Obesity is a major international public health issue. The mechanism underlying obesity is complex and heterogenous, including, but not limited to; metabolic, genetic, inflammatory and neurocognitive contributions. The question of self-control, or the ability to control our impulses is highly relevant to pathological eating behaviours. Impulsivity is a heterogeneous construct with discrete but overlapping neural substrates. Impulsivity can be divided into decisional and motor subtypes. Decisional impulsivity is further divided into reflection impulsivity (the amount of information gathered before taking a decision) and delay discounting (a measure of subjective discounting of a delayed reward). Motor impulsivity divides into motor inhibition and premature or anticipatory responding.

Here we focus on assessing impulsivity in an adult population in Malta, a country highlighted as having one of the most obese populations.
self-control, or the ability to control our impulses is highly relevant to pathological eating behaviours

Impulsivity has been shown to be high in addicts

Is the same underlying process present in obese persons
DECISIONAL IMPULSIVITY IN OBESITY

• Subjects with BMI of 30 or higher from an eating disorders unit (‘Fondazzjoni Kenn Ghal Sahhtek’).

• Obese subjects were also screened for BED using the DSM-V criteria for BED.

• Age- and gender-matched healthy volunteers with a BMI of 26 or less were recruited via local advertisement.
Inclusion criteria:

- either male or female English speakers,
- aged between 18-75 years,
- capable of giving a written informed consent.
DECISIONAL IMPULSIVITY IN OBESITY

Exclusion criteria:

• history of severe neurological deficit or head injury,

• a clinical diagnosis of a significant DSM Axis one mental disorder, (e.g. schizophrenia, bipolar disorder, substance dependence) was also excluded,

• current major depression of moderate severity.
DECISIONAL IMPULSIVITY IN OBESITY

Questionnaires and tasks

• Subjects completed the Alcohol Use Disorders identification test (AUDIT)

• Beck Depression Inventory
DECISIONAL IMPULSIVITY IN OBESITY

‘Trait impulsivity’:

• Impulsive Behaviour Scale

• Spielberger State and Trait Anxiety Inventory

‘Impulsive choice’:

• Monetary Choice Questionnaire
Figure 1:
Beads task. Subjects viewed two jars with opposite ratios of red and blue beads (Jar 1: P = 0.80 red; P = 0.20 blue/Jar 2: P = 0.80 blue; P = 0.20 red). Beads selected from a single jar were sequentially shown to the participants. The goal was to infer from which jar the beads were being selected. After each bead was drawn, participants either chose to draw another bead or to make a decision. The drawn beads remained on display at the top of the screen. (Banca et al., 2015)
DELAYED DISCOUNTING TASK

• Monetary choice questionnaire

• Compared 27 items

• Participants chose between small immediate reward and larger delayed reward
Figure 2:
Premature responding task. (A) Task. Subjects press and hold down the space bar when they see four empty boxes (Cue) on the touch screen. After a green circle (Target) appears in one of the boxes, the subject releases the space bar and touches the box in which the target had appeared. The main outcome measure, premature responding, is measured as release of the space bar before target onset. (B) Feedback for the Test blocks is individualized on the basis of the mean fastest reaction time (RT) and SD obtained in the Baseline block (Voon et al., 2014)
## DECISIONAL IMPULSIVITY IN OBESITY

<table>
<thead>
<tr>
<th></th>
<th>Obese (N=30)</th>
<th>HVs (N=30)</th>
<th>T test</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>36.46 (10.13)</td>
<td>34.66 (9.39)</td>
<td>.71</td>
<td>.47</td>
</tr>
<tr>
<td>Males:females</td>
<td>8:22</td>
<td>8:22</td>
<td></td>
<td></td>
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<tr>
<td>BMI</td>
<td>49.06 (11.67)</td>
<td>21.86 (4.72)</td>
<td>11.82</td>
<td>&lt;.0001</td>
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<tr>
<td>BDI</td>
<td>20.26 (11.47)</td>
<td>7.73 (9.88)</td>
<td>4.53</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>SSAI</td>
<td>51.30 (13.21)</td>
<td>39.93 (11.93)</td>
<td>3.49</td>
<td>.001</td>
</tr>
<tr>
<td>BES</td>
<td>20.96 (10.48)</td>
<td>6.83 (7.21)</td>
<td>6.08</td>
<td>&lt;.0001</td>
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<td>AUDIT</td>
<td>3.50 (4.50)</td>
<td>4.33 (4.19)</td>
<td>-.74</td>
<td>.46</td>
</tr>
<tr>
<td>OCI-R</td>
<td>23.40 (11.37)</td>
<td>18.30 (10.70)</td>
<td>1.78</td>
<td>.07</td>
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<tr>
<td>UPPS total</td>
<td>137.93 (20.09)</td>
<td>121.65 (20.66)</td>
<td>3.06</td>
<td>.003</td>
</tr>
</tbody>
</table>

Table 1 shows the descriptive data and t-test differences for the obese and healthy subjects included in the study.
Figure 3. Jumping to conclusions

The graph shows the primary outcome measure, the number of beads viewed prior to decision in Obese subjects and matched healthy volunteers (HV).
DELAYED DISCOUNTING TASK

• Trend for preferring smaller immediate award than wait for a bigger award later
DECISIONAL IMPULSIVITY IN OBESITY

Figure 4. Delay discounting and premature responding
The left graph shows the primary outcomes of the delay discounting task and right shows the 4-Choice Serial Reaction Time task (4-CSRT).
CONSIDERATIONS

• Enough evidence to direct us for therapeutic purposes

• Treatment can consider obesity as addiction

• Medical Treatment: still experimental stage

• Lifestyle Model Change: Like Kenn Ghal Sahhtek
MALTA AND OBESITY

In the 2009 Eurostat statistics, European Union Member States:

Women: between 8.0% (Romania) and 23.9% (UK) and between

Men: between 7.6% (Romania) and 24.7% (Malta)
Figure 1. Ranking of the 34 (primarily European) countries according to the prevalence of overweight youth (aged 10–16 years) in 2001–2002. The contribution of the pre-obese and obese children to the total overweight prevalence are represented by the closed (■) and open (○) bars respectively.
‘DAR KENN GHAL SAHITEK’ - AN EATING DISORDER AND OBESITY SERVICE IN MALTA

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3Department of Psychiatry University of Cambridge, Clare College Cambridge, Cambridge, UK
4Psychiatry Department, Addenbrooks Hospital, Cambridge, UK

SUMMARY
This paper will describe the incidence of eating disorders, with particular focus on obesity and binge eating, within the Island of Malta. The development of and ‘Dar Kenn Ghal Sahhtek’, the first centre for eating disorders in Malta will then be recounted, and the effective therapeutic interventions provided in it will be described. One important function of this unit is the treatment of excessive obesity. Some epidemiological data on the Obese Patients in DK5, relating to the incidence of Binge Eating Disorder in the DK5 patient group will be given. This data was collected during a collaborative research project between the Psychiatry Department of Cambridge University and ‘Dar Kenn Ghal Sahhtek’.

Key words: eating disorder – obesity - multidisciplinary team – research - Binge eating disorder (BED) - Dar Kenn Ghal Sahhtek (DKS)

* * * * *

INTRODUCTION
Malta is in the lead when considering people suffering from overweight and obesity. For this reason, a centre for eating disorders and obesity was set up in 2014. This unit is called ‘Dar Kenn Ghal Sahhtek’, a residential and semi-residential facility located in the town of Martfa, in the North of Malta. With the professional help of a multidisciplinary team of doctors, psychiatrists, nurses, rheumatologists and nephrologists, the service was specially designed for the care of patients and their families. Studies have suggested that a significant portion of individuals in that “not otherwise specified” category may actually have binge eating disorder.

BINGE EATING DISORDER

Binge eating disorder was approved for inclusion in DSM-5 as its own category of eating disorder. In DSM-IV, binge-eating disorder was not recognized as a disorder but rather described in Appendix B. Criteria
PROGRAMME

• MULTIDISCIPLINARY

• RESIDENTIAL (8WEEKS)

• BASED ON LIFESTYLE CHANGE
A PROSPECTIVE STUDY OF SHORT-TERM OUTCOMES
OF A RESIDENTIAL PROGRAMME FOR
THE MORBIDLY OBESE IN MALTA

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SUMMARY
Obesity is a worldwide problem, and Malta is no exception. In Malta, a Foundation was established to address weight problems amongst the population, and this initiative included the opening in 2014 of an 8-week residential programme for morbidly obese patients. This multidisciplinary programme is managed and coordinated by a team consisting of doctors, psychiatrists, nurses, physiotherapist, psychologists, dietitians, nutritionists and occupational therapists. This team guides residents towards adopting a healthier lifestyle, rather than focusing solely on food intake. In this study, the first 163 residents admitted to the programme, 65 males and 98 females, were assessed at the point of admission and discharge against several physical parameters. The effectiveness of the programme in the short term was validated since at the point of discharge these patients had a statistically significant reduction in weight, BMI, cholesterol levels, glucose levels and HbA1C. They were also more mobile, and this difference was also statistically significant.

Key words: Obesity - Malta

Introduction
Obesity is a worldwide problem, and it is now being considered as a pandemic (Swinburn et al, 2001). part of the multidisciplinary team at the centre. These sessions are held on a weekly basis. Practical cooking
SUBJECTS

• All individuals from 6 October 2014 to 24 February 2017

• 163 clients

• Ages: M 14 - 69 yrs, F 17- 68 yrs

• BMI: M 35.09 - 81.18, F 32.47- 86.58
Table 1. Paired Samples Test

<table>
<thead>
<tr>
<th>Pair</th>
<th>Paired Differences</th>
<th>95% Confidence Interval of the Difference</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Std. Deviation</td>
<td>Std. Error Mean</td>
<td>Lower</td>
<td>Upper</td>
</tr>
<tr>
<td>Pair 1</td>
<td>WEIGHT-Before - WEIGHT-After (kg)</td>
<td>7.041</td>
<td>6.540</td>
<td>0.689</td>
<td>5.671</td>
</tr>
<tr>
<td>Pair 2</td>
<td>BMI - Before - BMI-After</td>
<td>2.849</td>
<td>2.677</td>
<td>0.219</td>
<td>2.414</td>
</tr>
<tr>
<td>Pair 3</td>
<td>No. OF STEPS WEEK 1 - No. OF STEPS WEEK 8 (*)</td>
<td>-29.292</td>
<td>20.852</td>
<td>2.210</td>
<td>-33.685</td>
</tr>
<tr>
<td>Pair 4</td>
<td>DISTANCE - WEEK 1 - DISTANCE - WEEK 8 (*)</td>
<td>-69.678</td>
<td>84.178</td>
<td>9.025</td>
<td>-87.619</td>
</tr>
<tr>
<td>Pair 5</td>
<td>Cholesterol-Before - Cholesterol-After</td>
<td>0.215</td>
<td>0.552</td>
<td>0.055</td>
<td>0.106</td>
</tr>
<tr>
<td>Pair 6</td>
<td>Glucose-B - Glucose-A</td>
<td>0.309</td>
<td>1.041</td>
<td>0.116</td>
<td>0.077</td>
</tr>
<tr>
<td>Pair 7</td>
<td>LDL-B - LDL-A</td>
<td>-0.393</td>
<td>5.480</td>
<td>0.543</td>
<td>-1.469</td>
</tr>
<tr>
<td>Pair 8</td>
<td>GGT-B - GGT-A</td>
<td>4.778</td>
<td>27.498</td>
<td>2.646</td>
<td>-0.468</td>
</tr>
<tr>
<td>Pair 9</td>
<td>ALT-B - ALT-A</td>
<td>1.078</td>
<td>16.118</td>
<td>1.596</td>
<td>-2.087</td>
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<tr>
<td>Pair 10</td>
<td>HBA1C-B - HBA1C-A</td>
<td>0.277</td>
<td>0.740</td>
<td>0.094</td>
<td>0.089</td>
</tr>
</tbody>
</table>

(*) number of steps and distance walked in 6 minutes
CONCLUSION

- Similarities between addiction and loss of control on food intake

- Needs further exploration