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## Social Anhedonia and Work and Social Functioning in Eating Disorders

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Social Anhedonia and Work and Social Functioning in Eating Disorders

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Thesis submitted to King's College London in partial fulfilment for the degree of  
Doctorate in Clinical Psychology (DClinPsy)

May 2013

VOLUME 1: MAIN PROJECT AND SERVICE EVALUATION PROJECT

This thesis is dedicated to the memory of Boleslaw Karol Stochaj and Jean Teresa  
Stochaj

**PART ONE: Main Research Project**

**Social Anhedonia and Work and Social Functioning in Eating Disorders**

**Supervised by Dr Kate Tchanturia and Dr Vicki Mountford**

## ABSTRACT

### *Background*

Eating Disorders (EDs) can be severe and enduring illnesses for a significant proportion of patients (20%; Robinson, 2006). Previous research highlights social-emotional processing difficulties are present in these patients (e.g. Harrison et al., 2012) and the cognitive interpersonal maintenance model (Schmidt & Treasure, 2006; 2013) and transdiagnostic cognitive behavioural model both suggest interpersonal difficulties play an important role in maintaining the illness. This thesis aimed to explore social anhedonia (SA) and work and social functioning (WSF) in women with anorexia nervosa (AN), bulimia nervosa (BN), women recovered from AN (RAN) and non-ED controls (HCs), with the aim of understanding whether social anhedonia may predict work and social functioning difficulties.

### *Methods*

317 female participants (AN n=105, BN n=46, HC=136, Recovered AN=30) completed the Revised Social Anhedonia Scale (SA; Eckbald et al., 1982), the Work and Social Adjustment Scale (WSF; Mundt et al., 2002), the National Adult Reading Test (Nelson & Willison, 1991), the Eating Disorders Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994) and the Hospital Anxiety and Depression Scale (Zigmond & Snaith, 1983).

### *Results*

In the ED group, 75% were single and 48.34% were unemployed or on sick-leave. There was a very large sized difference for SA for both ED groups compared to HCs, with 66.67% scoring in the clinical range (>12). The AN group (particularly inpatients) reported more WSF difficulties than BN participants, although both clinical groups reported more WSF difficulties than HCs with very large effect sizes. The RAN group reported less SA and WSF difficulties than RAN participants, but more SA and WSF than HCs. Those who had recovered but scored in the clinical range for SA reported significantly more WSF difficulties than RAN participants scoring below the clinical range for SA.

Current severity (BMI), lifetime severity (lowest ever BMI as an adult) and SA were significant predictors of WSF difficulties.

### *Conclusions*

EDs are associated with clinical levels of SA and significant WSF difficulties which to some degree abate in the recovered phase. SA appears to contribute to the interpersonal functioning difficulties observed in ED sufferers.

(300 words)

## **ACKNOWLEDGEMENTS**

### **Professional Acknowledgements**

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Thank you to my colleagues in the eating disorder unit and on the doctorate in clinical psychology training course who helped to identify potential participants and showed their interest and support for my work.

This thesis would not have been possible without the time and effort of the 317 participants who took their time to complete the measures. Thank you. Without you, we would not have been able to understand more about these important concepts in eating disorders and to contribute new ideas for enhancing treatments for these unrelenting illnesses.

### **Personal Acknowledgements**

I would like to acknowledge the support of my family and friends who have helped me to complete this thesis. Fortunately, I learnt a lot from writing the first one for my PhD which probably made it more bearable for you to be around me when writing this one! Particular thanks to the unrelenting support of my husband Daniel who has supported me in so many different ways during this stage of my career. Unfortunately as a family we lost our dear grandfather Karol whilst I was writing this thesis and much of the Discussion was written whilst I sat with him and kept him company during his last few weeks with us. It has not been an easy few months but I know Grandpa was very proud of this work and this is why this thesis is dedicated to his memory.

## **COMMON ABBREVIATIONS USED THROUGHOUT THE THESIS**

AN = anorexia nervosa

APA=American Psychiatric Association

ASCs = autistic spectrum conditions

BMI = body mass index

BED = binge eating disorder

BN = bulimia nervosa

BPAN = binge purge anorexia nervosa

CBT = cognitive behavioural therapy

CI = Confidence interval

DSM = Diagnostic and Statistical Manual of Mental Disorders

ED(s) = eating disorder(s)

EDE = eating disorder examination interview

EDE-Q = eating disorder examination questionnaire

HC = healthy controls

IQ = intelligence quotient



IQR = interquartile range

NART= National Adult Reading Test

OCD = obsessive compulsive disorder

RAN = restricting anorexia nervosa

SD = standard deviation

## TABLE OF CONTENTS – MAIN PROJECT

|  | Page Number |
|--|-------------|
| Abstract   | 4           |
| Acknowledgements: Professional Acknowledgements                                | 6           |
| Common abbreviations used throughout the thesis                                | 7           |
| Table of contents  | 9           |
| List of tables   | 13          |
| List of figures  | 14          |
| List of appendices   | 14          |
| Papers associated with this thesis   | 15          |
| Conference and research presentations associated with this thesis              | 15          |
| Declaration of candidate’s role in each of the studies                         | 16          |
| <b>1.0 Introduction</b>  | <b>17</b>   |
| <i>1.1 Thesis Aims and Objectives</i>  | <i>17</i>   |
| <i>2.0 What are Eating Disorders?</i>  | <i>17</i>   |
| <i>3.0 Defining Eating Disorders</i>   | <i>17</i>   |
| <i>3.1 Anorexia Nervosa</i>  | <i>18</i>   |
| <i>3.1.1 Anorexia Nervosa Subtypes</i>   | <i>19</i>   |
| <i>3.2 Bulimia Nervosa</i>   | <i>19</i>   |
| <i>3.2.1 Bulimia Nervosa Subtypes</i>  | <i>20</i>   |
| <i>4.0 Diagnostic Classification</i>   | <i>20</i>   |
| <i>4.1 Continuum Approaches to Diagnosis</i>                                   | <i>21</i>   |
| <i>4.2 Diagnostic Instability</i>  | <i>22</i>   |
| <i>4.3 Defining Eating Disorders: A Summary</i>                                | <i>23</i>   |
| <i>5.0 Onset, Prevalence and Life Course of Eating Disorders</i>               | <i>23</i>   |
| <i>5.1 Mortality Rate</i>  | <i>24</i>   |
| <i>6.0 Co-Morbidity</i>  | <i>24</i>   |
| <i>6.1 Anxiety Disorders</i>   | <i>25</i>   |
| <i>6.2 Obsessive Compulsive Disorder (OCD)</i>                                 | <i>25</i>   |
| <i>6.3 Depression</i>  | <i>26</i>   |
| <i>6.4 Personality Disorders</i>   | <i>26</i>   |
| <i>6.5 Self-Harm</i>   | <i>27</i>   |
| <i>6.6 Summary of Comorbidity in Eating Disorders</i>                          | <i>27</i>   |
| <i>7.0 The Aetiology of Eating Disorders</i>                                   | <i>28</i>   |
| <i>7.1 Genetic Factors</i>   | <i>28</i>   |
| <i>7.1.2 Serotonergic and Dopaminergic Genes</i>                               | <i>28</i>   |
| <i>7.1.3 A Recent Review of the Literature</i>                                 | <i>29</i>   |
| <i>7.2 Physical and Developmental Risk Factors</i>                             | <i>30</i>   |
| <i>7.3 Environmental Factors</i>   | <i>30</i>   |
| <i>7.3.1 Culture of Thinness</i>   | <i>30</i>   |
| <i>7.3.2 Familial Environment</i>  | <i>31</i>   |
| <i>7.3.3 Role of the Media</i>   | <i>31</i>   |
| <i>7.3.4 Psychosocial Risk Factors</i>   | <i>32</i>   |
| <i>7.4 Puberty as a Putative Risk Factor</i>                                   | <i>32</i>   |
| <i>8.0 Models of Eating Disorders</i>  | <i>33</i>   |
| <i>8.1 Transdiagnostic Cognitive Behavioural Model (Fairburn, Cooper &amp;</i> | <i>33</i>   |

|  |    |
|--|----|
| <i>Zafra, 2003; Fairburn, 2008)</i>  |    |
| <i>8.1.2 Relevance to the Factors Investigated in this Thesis</i>  | 34 |
| <i>8.2 Biopsychosocial Maintenance Model of Eating Disorders: The Cognitive-Interpersonal Maintenance Model of AN (Schmidt and Treasure, 2006; Schmidt &amp; Treasure, 2013)</i> | 35 |
| <i>8.2.1 Cognitive Factors</i>   | 35 |
| <i>8.2.2 Social Emotional Style</i>  | 36 |
| <i>8.2.3 Interpersonal Factors</i>   | 36 |
| <i>8.2.4 Relevance to the Factors Investigated in this Thesis</i>  | 37 |
| <i>8.3 Summary of Work Which Has Led up to This Thesis</i>   | 37 |
| <i>8.2.4 Pro AN Thinking</i>   | 39 |
| <i>9.0 Interim Summary</i>   | 41 |
| <i>10.0 Treatment for Adults with Eating Disorders</i>   | 40 |
| <i>10.1 Benefits of the Recovery Approach in Treating Severe and Enduring Eating Disorders</i>   | 42 |
| <i>11.0 Defining Anhedonia</i>   | 43 |
| <i>11.1 Social Anhedonia</i>   | 45 |
| <i>11.2 Research into Social Anhedonia: A Brief Background</i>   | 46 |
| <i>11.3 Past Research into Social Anhedonia in Eating Disorders</i>  | 47 |
| <i>11.4 The Experience of Social Stimuli as Rewarding</i>  | 47 |
| <i>11.5 Direct Measurement of Social Anhedonia in Eating Disorders</i>   | 48 |
| <i>11.6 Measurement of Social Anhedonia in Individuals Recovered from Eating Disorders</i>   | 49 |
| <i>11.7 Summary of Social Anhedonia Research</i>   | 50 |
| <i>12.0 Measurement of Social Anhedonia</i>  | 50 |
| <i>12.1 Chapman Physical and Social Anhedonia Scales</i>   | 50 |
| <i>12.2 Snaith-Hamilton Pleasure Scale (SHAPS)</i>   | 51 |
| <i>12.3 Fawcett-Clark Pleasure Capacity Scale (FCPS)</i>   | 51 |
| <i>12.4 Summary of Social Anhedonia Measures</i>   | 52 |
| <i>13.0 Work and Social Functioning</i>  | 53 |
| <i>13.1 Work and Social Functioning in Psychological Disorders</i>   | 53 |
| <i>13.2 A Review of Social Functioning in Eating Disorders</i>   | 55 |
| <i>13.3 Social Functioning after Recovery from an Eating Disorder</i>  | 57 |
| <i>13.4 A Review of Work Functioning in Eating Disorders</i>   | 60 |
| <i>13.5 Studies Addressing both Work and Social Functioning in Eating Disorders</i>  | 63 |
| <i>13.6 Summary of Work and Social Functioning in Eating Disorders</i>   | 65 |
| <i>13.7 Measurement of Work and Social Functioning</i>   | 65 |
| <i>13.7.1 Morgan-Russell Psychosocial Subscales (Morgan &amp; Hayward, 1988)</i>   | 65 |
| <i>13.7.2 Groningen Social Disabilities Schedule (Wiersma, DeJong &amp; Ormel, 1988)</i>   | 66 |
| <i>13.7.3 Social Adjustment Scale (Weissman &amp; Bothwell, 1976)</i>  | 66 |
| <i>13.7.4 Work and Social and Social Adjustment Scale (Marks, 1986; Mundt, Marks, Shear &amp; Greist, 2002).</i>   | 67 |
| <i>13.7.5 Summary of Measures</i>  | 67 |
| <i>14.0 Research Questions for this Thesis</i>   | 68 |
| <i>14.1 Aims</i>   | 69 |

|  |     |
|--|-----|
| 14.2 Hypotheses  | 69  |
| <b>15.0 Methods</b>  | 70  |
| 15.1 Ethical approval  | 70  |
| 15.2 Recruitment   | 71  |
| 15.2.1 Anorexia Nervosa and Bulimia Nervosa Groups   | 71  |
| 15.2.1.1 Definition of Recovery  | 72  |
| 15.2.2 Healthy Control Group   | 72  |
| 15.2.3 Inclusion and Exclusion Criteria  | 72  |
| 15.3 Measures  | 73  |
| 15.3.1 The Revised Social Anhedonia Scale (RSAS) (Eckblad, Chapman, Chapman, & Mishlove, 1982).                            | 73  |
| 15.3.2 Work and Social Adjustment Scale (WSAS; Marks, 1986; Mundt et al., 2002)  | 74  |
| 15.3.3 Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983).   | 74  |
| 15.3.4 Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994)  | 75  |
| 15.3.5 Demographic Questionnaire   | 75  |
| 15.3.6 Estimation of Intelligence  | 75  |
| 15.4 Procedure   | 76  |
| 15.5 Design  | 77  |
| 15.6 Data Analysis   | 77  |
| 15.7 Power Calculation   | 77  |
| <b>16.0 Results</b>  | 78  |
| 16.1 Participants  | 78  |
| 16.2 Demographic Data  | 78  |
| 16.2.1 Treatment Modality and Employment and Marital Status  | 85  |
| 16.3 Clinical Data   | 91  |
| 16.4 Results for the Revised Social Anhedonia Scale and the Work and Social Adjustment Scale                               | 95  |
| 16.5 Social Anhedonia Scale (RSAS)   | 96  |
| 16.6 Work and Social Adjustment Scale Total Score  | 97  |
| 16.7 Work and Social Adjustment Scale: Work Subscale   | 97  |
| 16.8 Work and Social Adjustment Scale: Home Management Subscale  | 98  |
| 16.9 Work and Social Adjustment Scale: Social Leisure Subscale   | 98  |
| 16.10 Work and Social Adjustment Scale: Private Leisure Subscale   | 99  |
| 16.11 Work and Social Adjustment Scale: Close Relationships Subscale   | 99  |
| 16.12 Effect of Treatment Modality of Social Anhedonia and Work and Social Functioning Score in the Eating Disorder Groups | 99  |
| 16.13 Analysis of Covariance   | 101 |
| 16.13.1 Anxiety and Depression as Covariates   | 101 |
| 16.14 Correlation Analysis   | 102 |
| 16.14.1 Entire Sample  | 102 |
| 16.14.2 Eating Disorder Sample   | 103 |
| 16.14.3 Relationship between Social Anhedonia and Work and Social Functioning in the Recovered Group                       | 104 |
| 16.15 Regression Analysis  | 107 |

|  |     |
|--|-----|
| <b>17.0 Discussion</b>   | 107 |
| <i>17.1 Summary of Findings</i>  | 107 |
| <i>17.2 Work and Social Adjustment Scale: Comparisons with Studies Using the Same Measure</i>  | 110 |
| <i>17.3 Work Functioning Findings: Comparisons with Previous Studies</i>   | 111 |
| <i>17.4 Social Functioning Difficulties: Comparisons with Previous Studies</i>   | 113 |
| <i>17.5 Social Anhedonia Findings: Comparisons with Previous Studies Using the Revised Social Anhedonia Scale and Other Measures</i> | 113 |
| <i>17.6 Comparison with other Studies Exploring Work and Social Functioning in People Recovered from Anorexia Nervosa</i>            | 114 |
| <i>17.7 Comparison with other Studies Exploring Social Anhedonia in People Recovered from Anorexia Nervosa</i>                       | 116 |
| <i>17.8 Relevance of Findings in Relation to Current Literature on Eating Disorders</i>  | 117 |
| <i>17.9 How the Findings of the Thesis Inform Understanding of Eating Disorders</i>  | 118 |
| <i>17.9.1 Role of Work and Social Functioning in Recovery</i>  | 120 |
| <i>17.10 Putting the Findings into the Context of Findings for Other Psychological Disorders</i>                                     | 120 |
| <i>17.11 Limitations</i>   | 121 |
| <i>17.11.1 Gender Bias</i>   | 121 |
| <i>17.11.2 Cultural Bias</i>   | 121 |
| <i>17.11.3 Sampling Methods</i>  | 122 |
| <i>17.11.4 Definition of Recovery</i>  | 122 |
| <i>17.11.5 Confounding Variables</i>   | 123 |
| <i>17.11.6 Measures</i>  | 124 |
| <i>17.11.7 Design</i>  | 124 |
| <i>17.11.8 Measurement of Intelligence Quotient (IQ)</i>   | 124 |
| <i>17.11.9 Selection of Measures</i>   | 125 |
| <i>17.11.10 Lack of a Psychiatric Control Group</i>  | 126 |
| <i>17.12 Strengths of the Studies Reported in the Thesis</i>   | 126 |
| <i>17.12.1 Sample Size</i>   | 126 |
| <i>17.12.2 Sample</i>  | 127 |
| <i>17.13 Clinical Implications</i>   | 127 |
| <i>17.14 Future Work</i>   | 130 |
| <i>17.15 Closing Remarks</i>   | 130 |
| <b>References</b>  | 131 |
| <b>Appendices</b>  | 170 |

## LIST OF TABLES

Section 6.2: Table 1: Demographic Characteristics of the Anorexia Nervosa, Bulimia Nervosa and Healthy Control Groups. PAGE 82

Section 6.3: Table 2: Clinical Characteristics of the Anorexia Nervosa, Bulimia Nervosa and Healthy Control Groups. PAGE 88

Section 6.4: Table 3: Results for the Anorexia Nervosa, Bulimia Nervosa, Recovered Anorexia Nervosa and Healthy Control Groups for the Social Anhedonia Scale and the Work and Social Adjustment Scale. PAGE 92

Section 16.12: Table 4: Effect Sizes for the Anorexia Nervosa, Bulimia Nervosa and Recovered Anorexia Nervosa Groups Compared to Healthy Controls for the Revised Social Anhedonia Scale and Work and Social Adjustment Scale. PAGE 100

Section 16.14.1: Table 5: Correlations between Eating Disorder Measures, Body Mass Index, Depression and Anxiety and Work and Social Adjustment and Social Anhedonia for the Entire Sample of Anorexia Nervosa, Bulimia Nervosa, Recovered Anorexia Nervosa and Healthy Control Participants. PAGE 105

Section 16.14.2: Table 6: Correlations between Eating Disorder Measures, Body Mass Index, Depression and Anxiety and Work and Social Adjustment and Social Anhedonia for the Eating Disorder Sample (Anorexia Nervosa and Bulimia Nervosa Participants). PAGE 106

## LIST OF FIGURES

|   |          |
|---|----------|
| Section 7.1: Figure 1: Transdiagnostic Cognitive Behavioural Model of Eating Disorders  | PAGE 34  |
| Section 16.2: Figure 2: A Bar Chart to show the Employment Status of Eating Disorder Participants (n=151) for each Treatment Modality   | PAGE 80  |
| Section 16.2: Figure 3: A Bar Chart to show the Relationship Status of Eating Disorder Participants (n=151) for each Treatment Modality | PAGE 81  |
| Section 17.9: Figure 4: Revisions Suggested to the Transdiagnostic Model of Eating Disorders Based on the Data Collected in the Thesis  | PAGE 119 |

## LIST OF APPENDICES

|             |  |          |
|-------------|--|----------|
| Appendix 1  | Confirmation of ethical approval   | PAGE 171 |
| Appendix 2  | Information sheet  | PAGE 175 |
| Appendix 3  | Consent form   | PAGE 178 |
| Appendix 4  | Eating Disorders Examination Questionnaire   | PAGE 179 |
| Appendix 5  | Revised Social Anhedonia Scale   | PAGE 184 |
| Appendix 6  | Work and Social Adjustment Scale   | PAGE 187 |
| Appendix 7  | Hospital Anxiety and Depression Scale  | PAGE 188 |
| Appendix 8  | Demographic questionnaire  | PAGE 190 |
| Appendix 9  | National Adult Reading Test word list  | PAGE 192 |
| Appendix 10 | National Adult Reading Test scoring key  | PAGE 193 |
| Appendix 11 | Tchanturia, K., Davies, H., <u>Harrison, A.</u> , Fox, J. R. E., Treasure, J., & Schmidt, U. (2012). Altered social hedonic processing in eating disorders. <i>International Journal of Eating Disorders</i> , 45(8), 962-969. |          |

## **PAPERS ASSOCIATED WITH THIS THESIS**

A preliminary study related to the study reported in this thesis was published in 2012 and is available in Appendix 11.

Tchanturia, K., Davies, H., Harrison, A., Fox, J. R. E., Treasure, J., & Schmidt, U. (2012). Altered social hedonic processing in eating disorders. *International Journal of Eating Disorders*, 45(8), 962-969.

The data from the thesis are being prepared to be submitted for publication to a high impact journal in the following article:-

Harrison, A., Mountford, V., & Tchanturia, K. (In Preparation). Social Anhedonia and Work and Social Functioning in the Acute and Recovery Phases of Eating Disorders.

## **CONFERENCE AND RESEARCH PRESENTATIONS ASSOCIATED WITH THIS THESIS**

Harrison, A. (2013). Social Anhedonia and Work and Social Functioning in Eating Disorders. Research presentation given to the Eating Disorder Unit research meeting at the Institute of Psychiatry, King's College London on 4<sup>th</sup> March 2013 to an audience of researchers, clinicians and service users.

Harrison, A., Mountford, V., & Tchanturia, K. Social Anhedonia and Work and Social Functioning in the Acute and Recovery Phases of Eating Disorders. Poster presentation submitted to be presented at the British Association of Cognitive and Behavioural Psychotherapies, London, UK. 18th July 2013.



## **DECLARATION OF CANDIDATE'S ROLE IN EACH OF THE STUDIES**

The ideas for the study reported in this thesis were developed jointly between the candidate and her supervisors. The candidate recruited the participants for the studies, administered the measures, scored the measures, entered the data into an electronic database, analysed the data and took the lead in writing up the study published in this thesis.

## **1.0 INTRODUCTION**

### *1.1 Thesis Aims and Objectives*

The overall aim of this thesis is to contribute improved understanding of social anhedonia in eating disorders (EDs) by exploring this concept in women who are currently ill with an ED and women who have recovered from either anorexia nervosa (AN) or bulimia nervosa (BN) in comparison to a healthy sample of women. In parallel, the thesis also aims to measure difficulties in both work and social functioning reported by individuals with EDs, to explore relationships between these difficulties and social anhedonia and to investigate whether difficulties in work and social functioning reported by individuals acutely ill with an ED are also present in a group of women who have successfully recovered from the illness.

### *2.0 What are Eating Disorders?*

EDs are severe psychological disorders which can be chronic and may have long-lasting physical and psychological effects. EDs are associated with significant levels of physical and psychological co-morbidity and poor quality of life (Schmidt, 2009; Steinhausen et al., 2002; 2009), as well as profound, protracted physical and psychosocial morbidity. EDs, particularly AN, are associated with the highest mortality rate of all psychiatric disorders Striegel-Moore and Bulik (2007). They are caused by a broad range of factors, including cultural, social, and interpersonal components, and changes in neural networks may maintain the disorder (Treasure, Claudino & Zucker, 2010).

### *3.0 Defining Eating Disorders*

EDs are described in axis I of the DSM IV (American Psychological Association, 1994, p583) and as “behavioural syndromes associated with physiological disturbances and physical factors” in the ICD 10 (World Health Organisation, 1992). EDs consist of a spectrum of disorders characterised by severe disturbances in eating behaviours and extreme distress or concern relating to food, body, weight and shape factors. What

characterises EDs, particularly AN, from other psychiatric illnesses is the presence of a denial of the symptoms and a strong reluctance to seek psychological and medical help, despite the individual's psychological and physical health being severely threatened by the illness. As previously mentioned, the DSM IV clearly outlines three main types of ED, which are AN, BN and ED-NOS. In the section below, AN and BN will both be described in terms of their clinical features and history.

### *3.1 Anorexia Nervosa*

The term 'AN' was first used by Queen Victoria's physician, William Gull in 1874, but reports of the disorder were noted before this date. For example, female catholic saints in the 13<sup>th</sup> and 14<sup>th</sup> centuries are documented as going on long fasts and struggled to eat normally again after this experience (Bell, 1985). Around the same time that Gull began talking about the illness, Ernest-Charles Lasègue, a French physician working at the Salpêtrière in Paris published a journal article in the Archives Générales de Médecin in which he described a condition called "l'anorexie hystérique" and shortly after a translated version of the same paper was published in the British Medical Times. Both men, making independent observations of what sounded like the same illness, including starvation and cognitive distortions, decided on the name, anorexia nervosa. Interestingly, Lasègue noted the potential role of family interactions and family influences on the development of the illness, describing how family dynamics were affected by the illness and describing family members trying in vain to persuade their loved one to eat.

The DSM IV (p583) describes AN as a "refusal to maintain body weight at or above a minimally normal weight for age and height" and quantitatively this relates to an individual having a body weight lower than 85% of what would be expected given their height, age and gender. In the adult research literature, this has been operationalised as having a body mass index (BMI;  $\text{weight}/\text{height}^2$ ) at or below 17.5. Pertaining to adolescent patients, this group will fail to "make expected weight gain during a period of growth, leading to body weight less than 85% of that expected" (p583). Cognitively, individuals present with an "intense fear of gaining weight or becoming fat, even though underweight" and a "disturbance in the way one's body, weight or shape are

experienced, undue influence of body, weight or shape on self-evaluation, or denial of the seriousness of the current low body weight” (p584). A postmenarchal female with AN will also experience amenorrhea across 3 or more consecutive menstrual cycles.

### *3.1.1 Anorexia Nervosa Subtypes*

There are two subtypes of AN. One is the restricting type (subsequently referred to as restricting AN, or RAN) in which the individual consciously attempts to restrict their food intake and does not engage in binge-eating or purging behaviour, such as vomiting or using laxatives, diuretics, or enemas. The other subtype is the binge purge type (subsequently referred to as binge-purge AN or BPAN), in which individuals exhibit binge eating behaviours during which they consume a larger amount of food than would normally be appropriate and experience a loss of control over eating. The binge eating may be followed by purging behaviour, such as vomiting or abusing laxatives or the use of diuretics or enemas.

### *3.2 Bulimia Nervosa*

BN was first highlighted by the British Psychiatrist, Gerald Russell in 1979. Professor Russell described BN as a variant of AN and provided a rich, clinical description of this variant of ED which allowed other clinicians to detect such cases in their own practice (Palmer, 2004). Russell (2004) has emphasised that change in the manifestation of BN over time is to be expected. The pathoplastic nature of the illness implies the role of an underlying state amenable to change which is driving the illness (Palmer, 2004). The original groups of symptoms described by Russell, episodic overeating, vomiting and/or laxative use are currently used as diagnostic criteria in the DSM IV (Russell, 2004).

The DSM IV describes BN as “recurrent episodes of binge eating” (p389). Binge eating is characterised by eating an amount of food which is “definitely larger than most people would eat during a similar period of time and under similar circumstances.” The DSM describes that the binge eating occurs during a discrete time, such as a 2 hour period. The consumption of a large amount of food is accompanied by losing control over eating during the episode, such that the individual “cannot stop eating or control what

or how much one is eating” (p590). Alongside episodes of binge eating are recurrent “inappropriate compensatory behaviours” employed to prevent weight gain. These may be “self-induced vomiting, misuse of laxatives, diuretics, enemas, or other medications, fasting and excessive exercise.” The binge eating and inappropriate compensatory behaviours will both “occur, on average, at least twice a week for 3 months. Self-evaluation is unduly influenced by body shape and weight” (p591).

### *3.2.1 Bulimia Nervosa Subtypes*

The DSM IV also describes two subtypes of BN. One is the purging type in which the individual regularly engages in “self-induced vomiting or the misuse of laxatives, diuretics, or enemas” (p591). The other is the non-purging type, in which the individual uses inappropriate compensatory behaviours, but does not regularly engage in self-induced vomiting or misused laxatives, diuretics, or enemas.

## *4.0 Diagnostic Classification*

“Diagnosis is challenging because diagnostic symptoms and associated behaviours substantially overlap across the range of EDs. For example, extreme dietary restraint, binge eating, and overvalued ideas about weight and shape can be present in all forms of eating disorder” (Treasure, Claudino & Zucker, 2010, p383). In spite of this, the two predominant classification systems, the Diagnostic and Statistical Manual of the American Psychiatric Society (DSM), 4<sup>th</sup> edition (APA, 1994) and the International Classification of Disease (ICD) from the World Health Organisation (WHO), 10<sup>th</sup> edition (WHO, 1992) both describe EDs using three overarching diagnoses: Anorexia Nervosa (AN), Bulimia Nervosa (BN) and Eating Disorders Not Otherwise Specified (ED-NOS). According to the APA, the fifth version of the DSM will be published in May 2013 and this new version is thought to make an attempt to account for the fact that whilst the two classical presentations (AN and BN) are emphasised by previous versions of the diagnostic system, at least half of cases fall into the ED-NOS category, perhaps because the criteria lack everyday clinical validity (Walsh, 2007; Fairburn, 2011). For example, under the current system, although severely distressed and functionally impaired, individuals who have all the symptoms of AN but are still menstruating are given a

diagnosis of ED-NOS. It has been suggested that in the DSM 5, for a diagnosis of AN, there will no longer be the need to meet the amenorrhoea criterion (Attia & Roberts, 2009). In addition, the threshold for the frequency of binge-purge episodes required for a diagnosis of BN will be reduced (Watson & Sysko, 2009). Furthermore, binge eating disorder (BED), previously considered under the ED-NOS category, will be recognised as a distinct ED, which several authors have argued is more suitable given its presentation, distribution and course are different to AN and BN and it appears to be more responsive to treatment than the other EDs (Norrington and Palmer, 2005; Wonderlich, Gordon, Mitchell, Crosby & Engel, 2009). It is hoped that by altering these criteria, the full range of anorexia-like and bulimia-like symptom patterns seen daily in clinical centres across the world will be better represented (Walsh, 2007).

#### *4.1 Continuum Approaches to Diagnosis*

In contrast to conceptualising EDs as distinct categories of symptoms, many propose a continuum approach better reflects the clinical reality of those who present in services. This approach argues that EDs “differ in degree, rather than in kind” (Gleaves, Lowe, Snow, Green & Murphy-Eberenz, 2000, p56). One example of this might be Christopher Fairburn’s transdiagnostic model of EDs (Fairburn, 2008) which suggests EDs are best considered within one category, rather than several sub categories, as their cognitions, behaviours and associated difficulties overlap. This model states that at the heart of any form of eating pathology is a core central cognitive disturbance, characterised by the over-evaluation of eating, shape and weight and their control and the eating difficulties are maintained by low self-esteem, mood intolerance interpersonal difficulties and perfectionism. This model explains that patients move between these different symptoms over time.

Lampard, Tasca, Balfour & Bissada (2013) used multi-group structural equation modelling to explore the validity of these transdiagnostic maintenance factors in 1451 patients diagnosed AN, BN and ED-NOS. Data were collected using the Eating Disorder Examination Questionnaire (Fairburn & Beglin, 1994), the Eating Disorder Inventory-2 (Garner, 1991) and the Personality Assessment Inventory (Morey, 2007). The results

indicated that low self-esteem, over-evaluation of weight and shape, and mood intolerance processes were transdiagnostic. There were however some differences between the diagnostic groups, such that dietary restraint was only positively associated with binge eating in BN, interpersonal difficulties were only associated with dietary restraint in ED-NOS and perfectionism was not associated with core eating disorder maintaining mechanisms in BN.

Some clinical researchers have expanded the transdiagnostic concept even further. For example Waller's (2008) "trans-transdiagnostic" approach proposes that EDs could be viewed as a form of anxiety disorder (Waller, 2008), Hollander and colleagues' work suggests EDs should be considered part of the obsessive compulsive (OCD) spectrum (Hollander, Friedberg, Wasserman, Yeh & Lyengar, 2005; Bartz, Kaplan & Hollander, 2007; Hollander, Kim, Khanna & Pallanti, 2007), and the work of Gillberg and colleagues suggests overlaps between AN and autism spectrum conditions (ASCs) (Gillberg, 1983; Gillberg & Råstam, 1992). A longitudinal study of community cases, found that approximately 6.7 years after the onset of AN 20% of cases (10 out of 51 patients) either had an ASC or autistic-like traits (Gillberg, Gillberg, Rastam & Johansson, 1996).

#### *4.2 Diagnostic Instability*

Continuum approaches to classifying EDs may be one way of accounting for the high degree of movement around different ED behaviours and thus diagnostic categories. Temporal movement between ED diagnoses is prevalent and has been reported in several studies, for example, Collings and King (1994); Eckert et al., (1995); Bulik et al., (1997) and Eddy et al., (2008). Keel and Mitchell (1997) found that 50% of individuals with AN (particularly the binge-purging subtypes) later developed BN. These authors also reported that among individuals with BN, 30% report a past history of AN. Milos, Spindler, Schnyder and Fairburn (2005) reported that less than a third of acutely unwell patients retain the same diagnosis 30 months after first presenting for treatment. Despite the previously discussed limitations of the DSM IV, this is the most common diagnostic system (Mezzich, 2002) and so the diagnostic categories described will be used to classify the patient groups used in this thesis, whilst acknowledging its

limitations as a categorical system in describing heterogeneous illnesses with high temporal movement.

#### *4.3 Defining Eating Disorders: A Summary*

EDs, particularly AN, have been around for many centuries and can be characterised by a broad range of symptoms which have at their core difficulties with food, body, weight and shape. It is common for sufferers to experience symptoms from different ED subtypes over time and because of this heterogeneity and temporal movement, some researchers have moved to a continuum approach, conceptualising EDs as transdiagnostic illnesses maintained by common mechanisms which may share features with other disorders including anxiety, OCD and ASCs.

#### *5.0 Onset, Prevalence and Life Course of Eating Disorders*

The most common age of onset for AN is during the mid-teenage years and a small subgroup (5%) report onset in their early twenties. The onset of BN tends to be later and occurs during late adolescence to early adulthood (Devlin, Jahraus & DiMarco, 2010; Fairburn, Harrison & Brownell, 2003). Hoek (2006) reports a small increase in the number of people with AN reporting to general practice over time, up until the late 1970s when the incidence rate became more stable. Between and 1988-1993, there was a steady increase in the prevalence rate of BN (Currin, Schmidt, Treasure & Jick, 2005). Keel and Klump (2003) found that whereas BN is a culture-bound syndrome, found predominantly in western countries where there is easy access to highly palatable foods, AN exists throughout the world and is present in most societies. Makino, Tsuboi and Dennerstein (2004) report that although the prevalence of EDs in non-western countries is lower than prevalence rates reported for western countries, the data show that EDs are increasing in prevalence in non-western societies.

Based on data from an Australian adult female twin population aged 28-39 years old, Wade et al., (2006) report a 1.9% lifetime prevalence of AN. A further 2.4% met the criteria for AN, but had an absence of amenorrhea (this would be described as ED-NOS



AN type in the DSM-IV and as previously discussed, these individuals may be classified as having AN in the DSM 5). 2.9% of women met criteria for BN and a further 2.9% had BED. Despite no longer meeting DSM-IV criteria for an ED, less than 50% of those in recovery were completely asymptomatic, a finding which demonstrates the chronic and enduring symptomatology associated with EDs. A better prognosis is reported for cases which do not have a purging component (Milos, Spindler, Schnyder & Fairburn, 2005; Steinhausen, 2002; 2009).

### *5.1 Mortality Rate*

AN is associated with the highest mortality rate of all psychiatric illnesses (Steinhausen et al., 2009). In AN, the fraction of deaths in the study population, known as the crude mortality rate, has been reported by Sullivan (1995) to be 5.9%. The majority of deaths were due to physical health complications and suicide. Another statistic, the standardised mortality rate, which is the crude mortality rate compared to the expected mortality rate in the population of origin, was 9.6% in studies which had a 6-12 year follow-up and 3.7% in studies which had a 20-40 year follow-up (van Hoeken Seidell & Wijbrand, 2003). For BN, Keel, Dorer, Eddy, Franko, Charatan and Herzog (2003) report a standardised mortality ratio of 1.3%. In summary, EDs, particularly AN, are associated with a high risk of mortality relative to other psychiatric illnesses and the general population.

### *6.0 Co-Morbidity*

EDs are frequently associated with a high rate of co-morbidity with other disorders. This may make them more difficult to treat and requires health professionals to provide complex formulations considering the range of symptomatology present and the common and independent maintenance factors. The following section considers some of the most common comorbid conditions associated with EDs.

### *6.1 Anxiety Disorders*

Studies suggest that the majority of individuals with EDs experience one or more comorbid anxiety disorders (Godart, Berthoz, Perdereau & Jeammet, 2006; Walters and Kendler, 1995; Kendler, Walters, Neale, Kessler, Heath & Eaves, 1995), there is a high prevalence of anxiety disorders in the first degree relatives of people with EDs (Perdereau et al., 2008) and sub-clinical cases also report higher rates of generalised anxiety disorder relative to healthy peers (Touchette et al., 2010). A large study of 762 participants with EDs found that 64% had at least one comorbid anxiety disorder. These disorders include social phobia (20%), generalised anxiety disorder (10%) and specific phobia (15%) (Kaye, Bulik, Thornton, Barbarich, Masters & the Price Foundation Collaborative Group, 2004). Several studies report that the onset of anxiety disorders tends to precede the onset of either AN or BN (Deep, Nagy, Weltzin, Rao & Kaye, 1995; Bulik, Sullivan, Fear & Joyce, 1997; Godart, Flament, Lecrubier & Jeammet, 2000). This may be because the onset of anxiety disorders tends to be at a younger age than the onset of EDs (Kaye, 2008). However, it may also suggest that childhood anxiety may be a genetically mediated pathway which contributes towards the onset of EDs (Kaye et al., 2004).

### *6.2 Obsessive Compulsive Disorder (OCD)*

OCD is an anxiety problem in which people experience obsessions, which are ego-dystonic, intrusive thoughts which provoke anxiety and the individual counteracts this by using compulsions, particular behaviours, rituals or routines that temporarily abate the anxiety caused by the obsessions. Kaye et al., (2004) found OCD to be the most comorbid anxiety disorder in their sample of ED patients (41%). This finding is supported by a recent article by Hollander, Braun and Simeon (2009), in which comorbidity was stated to be 37%. Based on an analysis of disorders which are often comorbid with OCD, including EDs, trichotillomania, body dysmorphic disorder and ASCs, these authors suggest that OCD could be removed from its anxiety categorisation in the new DSM 5 and should have its own category termed obsessive compulsive

related disorders (OCRDs). Within OCRDs, EDs are described as having a moderate placement, meaning that they are relatively highly comorbid.

### *6.3 Depression*

Clinical observations highlight that depression is a core part of an ED and a variety of clinical and epidemiological studies report considerable comorbidity of depression among females with EDs (Lewinsohn, Striegel-Moore, & Seeley, 2000; Santos, Richards, and Bleckley, 2007; Zaider, Johnson, & Cockell, 2000). One study found 46% of female inpatients with BN also met DSM-IV criteria for a coexisting major depressive disorder (Blinder, Cumella, & Sanathara, 2006). Rates are also high in non-treatment seeking, community samples. For example, comorbidity between depression and BN was 18% in one study (Garfinkel et al., 1995). The evidence suggests clinicians will need to treat depression symptoms, as well as ED psychopathology. Exploring the reciprocal relations between depression and EDs has yielded interesting findings. Two studies report that earlier difficulties with eating predict future increases in depression (Stice, Burton & Shaw, 2004; Marmorstein, von Ranson, Lacono, & Malone, 2008). However, whilst Stice and colleagues found that earlier depression also predicted later onset of ED pathology, this was not replicated by Marmorstein von Ranson and colleagues. The high rates of depression in people with EDs and the potential causal nature of the relationship between the two disorders indicate that in DSM 5, depression might be best considered as integral to an ED diagnosis.

### *6.4 Personality Disorders*

In a systematic review and meta-analysis of studies exploring comorbidity between EDs and personality disorders, Rosenvinge, Martinussen and Ostensen (2000) report that the proportion of ED patients who have any personality disorder (average proportion = 0.58) is significantly greater than controls (average proportion = 0.28). Individuals with BN have more concurrent cluster B personality disorders (average proportion = 0.44) and borderline personality disorder (average proportion = 0.31) than those with AN.

There were no differences between AN and BN groups regarding cluster C personality disorders (average proportion = 0.45 and 0.44 respectively). These authors assert that routine assessment of personality disorders using structured clinical interviews should be commonplace when working with people with EDs in order to meet some of the unmet needs of these individuals. The use of clinical interviews is supported by Cassin and van Ranson (2005), whose meta-analysis found comorbid rates of personality disorders and EDs ranged from 0-58%. The variability in the comorbidity rate was explained in part by the use of self-report measures which overestimated the prevalence of all personality disorders in those with EDs.

### *6.5 Self-Harm*

A variety of reports suggest individuals with EDs are at risk for self-injurious behaviour (Garfinkel, Moldofsky & Garner, 1980; Jacobs & Issacs, 1986; Mitchell, Boutacoff, Hatsukami, Pyle & Eckert, 1986; Winchel & Stanley, 1991). Paul, Schroeter, Dahme and Nutzinger (2002) looked at lifetime presence and occurrence during the previous 6 months of self-harm in 376 women with EDs and report a lifetime rate of 34.6%. 21.3% of the sample had self-harmed during the preceding 6 months. Women with BN and those with ED-NOS reported the highest rates of lifetime self-harm within the sample (34.3% and 35.8% respectively). Thus, compared to clinical reports which report that 4-10% of psychiatric patients engage in self-harming behaviours (Favazza & Conterio, 1988), individuals with EDs show relatively high rates of self-injurious behaviours.

### *6.6 Summary of Comorbidity in Eating Disorders*

In summary, EDs are commonly comorbid with anxiety disorders, particularly OCD, as well as depression. People with EDs may also present with personality disorders such as borderline personality disorder and self-harm. It is possible that these high rates of comorbidity may reflect an underlying shared vulnerability to these disorders, or that current diagnostic categories are inaccurate, as the same symptoms are present across various disorder domains. Despite this, these data provide a clear message to clinicians

working in the field to carry out regular and thorough risk assessments of their ED patients.

### *7.0 The Aetiology of Eating Disorders*

The difficulties in specifying stable, homogeneous phenotypes has hampered research into the aetiology of EDs, described as “heterogeneous disorders with complex multi-factorial aetiology,” involving a wide range of factors, including epigenetic and social variables (Collier & Treasure, 2004, p363). However, this section aims to explore some of these factors and how they might contribute to the development and maintenance of the illness. It begins with a brief review of the genetic factors and then explores the environmental factors that have been researched.

### *7.1 Genetic Factors*

EDs themselves are heritable; approximately 50%, as are traits associated with EDs, including binge eating, self-induced vomiting, drive for thinness, dietary restraint and disinhibition (Bulik et al., 2007). EDs also co-segregate in families (Lilenfeld et al., 1998). However, the exact genes which drive these behaviours are as yet unknown, with researchers arguing that this is due to the highly variable phenotype (Anderluh, Tchanturia, Rabe-Hesketh, Collier & Treasure, 2008; Collier & Treasure, 2004) and AN for example is also a relatively rare complex disorder which means that population-based and longitudinal studies tend to be able to identify only a small number of cases (McKnight Investigators, 2003; Bulik, Slof-Op’t Landt, van Furth & Sullivan, 2007).

#### *7.1.2 Serotonergic and Dopaminergic Genes*

Serotonin, a neurotransmitter involved in body weight regulation is implicated in the development of both AN (Brewerton & Jimerson, 1996; Kaye, 1997) and BN (Weltzin,

Fernstrom & Kaye, 1994). Thus far, with two reliable replications produced by independent laboratories, studies exploring genes associated with serotonergic pathways have identified one single nucleotide polymorphism (SNP), rs674386, on the serotonin receptor 1D gene is associated with AN (Bergen et al., 2003; Brown, Bujac, Stubbins & Blundell, 2007). Dopamine is a neurotransmitter hypothesised to be involved in causing AN symptoms including repulsion to food, weight loss, hyperactivity, amenorrhea, distortion of body image, and obsessive-compulsive behaviours (Kaye, Strober & Jimerson, 2004). Reliable replications support the finding that polymorphisms within the dopamine D2 receptor gene are associated with AN, in particular, the purging-type of AN is associated with SNPs at rs1800497 and rs6278 in a case-control design (Bergen et al., 2005; Bulik et al., 2007).

The importance of dysregulation in the serotonergic and dopaminergic systems has important links with the factors being investigated in this thesis. It has been suggested that rather than finding social interaction rewarding, people with AN find it aversive and contrary to other individuals find restricted eating rewarding as it appears to reduce “negative mood caused by skewed interactions between serotonin aversive or inhibitory and dopamine reward systems” (Kaye, Wierenga, Bailer, Simmons & Grethe, 2013, p112).

### *7.1.3 A Recent Review of the Literature*

A review by Root et al., (2011) of 182 possible candidate genes for AN with genetic data collected from 1762 women with the illness reported that initial case-control results had thus far shown no statistically significant differences in single nucleotide polymorphisms. Root and colleagues’ review which used a regression analysis to investigate the candidate genes for phenotypes associated with AN, including lowest illness-related attained body mass index, age at menarche, drive for thinness, body dissatisfaction, trait anxiety, concern over mistakes and the anticipatory worry and

pessimism versus uninhibited optimism subscale of the harm avoidance scale on the Temperament and Character Inventory (Cloninger, 1994). Once corrections were applied to account for multiple testing, there were no statistically significant findings and it is possible that this is a viable approach to understanding the genetics of AN, but the sample size (power) needs increasing significantly. Indeed, studies of the genetics of AN have been criticised for being underpowered and subject to type 2 error (Bulik et al., 2007) and for example, in schizophrenia, sample sizes of at least 20,000 cases were required before significant findings were identified and reliably replicated (Collins et al., 2012).

### *7.2 Physical and Developmental Risk Factors*

In addition to the above genetic factors, prematurity, smallness for gestational age, and cephalohematoma (a haemorrhage of blood between the skull and the periosteum or skull bone membrane of a newborn baby) have all been identified as specific risk factors for the development of AN (Cnattingius, Hultman, Dahl & Sparen, 1999).

### *7.3 Environmental Factors*

#### *7.3.1 Culture of Thinness*

The modern, western world is comprised not only of easy access to highly palatable, highly calorific food, but also of slimness and dietary restraint being socially promoted and accepted norms. However, although intense pressure to conform to weight and shape norms is placed on many individuals in Western societies, only a small proportion of the population develop an ED. Whilst AN, as mentioned earlier, is found throughout the world, whether or not there is a strong media influence and the prevalence of a norm of thinness (Lee, 1996), more recent data suggests that media-naïve societies such as Fiji have experienced an increase in negative eating attitudes in young women with

the introduction of television to the population (Becker, Burwell, Herzog, Hamburg & Gilman, 2002).

### *7.3.2 Familial Environment*

However, other psychological factors do appear to play a role in the aetiology of EDs. A greater focus on dieting in families and critical comments around weight and shape within the family are important risk factors for the development of BN. The data indicate this is less important in the aetiology of AN, however (Fairburn, Cooper, Doll & Welch, 1999; Karwautz et al., 2011). Modelling of unhealthy behaviours around food, body, weight and shape may play a role. For example, case studies indicate that children imitate the purging and restricting behaviours of their mothers (Russell, Treasure & Eisler, 1998). In line with more recent work, as discussed above, these familial factors may interact with genes to influence the development of an ED. For example a child may inherit genes that increase their susceptibility to developing an ED and at the same time, their parents may be modelling ED behaviours such as food restriction and compulsive exercise and ED related attitudes, such as body dissatisfaction and a drive for thinness. These children may receive a “double-dose” of putative ED risk because of the genetic and environmental factors they have been exposed to (Mazzeo & Bulik, 2009). In a review by Stice (2002), social support was reported to be one factor that might mitigate the effects of these types of risk factors.

### *7.3.3 Role of the Media*

It is a common assumption made by many in the lay audience that the media are to be ‘blamed’ for the incidence of EDs. While this factor did not account for a significant proportion of the variance in a review and meta-analysis of risk factors for EDs (Jacobi, Hayward, de Zwaan, Kraemer & Agras, 2004), a meta-analysis which looked at the data from 25 studies found that constant exposure to media images which depict thin women is related to a reduction in body related self-esteem, an effect that had most impact on adolescents and participants who highly valued thinness (Groesz, Levine &



Murnen, 2002). Indeed, the review of Jacobi et al., (2004) highlighted a range of common risk factors from longitudinal and cross-sectional studies and these include (female) gender, ethnicity, early childhood eating and gastrointestinal problems, elevated weight and shape concerns, negative self-evaluation, sexual abuse and other adverse experiences, and general psychiatric morbidity.

#### *7.3.4 Psychosocial Risk Factors*

Hilde Bruch (1979, pxxii) highlights the psychosocial aetiological factors in the development and maintenance of EDs. She proposed three domains of “disturbed psychological function” to be characteristic of individuals predisposed to EDs. These are “severe disturbances in body image;” “misinterpretations of internal and external stimuli, with inaccuracy in the way hunger is experienced as the most pronounced symptom;” and “a paralysing underlying sense of ineffectiveness, the conviction of being helpless to change anything about their lives.”

#### *7.4 Puberty as a Putative Risk Factor*

Crisp (1980) argued that AN results from a maladaptive biological response to the growth changes that occur in puberty. This idea is supported by the fact that a proportion of cases have a later onset and AN is relatively infrequent in males (Crisp, Norton, Jurczak, Bowyer & Duncan, 1985). During an assessment lasting up to 3 hours, usually involving the family, Crisp formulated the underlying psychopathology of each case, assessing how AN might develop as an escape from growth (Crisp, 1997), which is used by the patient to regress to a more simple existence associated with fewer social emotional challenges and a lower level of responsibility. The patient maintains a pre-pubertal weight in order to achieve this state. The maturational crisis which triggers the AN may, or may not be associated with a precipitating event, including loss, separation, sexual activity, pregnancy, fantasised or real, or childbirth (Crisp et al., 1985). Due to its chronic nature and severe form, Crisp et al., (1991) argue for specialist treatment settings.

## *8.0 Models of Eating Disorders*

In the section below, two pertinent, contemporary maintenance models are described alongside a discussion of how these models have informed the development of the research questions.

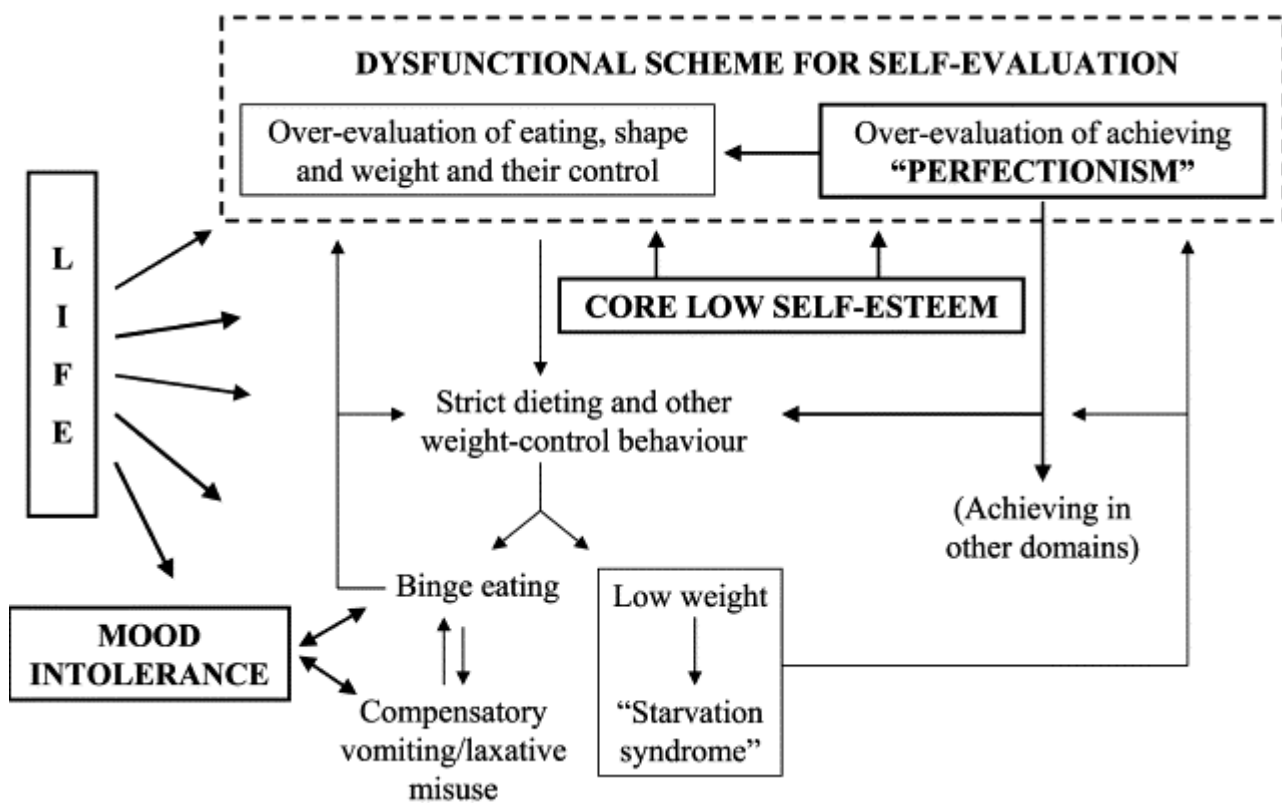
### *8.1 Transdiagnostic Cognitive Behavioural Model (Fairburn, Cooper & Shafran, 2003; Fairburn, 2008)*

Fairburn's model provides a cognitive behavioural, transdiagnostic formulation of EDs. This model hypothesises that the over-evaluation of shape and weight and their control are key maintenance factors for all types of EDs. The other clinical features, for example, restriction, obsessive, intrusive thoughts about food and eating, weight and shape, the repeated checking of body shape and weight or its avoidance and the use of extreme methods of weight control like self-induced vomiting, excessive exercise and laxative abuse can be understood to be direct consequences of this psychopathology. The model states that binge eating is one feature that is not a direct expression of the core psychopathology. The model purports that this behaviour is a result of attempts to adhere to multiple extreme, and highly specific, dietary rules, which are inevitably broken and the negative reaction of the ED patient to this dietary slip is viewed as evidence of poor self-control. In response, the patient temporarily abandons their efforts to restrict and resorts to binge eating. This contributes to maintaining the core psychopathology by intensifying patients' concerns about their ability to control their eating, shape, and weight. It also encourages more dietary restraint, which further increases the risk of binge eating (Fairburn, 2008; Murphy, Straebl, Cooper & Fairburn, 2010). Binge eating is also maintained by low mood which prevents the individual from successfully restricting; by binge eating becoming a way of temporarily alleviating low mood and through engagement in compensatory behaviours such as purging which seem to the patient to control their weight and shape and prevent them from stopping the binge eating. Interpersonal difficulties (represented as LIFE) in the schematic provided by the authors are hypothesised to contribute to the maintenance

of disordered eating behaviours both independently and also via associated mood regulation problems.

The transdiagnostic model is illustrated in figure 1, below.

Figure 1: Transdiagnostic Cognitive Behavioural Model of Eating Disorders (Fairburn, Cooper & Shafran, 2003; Fairburn, 2008)



(Figure from Fairburn, Cooper & Shafran, 2003)

### 8.1.2 Relevance to the Factors Investigated in this Thesis

This model is of relevance to the factors investigated in this thesis because it predicts that the vicious cycles of thoughts, feelings and behaviours might prevent a sufferer from engaging in a full social and vocational life. Experiencing intrusive, obsessive

thoughts about weight and shape, as described in the model, may prevent individuals from achieving optimal social functioning.

At present, the model highlights the role of mood (anhedonia) and interpersonal problems in maintaining the illness, but does not elucidate what the mechanisms behind the interpersonal maintenance factors might be. Therefore, it is predicted that anhedonia in the social domain, social anhedonia, may be an additional maintaining factor currently missing from this model which contributes not only to the interpersonal maintaining factors (for example, difficulties with social adjustment), but also independently to maintaining the illness. The first prediction would be supported by social anhedonia being a significant predictor of social adjustment and the presence of a positive correlation between social functioning difficulties and length of illness or current symptoms. The second prediction would be supported through a positive correlation between social anhedonia and years of illness.

## *8.2 The Cognitive Interpersonal Maintenance Model (Schmidt & Treasure, 2006; Schmidt & Treasure, 2013)*

This model is a maintenance model, although some components originate from a developmental perspective. It is disorder specific, and was developed to explain AN, although in their 2013 revision, Schmidt and Treasure also explore the proposed maintaining factors in the context of BN. The four components of the model are emotional style, cognitive style, pro AN thinking and interpersonal factors and these factors are described in more detail below

### *8.2.1 Cognitive Factors*

The model states that people with EDs tend to have an inflexible, detail focused cognitive style (Lopez et al., 2009; Tchanturia et al., 2011; 2012c) exaggerated by starvation in the acute phase of the illness. Being able to rigidly stick to a strict dietary regime and focusing on the details of thermoregulation help to maintain the ED. It is

likely that this cognitive style is a trait associated with both the development and maintenance of EDs (Harrison et al., 2010b; Goddard et al., 2011).

### *8.2.2 Social Emotional Style*

It is hypothesised that social emotional difficulties are present before the ED develops. In the acute phase of the ED, eating becomes threatening to the individual's emotional and physical equilibrium, such that they feel a failure if they consume anything outside of their strict dietary regime. The individual becomes disconnected from their emotions, shows high levels of experiential avoidance and starvation helps them to feel numb, which is perceived as a positive state. Individuals find social information more threatening and demonstrate high levels of avoidance (Oldershaw et al., 2011; Harrison et al., 2010b; Davies et al., 2011; Hambrook et al., 2013).

### *8.2.3 Interpersonal Factors*

The model states that in the early stages of AN, dietary restriction is maintained interpersonally, as the individual receives positive reinforcement for their efforts at eating restraint through temporary improvement in mood and well-being. Subsequently, close others become extremely concerned and worried about the individuals' declining physical state, which results in high levels of care related behaviours from those around them. The ED may result in confrontation and hostility among close others and the individual with AN then isolates themselves further, as they are highly intolerant of negative emotions and criticism. Interpersonal relationships decline further, they are increasingly viewed as threatening and dangerous and AN itself appears more dependable and safe than contact with others (Schmidt & Treasure, 2006; Schmidt & Treasure, 2013).

### *8.2.4 Pro AN Thinking*

The individual develops positive beliefs about starvation as they master dietary rules and excel at attention to detail regarding dieting rituals. Pro-anorexia beliefs develop

(Serpell, Teasdale, Troop & Treasure, 2004) which may relate to the role AN plays in helping the individual to cope with emotions and remain in control. The person with AN may also develop beliefs that AN singles them out as being more attractive and special (Branch & Eurman, 1980) and they have less time and energy to focus on broader areas of their life because they become so focused at achieving highly at the goals of anorexia (Mond, Hay, Rodgers, Owen & Beumont, 2005).

In this model, the physical effects of starvation on the body and overall functioning are also considered significant maintaining factors, such that starvation prevents people from having to face difficult developmental challenges such as making friends, moving out of the family home and finding employment or occupation in life because they are considered too weak and unwell.

#### *8.2.5 Relevance to the Factors Investigated in this Thesis*

Unlike Fairburn's model, this model offers some explanation of what the social emotional and interpersonal difficulties might be that contribute to maintaining the illness. For example, difficulties with recognising and regulating emotions and the perception of social stimuli as threatening help to maintain the illness. However, this model does not fully elucidate the potential mechanisms driving the interpersonal difficulties. Therefore, it is hypothesised that social anhedonia may be a potential maintaining factor currently missing from the model and this prediction would be supported through the presence of social anhedonia as a significant predictor of social difficulties.

#### *8.3 Summary of Work which has led up to this Thesis*

A review and meta-analysis of 37 experimental studies found that people with AN had difficulties in both basic and complex emotion recognition and regulation (Oldershaw et al., 2011a). Several studies published after this review further highlight the broad range of social emotional inefficiencies observed in EDs, particularly recognising, expressing and regulating emotions in social contexts (e.g. Castro et al., 2010; Davies et al., 2010;

Harrison et al., 2011; Hambrook et al., 2012). In a previous PhD thesis, the candidate sought to understand more about the social emotional functioning of people with all forms of EDs in a sample of 50 women with AN, 50 women with BN, 35 women recovered from AN and 90 non-ED controls. The findings were published in two papers in Psychological Medicine (Harrison et al., 2010b) and Biological Psychiatry (Harrison et al., 2010c). These data were analysed in the context of a principal components analysis which included other data collected by the candidate on the cognitive style of people with EDs and this work was published in the British Journal of Clinical Psychology (Harrison et al., 2012). This work involved:-

1) The experimental measurement of emotion recognition using the Reading the Mind in the Eyes task (Baron-Cohen et al., 2001) in which participants are asked to identify complex emotions having been shown static pictures of the eye region of the face. The data showed that emotion recognition difficulties were present in people with EDs with a small effect size relative to non-ED controls and the effect was more pronounced for people with AN than people with BN. The emotion recognition difficulties improved with recovery.

2) The experimental measurement of attentional biases to social stimuli (faces) and to the emotion of anger measured using a pictorial emotional Stroop task (Ashwin et al., 2006). The data showed that people with EDs demonstrated an attentional bias for social stimuli compared to non-social items (furniture) with medium effect sizes for the AN group and a large effect size for the BN group relative to non-ED controls. People with EDs also showed an attentional bias for angry faces relative to neutral faces, with a large effect size for both individuals with AN and BN relative to non-ED controls. This attentional bias remained in the recovered phase of the illness.

Other research collected in the context of the candidate's PhD thesis involved the following:-

3) The experimental measurement of the regulation of aggression during socially frustrating situations using the Rosenzweig Picture Frustration Study (Rosenzweig, 1945) in which 22 participants with AN and 44 non-ED controls were required to respond to cartoons depicting socially frustrating situations such as a friend's car breaking down whilst driving you to the train station. The data showed that individuals with AN responded with significantly fewer solution-focused responses and focused

aggression on the people in the situation more often than non-ED controls. There was a trend towards those with AN being less able to minimise or neutralise aggression compared to non-ED controls. These data are published in the literature in the journal *Clinical Psychology and Psychotherapy* (Harrison et al., 2011).

4) Measurement of self-reported difficulties in emotion regulation using the 36 item Difficulties in Emotion Regulation Scale (Gratz & Roemer, 2004). Data collected using this measure were reported in Harrison et al (2009; 2010b; 2010c) and highlighted that people with both AN and BN reported significantly greater emotion regulation difficulties than non-ED controls, with very large effect sizes. However, once recovered, people with AN report their emotion regulation skills improve.

Taken together, this body of work indicates that people with EDs have difficulties recognising other people's emotions, regulating their own emotions in social situations, social cues and in particular the emotion of anger are particularly salient stimuli for these individuals and an attentional bias for these types of information may have consequences for their everyday social functioning. To some degree, these social emotional difficulties may improve somewhat in the recovered phase of the illness, indicating that they may either be a scar of the illness or that they may be vulnerability factors associated with the development of an ED which are exacerbated during the acute phase. It is possible that people with EDs struggle with social emotional functioning because they have difficulties with social skills and the work conducted to date by the candidate would support this idea. There may also be additional factors that explain the social emotional difficulties reported and demonstrated under experimental conditions by individuals with EDs. It is possible that these individuals lack a drive to seek out and experience pleasure for social interaction and this concept is known as social anhedonia. Therefore, the work conducted in the context of the present thesis aims to explore whether social anhedonia is present in these individuals, whether it is present in the recovered phase of the illness and thus may potentially be a trait associated with developing an ED and whether social anhedonia might contribute to explaining social and work adjustment problems in this patient group.

### *9.0 Interim Summary*



Thus far, the Introduction has described the symptoms that are present in EDs and evaluated the literature which explores how best to categorise these complex illnesses. It has also described and evaluated the data on onset, prevalence, life course and possible aetiology, as well as presenting a maintenance model of the illness alongside possible implications for the factors this thesis aims to explore. The section below outlines why social anhedonia and work and social functioning were chosen as targets for research in this thesis and later, these concepts are defined in more detail and the current evidence base in EDs is provided.

### *10.0 Treatment for Adults with Eating Disorders*

At present, there is good evidence that using family based work to mobilise parents or guardians to restore a pattern of healthy eating in the adolescent sufferer is an effective treatment (Fisher, Hetrick & Rushford, 2010; Lock, LeGrange, Agras, Moyer & Bryson, 2010; Stiles-Shields, Hoste, Doyle & LeGrange, 2010). However, the evidence suggests that if not successfully tackled in childhood, and where the illness lasts over 3 years, change becomes more difficult (Treasure & Russell, 2011). The National Institute of Clinical Health and Excellence (NICE; 2004) guidelines for treating EDs in adults recommend cognitive behavioural therapy and antidepressant medication as gold standard treatments for adult patients with BN. Unfortunately, this is not the case for adults with AN. In a review of the literature, Hay and Claudino (2011) found the evidence for the efficacy of drug treatments is mostly weak or moderate and clinically, it can be difficult for patients to take medication because of concerns of the potential side effect of weight gain. In a multi-site study of a 40-session enhanced cognitive behaviour therapy for marked adult AN (Fairburn et al., 2013), 64% of patients who started therapy completed treatment. The mean weight increase of 7.47kg was largely sustained at 60-week follow-up and 88% scored less than 1 standard deviation above the community mean for the Eating Disorders Examination Questionnaire (Fairburn & Beglin, 1994; Mond et al., 2006). Whilst these data offer promising progress in finding effective, evidence-based treatments for adult AN, further research is needed,

particularly for severe and chronic patients who are severely underweight (Bulik et al., 2007). Indeed, AN in adults has been described as ‘one of the most difficult psychiatric disorders to treat’ (Halmi et al., 2005). For 20% of patients (Robinson, 2006), the illness takes an intractable, highly debilitating course (Hay et al., 2012), lasting over 10 years (Arkell & Robinson, 2008). These severe and enduring cases report longstanding difficulties with bingeing and purging, significant comorbidity including depression, anxiety, obsessive compulsive disorder and personality disorders, have a mortality rate of 15% (Steinhausen, 2009) and similar levels of social debilitation, quality of life and interpersonal avoidance to schizophrenia patients (Arkell & Robinson, 2008). These patients with severe and enduring illnesses have difficulties accessing treatments; for example in one study, 50% of community cases offered appointments failed to even present themselves to the clinic (Keski-Rahkonen et al., 2007). A comprehensive review of 119 studies of 5590 people with a follow-up period of between 1 and 29 years found that whilst 47% recovered (range 0–92%) and 34% improved (range 0–75%), 5% died and 21% developed a chronic ED (range 0–79%) (Steinhausen, 2002; Keel & Brown, 2010). Indeed, Steinhausen also reported that aged 20, patients with AN had a mortality rate of 20%, which increased by an additional 5–10% for every additional decade they were unwell. These severe and enduring cases impose a heavy burden on health and other public services (Treasure & Russell, 2011). They tend to be under-employed or out of work completed for long periods, require sickness benefits, suffer multiple medical complications (renal, liver, cardiac failure and osteoporosis), have repeated admissions to general and specialist medical facilities, and are frequent users of primary care services (Birmingham & Treasure, 2010). They also pose a significant burden on their family members who try to care for them in-between hospital admissions (Zabala, McDonald & Treasure, 2009).

### *10.1 Benefits of the Recovery Approach in Treating Severe and Enduring Eating Disorders*

Symptom amelioration is important. However, whereas the medical model of recovery would dictate that individuals need to be in full remission from symptoms to be recovered, the Recovery Approach, defined as “a social movement that is influencing

mental health service development around the world. It refers to the subjective experience of optimism about outcome from psychosis, to a belief in the value of the empowerment of people with mental illness, and to a focus on services in which decisions about treatment are taken collaboratively with the user and which aim to find productive roles for people with mental illness” (Warner, 2010, p3; Appleby, 2004; Brown & Bhungra, 2007; Fulford, 2004, Slade, 2009). Indeed, the recovery approach offers a more diffuse and subjective conceptualisation of recovery with a focus on being productive and functioning more independently (Warner, 2009), which may offer enhanced support to individuals with severe and enduring EDs. This approach aims to support and empower individuals to enhance their functioning across a broad range of domains including self-care, identity and trust, work, social skills and hobbies. This approach to recovery emphasises the need for collaboration, empowerment, recognises the value of work in rehabilitation, subjective experiences of optimism, the importance of environmental factors and the experience of being part of the community in helping people with serious mental health illnesses to achieve their best functioning (Leff & Warner, 2006; Ramon, Healy & Renouf, 2007; Warner, 2009). In reviews by Warner (2009; 2010) on the impact of the recovery approach on recovery and functioning in people with schizophrenia, data indicate that empowerment, employment, and good social functioning contribute to greater functioning and the subjective experience of recovery in these severe and chronically unwell individuals. The theme of social inclusion is strongly reflected in a qualitative study of ED service users’ views of the recovery approach (Turton et al., 2011).

Current treatments for EDs in adults include components that focus on interpersonal recovery (Enhanced Cognitive Behaviour Therapy; Fairburn et al., 2013; The Maudsley Model: Wade, Treasure & Schmidt, 2011; Cognitive Remediation and Emotion Skills Training; CREST; Money et al., 2011a; Davies et al., 2012). By understanding more about social anhedonia and the work and social functioning difficulties reported by people with EDs, it may be possible to contribute empirically based knowledge to enhance this treatment packages to support patients in particular areas of difficulty to enhance overall well-being and functioning. Therefore, in the section below, the current state of the literature on social anhedonia and work and social functioning in people with EDs

will be reviewed and this review will be followed by specific aims and hypotheses for the studies presented in this thesis.

### *11.0 Defining Anhedonia*

The term ‘anhedonia’ was initially described by Haslam, a psychiatrist working in the early 1800s in a description of a psychiatric patient suffering with symptoms that would now be categorised as schizophrenia. This patient was observed to neglect objects and pursuits which had previously been a source of pleasure (Haslam, 1809). The term ‘anhedonie’ was also used by Ribot, a French psychologist, to describe the inability of patients to derive pleasure from life (Ribot, 1986). At the other end of the continuum, ‘hedonia’ is used to refer to “enhanced motivation to approach naturally pleasurable behaviours and to find them rewarding” (Davis, Strachan & Berkson, 2004, p132).

Since its initial description, the term ‘anhedonia’ has become a widely used expression typically used to refer to symptoms of apathy and indifference, particularly in the context of serious psychological difficulties like schizophrenia (Der-Avakian & Markou, 2011). Indeed, Rado (1956) and Meehl (1962) both suggest that anhedonia, described as the absence of a drive to seek out rewarding activities and experience pleasure, may be an inherited trait which predisposes individuals to serious psychological illnesses such as schizophrenia. It is not realistic to suggest that anhedonia, as previously defined, adequately explains the complex, multifactorial reward related differences present in people with neuropsychiatric disorders like schizophrenia (Der-Avakian & Markou, 2011). However, the term provides a useful description of part of the prototypical presentation of people struggling with schizophrenia and other psychological difficulties such as depression and EDs which includes a reduced interest in seeking out pleasurable activities and experiencing pleasure in life.

When considering the broader context of the anhedonia observed in people with psychological difficulties like EDs, it is useful to take into account the range of processes involved in reward-related processes in which deficits may occur that can lead to a subjective experience and observable behaviours that can be interpreted as indicating a loss of interest or pleasure. Der-Avakian and Markou (2011) have described the

presence of difficulties across five types of process. These are: 1) a reduction in the ability to anticipate or predict expected rewards; 2) difficulties relating to the ability to associate relative values and costs with rewards; 3) problems determining the effort required to obtain rewards; 4) a reduced ability to integrate this information and then decide or predict how worthwhile it may be to obtain rewards; and 5) a reduction in the motivation required to perform the necessary actions to obtain rewards. These authors suggest that difficulties in any one of these five processes may prevent an individual “from engaging in goal-directed actions for rewards, regardless of whether or not the reward is perceived as pleasant once obtained” (Der-Avakian & Markou, 2011, p69). In summary, the experience of anhedonia is likely to be underlined by reduced levels of pleasure and motivation and sub-optimal performance in valuation, anticipation and decision-making skills.

The neural substrates of these differences in the hedonic system have been reviewed by Berridge (2009) who describes a hedonic circuitry encompassing the anterior cingulate, the orbitofrontal cortex, the insula, the ventromedial prefrontal cortex and the ventral tegmental area and within this circuit are the ‘hedonic hotspots’ of the nucleus accumbens, ventral pallidum, and brainstem parabrachial nucleus. In addition to this, Volkow and colleagues have carried out numerous studies which show the role of the neurotransmitter dopamine in hedonic system. Like Meehl (1975), who suggests the capacity to experience pleasure or reward is normally distributed across the general population, Volkow and colleagues (1999) also argue for the presence of individual differences in hedonia and suggest that the concept occurs along a continuum. They suggest the presence of an optimal, inverted U shaped relationship for hedonia and dopamine activity. This means that too much, or too little dopamine activation in the hedonic system outlined above can be aversive. For people described as hedonic, with high dopamine availability, a small increase in dopamine stimulation is associated with a pleasant experience, whereas a larger increase, achieved through ingesting dopamine agonist drugs for example, would be experienced as aversive by the individual. Conversely, people experiencing anhedonia tend to have lower dopamine availability and may be predisposed to psychological difficulties such as addiction because their makeup favours the initial pleasant response to addictive drugs. This is because the

initial level of dopamine activation achieved does not result in their optimal level of activation being surpassed as it would for the hedonic group (Volkow et al., 1999; Wang, Volkow & Fowler, 2002). This supports findings reported by others who suggest that anhedonia is a pertinent risk factor for many forms of addiction, including alcoholism, smoking and opiate use (Blum et al., 1995; Cloninger, 1987; Elmer et al., 2002; Waldman et al., 1998).

### *11.1 Social Anhedonia*

As described in the section above, anhedonia is a general term which relates to individual differences in the way people seek out and gain pleasure from life. One specific form of anhedonia relates to individual differences in the drive to seek out and experience pleasure from social interaction and this form of anhedonia is a focal point of this thesis. Successful human survival, has, during our evolutionary history, involved humans acting as social creatures, motivated by the need for frequent and meaningful social contact and interaction (Baumeister & Leary, 1995). The term 'social anhedonia' relates to a reduction in the perception of social contact as pleasurable, a reduced drive to seek out social interaction and the experience of diminished pleasure during interpersonal contact (Brown et al., 2007; Kwapil et al., 2009). Social anhedonia is associated with a reduction in the desire to belong to a social group and the construct differs from social anxiety in that individuals with social anhedonia show a preference for solitude, disengage during social interactions (Brown et al., 2007), perhaps because they report experiencing less negative affect when they are alone (Kwapil et al., 2009). Social anhedonia is negatively correlated with social support and social functioning (Blanchard et al., 2009), and is associated with smaller social networks (Miller et al., 2009), a social situation commonly observed in individuals with EDs (Tiller et al., 1997). Indeed, the relevance of the concept becomes even more pertinent when considering Germine et al's (2011) summary that social anhedonia represents a psychologically and clinically significant deviation from typical social functioning which has broad implications for how psychologists understand both normal and abnormal social functioning. It could be suggested that understanding more about this factor in people

with EDs might enable clinicians to develop interventions which aim to improve social functioning in this group of patients.

### *11.2 Research into Social Anhedonia: A Brief Background*

Prior research in the field of social anhedonia has focused on understanding the impact of the construct on the social functioning of people with schizophrenia. High levels of social anhedonia have been reported for this patient group and the symptom has been found to be a stable feature of schizophrenia (Blanchard et al., 2001) which can be reliably measured (Horan et al., 2006) using a self-report measure called the Social Anhedonia Scale (Eckblad et al., 1982). Social anhedonia is considered to be a potential risk marker for psychotic type illnesses (Cohen, Leung, Saperstein & Blanchard, 2006; Horan, Brown & Blanchard, 2007) and in a longitudinal study Kwapil (1998) found participants who later developed psychotic illnesses had higher scores on the RSAS. Pelizza and Ferrari (2009) have recommended a clinical cut-off of >12 for this measure and clinical levels of social anhedonia have been reported for 24% of people with a schizophrenia spectrum illness compared to only 1% of controls. Furthermore, higher social anhedonia scores were also found in first degree relatives of people with schizophrenia (Kendler, Thacker, & Walsh, 1996), indicating that it may be a heritable trait. The literature provides caveats that these findings may not be generalisable to non-schizophrenia patient groups, as the findings may be confounded by anti-psychotic medication and the neurodegenerative processes associated with schizophrenia (Lenzenweger, 2006).

Studies exploring the neural correlates of social anhedonia have highlighted the role of the amygdale (Becerril & Barch, 2011), caudate nucleus (Dowd & Barch, 2010), dorsolateral prefrontal cortex (Becerril & Barch, 2011) and somatosensory regions (Arnfred & Chen, 2004) in the reduced drive for social contact. These are areas that have been found to show differences in structure and activity in the brains of people with EDs (amygdale: Giordano et al., 2001; caudate nucleus: Krieg, Holthoff, Schreiber, Pirke & Herholz, 1991; dorsolateral prefrontal cortex: Pietrini et al., 2011; Uher et al.,

2004; and somatosensory regions (Nunn, Frampton, Gordon & Lask, 2008) relative to healthy populations.

### *11.3 Past Research into Social Anhedonia in Eating Disorders*

Kaye (2008) proposed that AN may be caused, in part, by dysregulation in the reward brain-based reward systems and a systematic review and meta-analysis found that on self-report measures of reward sensitivity, individuals with the restricting subtype of AN (as opposed to the binge-purge subtype) reported lower reward sensitivity and lower appetitive motivation (motivation to approach rewarding stimuli) (Harrison et al., 2011). Furthermore, there is an established evidence base which points to the presence of social emotional information processing difficulties in people with EDs (for example, Russell et al., 2009; Harrison et al., 2010a; Harrison et al., 2010b; Oldershaw et al., 2011). Low sexual functioning and desire (Pinheiro et al., 2010; Treasure, Corfield & Cardi., 2012) in people with EDs may be clinical markers of social anhedonia in these patients. However, despite these findings and clinical observations that individuals with EDs are less likely than their healthy peers to seek out and experience social contact as rewarding, there has been little research directly targeting the concept of social anhedonia in this patient group. Given that, as mentioned in section 6.3, it is very common for individuals with EDs to suffer from depression and high levels of social withdrawal (Toro et al., 1995) and significantly smaller social networks (Tiller et al., 1997) than might be predicted for a group of people with average to above average IQ (see Lopez et al., 2010 for a systematic review), it is perhaps reasonable to predict that anhedonia would also be present in the social domain for people with EDs. The section below reviews the current evidence base relevant to this hypothesis.

### *11.4 The Experience of Social Stimuli as Rewarding*

Watson et al., (2010) carried out a small study of 11 patients with AN using an eye tracking paradigm and reported that these women found female faces less rewarding than controls and avoided looking at the face and eyes of these facial stimuli. These



authors hypothesise that the interpersonal difficulties observed in people with AN may be caused by a fundamental difference in the way that people with AN process social rewards and propose that disruptions in social reward processing may comprise part of the endophenotype of AN.

Using an acoustically elicited startle eye blink modulation paradigm, Friederich et al., (2006) found women with AN showed a decreased appetitive motivational response to pleasant stimuli taken from the International Affective Picture System (IAPS; Lang et al., 2008) (e.g. smiling faces; a baby's face), indicating people with AN do not find pleasant stimuli as rewarding as controls. Interesting preliminary findings also indicate that women with AN disengage from accepting faces and show a bias towards rejecting faces, measured using the dot probe paradigm, in comparison to controls who show the opposite pattern (Cardi, Matteo, Corfield & Treasure, 2012). These data indicate the presence of social anhedonia in people with EDs, as they find pleasant social stimuli unrewarding and disengage from this information where possible.

#### *11.5 Direct Measurement of Social Anhedonia in Eating Disorders*

In addition to the above findings, studies are currently available which report direct measurement of social anhedonia in AN. Two studies have used self-report measures of social anhedonia. Davies and Woodside (2002), using the Scales for Physical and Social Anhedonia (Chapman et al., 1976), found that individuals with AN demonstrate significantly higher self-reported physical anhedonia (gaining pleasure from sensory input; the experience of pleasure from physical sensations including touching, feeling and movement) in comparison to those with BN. Another study which used the same measure was carried out by Deborde et al., (2006). They reported data from the social anhedonia scale from Chapman's Scales for Physical and Social Anhedonia for a group of 46 mixed ED participants compared to 198 female HCs. Their data indicate that individuals with EDs had significantly higher social anhedonia scores than controls. They did not look at whether there were any differences between those with restricting symptoms and those with binge purge symptoms.

Also using Chapman's scales, Eiber, Berlin, Brettes, Foulon and Guelfi (2002) reported levels of social anhedonia for 20 RAN participants, 20 BPAN participants and 20 participants with BN. The groups did not differ significantly regarding levels of self-reported social anhedonia. However, there was a trend towards those with RAN scoring higher than those with BN with a small effect size ( $D=0.36$ ). This study did not include a non-ED control group but did assess correlations for the ED groups and found that social anhedonia was positively correlated with Drive for Thinness, measured using the Eating Disorder Inventory (Garner et al., 1983).

Using the revised version of the Social Anhedonia Scale from Chapman's original scales (Eckblad et al., 1982), Tchanturia et al., (2012a) also carried out direct measurement of social anhedonia in 72 women with AN, 19 women with BN and 43 HCs and found that those with AN and BN reported significantly higher rates of social anhedonia than HCs, with large effect sizes ( $D=1.28$  and  $D=1.52$  respectively). However, unlike Eiber et al., (2002), there was no difference between those with AN and those with BN regarding their social anhedonia scores.

#### *11.6 Measurement of Social Anhedonia in Individuals Recovered from Eating Disorders*

Little is known about whether social anhedonia might be present to a greater extent in those who have recovered from an ED relative to their peers with no lifetime history of an ED. It is possible that high levels of social anhedonia may persist to some degree and may contribute to explaining why Tiller et al., (1997) found that smaller social networks persisted after recovery in this group. Tchanturia et al., (2012a) included a small group of 14 recovered individuals in their study and found they reported social anhedonia scores on the Revised Social Anhedonia Scale that were lower than those who were currently unwell but higher than those reported by participants in the non-ED control group. An additional two studies which explored responses to reward more generally found that individuals recovered from AN (Wagner et al., 2007) and BN (Wagner et al., 2010) did not differentiate between positive and negative feedback in a monetary reward tasks and this finding was associated with altered striatal activity.

### *11.7 Summary of Social Anhedonia Research*

To summarise, social anhedonia relates to a reduction in the subjective experience of social contact as pleasurable and a reduced drive to seek out social interaction (Brown et al., 2007). This concept has been explored most frequently in the context of schizophrenia and there is emerging evidence that individuals currently unwell with EDs experience higher levels of social anhedonia than healthy peers. The studies described in this thesis will aim to build on the past research described in the section above, in particular on Tchanturia et al's (2012a) study using the Revised Social Anhedonia scale to explore with increased power the profile of social anhedonia for individuals in the acute phase of an ED, individuals in recovery from an ED relative to those who have no lifetime history of an ED. The section below aims to review the self-report measures that have been developed to measure this concept.

### *12.0 Measurement of Social Anhedonia*

#### *12.1 Chapman Physical and Social Anhedonia Scales*

Chapman and colleagues developed the Chapman Physical and Social Anhedonia Scales (CPAS/CSAS) (Chapman, Chapman & Raulin, 1976) to explore the previously discussed hypotheses of Rado (1956) and Meehl (1962) of a lifelong deficiency in pleasure, particularly in people with schizophrenia. This self-report measure contains 40 items that aim to measure physical anhedonia and 48 items that aim to measure social anhedonia. The questions are answered using a true/false dichotomous response scale. This measure not only measures lifetime levels of difficulty in seeking out and experiencing pleasure from life in general, but also explores social anhedonia. This measure was revised and published as two scales: 1) the Revised Physical Anhedonia Scale (Chapman, Chapman, & Raulin, 1976; Chapman, Chapman, & Kwapil, 1995) and 2) the Revised Social Anhedonia Scale (Eckblad, Chapman, Chapman, & Mishlove, 1982). These scales, on which higher scores relate to higher rates of social and physical anhedonia, have been widely used in part due to high rates of reliability and validity. For example, the Cronbach alpha for the social anhedonia scale has been estimated at 0.95

and the Cronbach alpha for the physical anhedonia scale has been estimated at 0.92 (Fonseca-Pedrero et al., 2009). The physical anhedonia scale consists of 61 items in a true/false format and measures difficulties experiencing pleasure from pleasant physical stimuli such as touching, smelling or listening to music. Sample items include: "I have often found walks to be relaxing and enjoyable; the beauty of sunsets is greatly overrated; the sound of rustling leaves has never much pleased me; and it has often felt good to massage my muscles when they are tired or sore." The social anhedonia scale consists of 40 items in a true/false format and measures schizoid indifference, associability, lack of social enjoyment and indifference towards others. Sample items include: "having close friends is not as important as many people say; I never had really close friends in high school; I prefer watching television to going out with other people; and just being with friends can make me feel really good."

### *12.2 Snaith-Hamilton Pleasure Scale (SHAPS)*

Snaith et al., (1995) developed this 14 item self-report measure in which questions are answered using a 4 point Likert scale ranging from 'strongly disagree' to 'strongly agree.' Sample items include: "I would enjoy seeing other people's smiling faces; I would enjoy my favourite television or radio programme; I would enjoy a cup of tea or coffee or my favourite drink." Participants are asked to consider their experiences over the past few days in order to answer the questions. Higher scores relate to higher levels of hedonia or pleasure capacity. Snaith and colleagues developed this scale in response to Chapman and colleagues' scales which were criticised for being rather long and placed a high degree of burden on the respondent. They aimed to develop a less complex scale that covered a several areas of pleasure and was less affected by social class, sex, age, dietary habits and nationality. The measure is reported to have good internal consistency, with the Richardson's formula statistic (Guildford, 1954; a statistic used to measure internal consistency in non-parametric data comparable to Cronbach's alpha) reported to be 0.86 (Snaith et al., 1995).

### *12.3 Fawcett-Clark Pleasure Capacity Scale (FCPS)*

This measure was developed by Fawcett, Clark, Scheftner and Gibbons (1983) and is a 36 item self-report measure which requires participants to respond based on a 5 point Likert scale ranging from 'no pleasure at all' to 'extreme and lasting pleasure.' Higher scores relate to greater hedonia or the capacity to seek out and experience pleasure from life. Participants are asked to rate their answers based on their current predicted relation to hypothetical pleasurable situations. For example: "You sit watching a beautiful sunset." This measure has been found to have strong discriminant validity and good psychometric properties (Clark, Fawcett, Salazar-Gruesso, & Fawcett, 1984). One feature of this measure is that it has been found to measure a single latent dimension of loss of pleasure capacity (both physical and social) and therefore measures anhedonia as a uniform concept (Fawcett et al., 1983).

In a study comparing the psychometric properties of the three measures described above, a confirmatory factor analysis indicated that the SHAPS and FCPS have substantial communality that can be taken to define a construct described as 'hedonic capacity,' with a latent variable factor loading of 0.92, whereas the CPAS measures constructs independent of hedonic capacity. The study found that the CPAS did not show the predicted negative correlation with hedonic capacity and the authors concluded that the construct validity of the CPAS, as a measure of hedonic capacity, was not supported (Leventhal, Chasson, Tapia, Miller & Pettit, 2006).

Leventhal et al's., (2006) confirmatory factor analysis also found that the SHAPS and the FCPS define a hedonic capacity construct that is distinguishable from depression and anxiety. This supports previous findings which have found anhedonia to be a stable dimension which is independent from depression, the negative symptoms of schizophrenia and other symptomatology described in people with serious mental health problems (Blanchard, Mueser, & Bellack, 1998; Herbener & Harrow, 2002; Herbener, Harrow, & Hill, 2005; Loas, Noisette, Legrand, & Boyer, 2000).

#### *12.4 Summary of Social Anhedonia Measures*

In summary, a range of measures purporting to measure social anhedonia or related concepts have been developed. In this study the Revised Social Anhedonia Scale (RSAS) (Eckblad, Chapman, Chapman, & Mishlove, 1982) will be used, based on its strong validity and reliability, its ability to measure social anhedonia as a trait concept as opposed to the other measures which assess the construct as a state factor and the fact that it has been widely used in the literature which permits greater comparison with other studies. This was the measure used in Tchanturia et al's., (2012a) preliminary study exploring social anhedonia in people with AN which also included small samples of people with BN and individuals recovered from AN.

### *13.0 Work and Social Functioning*

The section below aims to provide a background to work and social functioning in psychological disorders and in particular EDs. The area of social functioning could include perceptions of individual functioning in the domains of private leisure, including personal hobbies and social leisure, including shared hobbies and activities, and the experience of interpersonal relationships. The domain of work functioning may include the ability to participate in paid or voluntary employment, including looking after children, to carry out home management tasks, or participate in training or education. Initially, the research on work and social functioning in psychological disorders in general will be reviewed, followed by an in-depth review of the literature on social and work functioning in EDs.

#### *13.1 Work and Social Functioning in Psychological Disorders*

An Australian study of 1486 adult patients accessing psychological treatment completed the self-report Quality of Life Enjoyment and Satisfaction Questionnaire-Short Form (QLESQ-SF; Endicott, Ne, Harrison & Blumenthal, 1993) which explores quality of life in relation to physical health, economic status, relationships, living/housing situation, mood, employment, medication and overall life satisfaction. The participant group included people with EDs (n = 226), as well as depression (n = 687), bipolar disorder (n = 165), social anxiety disorder (n = 165), generalized anxiety disorder (n = 125), and panic

disorder (n = 118). The clinical groups reported significantly lower levels of quality of life across these domains, on average two standard deviations below the control group provided in the validation study for the measure (Endicott et al., 1993), which amounted to a huge effect size ( $D=2.23$ ) compared to people who had never been diagnosed with a mental health problem and a huge effect size when compared to those who had recovered from a mental health problem (Watson, Swan & Nathan, 2011). Patients who had two or more comorbid diagnoses reported even poorer quality of life. These data indicate that having a mental health problem is associated with poorer quality of life in several domains, including work and social life, which has strong implications for the focus of this thesis. The ED group reported poorer quality of life than the panic disorder, generalised anxiety disorder and social anxiety disorder groups and better quality of life than the depression and bipolar disorder groups.

In another large multisite study involving hospitals in Poland, Germany, Czech Republic, Slovakia and the UK, Rymaszewska et al., (2007) measured social disability using the Groningen Social Disability Schedule (Wiersma, DeJong & Ormel, 1988). This is a semi-structured interview used to assess the functioning of a working age adult in 8 social roles over the previous month. The social roles are: self-care, family, kinship (relationships with family), partner, parental, citizen, and occupational. The data were collected from 969 participants currently unwell with either a personality disorder, an ED, schizophrenia, depression or anxiety during the acute phase of the illness (n=969) and 3 months after discharge (n=753). They found that during acute episodes of illness, individuals with personality disorders, EDs and schizophrenia functioned less effectively in a social context than those with depression or anxiety. When age and current symptom severity were controlled for in the analysis, those with EDs and personality disorders had the highest levels of social disability. However, the number of previous episodes and hospital admissions did not have a significant impact on the social functioning of any of the patient groups, indicating that the level of current symptoms may be a better predictor of social functioning than the patient's illness history. Patients who on admission were employed and/or had a partner reported less social disability than those receiving benefits or retired. This finding implies that employment and relationships can, to some degree, protect people with mental health difficulties from

experiencing social disability. This study also provides information about the effect of having a mental illness on social functioning cross-culturally, as the data showed a significant site difference, with poorer social functioning reported for patients in the Polish and Czech sites relative to the other locations studied.

In summary, these large studies provide strong evidence for the presence of suboptimal social and work functioning during the acute, remitted and recovery phases of psychological illnesses and those with EDs score amongst the highest ranges for social disability relative to the other illnesses studied. The section below reviews studies which have looked at social functioning specifically in groups of people with EDs.

### *13.2 A Review of Social Functioning in Eating Disorders*

In the Minnesota Starvation Studies, Keys (1950) describes how men whose daily intake of calories was halved over a 6 month period became socially isolated, socially withdrawn and showed poorer social skills (Tucker, 2004). The effects of starvation on social functioning are also discussed by Russell et al., (2009). The data provided by these observations provide evidence for the detrimental effects of starvation alone on social functioning. Interestingly in an analysis of the extreme weight loss described in the biblical account of King David the Great, Ben-Noun (2004) cites social problems such as loneliness, social isolation and being neglected by others as causes of this man's significant weight loss.

The social functioning of sufferers has been of interest since EDs were first described in the medical literature and is mentioned in some early case descriptions of people with EDs. Whilst some accounts describe the isolation associated with AN, others highlight how some individuals try to continue with 'social duties,' despite having a serious illness (Inches, 1895, p74). Both examples are observed in clinical practice today. Since the late 1970s, when BN was first described, some studies have explored the impact of this illness on its sufferers' level of drive to seek out social contact. For example, Johnson and Larson (1982) found people with BN spent more time alone (and correspondingly



spent more time carrying out food-related behaviours) than healthy participants of a similar age. Unlike Rymaszewska et al's., (2007) work described in section 13.1, evidence derived from researchers working in the field of EDs suggests that the more chronic the illness, the poorer an individuals' social functioning. Indeed, Wentz et al., (2001) found women with poor illness outcomes (e.g. the persistence of symptoms) after 10 year follow-up had poorer psychosocial outcomes driven largely by social interaction problems. It is possible that poor social functioning could be one consequence of having a chronic ED. Indeed, in their recent review, Barbarich-Marstelle, Foltin and Walsh (2011) discuss whether AN should be considered as a form of addiction because people with this illness, like addicts, continue with disordered eating behaviours despite the serious consequences associated with the illness, which include social isolation.

Several studies have explored social functioning in EDs in a community setting. In a sample of 80 people with BN, using the Social Adjustment Scale (Weissman et al., 1978), a 42 item self-report scale measuring performance over the last fortnight in 6 areas: work, social and leisure activities, relationship with extended family, role as a spouse, role as a parent, and membership in the family unit, Johnson and Berndt (1983) found these individuals reported social functioning difficulties across all 6 areas measured. Compared to the clinical comparison groups provided by (Weissman et al., 1978), whilst the women with BN reported fewer difficulties than individuals with depression, they scored in a similar range to people with alcohol dependency and reported greater social functioning difficulties than people with schizophrenia.

In their community study of 1667 Andalusian adolescents aged between 12 and 16, García, Ortiz Gómez and Soto (2007) found that those at risk of an ED, assessed as those scoring >20 on the Eating Attitudes Test (Garner & Garfinkel, 1979) reported poorer social status but they did not differ from those scoring outside of the at-risk range on this measure with regards to the number of friendships they had. These data suggest

that is possible that difficulties in social functioning are present before the disorder becomes clinically recognisable and may be a risk factor for developing an ED.

Conversely, there is also evidence suggesting EDs may offer individuals coping resources in relation to social functioning when the individual is also struggling with comorbid problems. For example, Westermeyer and Speckler (1999) found individuals with an ED and a comorbid substance abuse disorder had more advantageous social resources than individuals suffering solely with substance abuse, as they had larger social networks and were more likely to be living with family or friends. This finding was specific to the social domain and the groups did not differ regarding their work functioning.

### *13.3 Social Functioning after Recovery from an Eating Disorder*

In a systematic review of randomised controlled trials (RCTs) of treatment for chronic AN, Hay, Touyz and Sud (2012, p1136) assert that “‘complete cure’ in chronic AN is extremely difficult to effect and attempts at such have been argued to be futile.” Indeed, in a study of 20 women with AN, 25% (n=5) stated that they believed that recovery does not exist, 35% (n=7) were undecided about the possibility of recovery, 20% (n=4) could not give any form of recovery definition, 10% (n=2) regarded recovery as an on-going process and the remaining 10% (n=2) said that they felt the illness was easier than recovery (Darcy et al., 2011). One conclusion based on Hay et al’s., (2012) RCT data is that “treatment trials need to move beyond targeting core ED pathology (primarily weight restoration) and examine efficacy and effectiveness in minimising harm and reducing personal and social costs of chronic illness.” The movement towards social rehabilitation rather than focusing solely on full weight restoration is reflected in the recovery approach described in detail in section 10.1 which emphasises broader recovery foci including social, personal and work rehabilitation.

As Noordenbos (2011, p441) states, “in the treatment of EDs, no consensus exists on relevant criteria for recovery and goals for treatment.” As long ago as the 1970s, researchers and clinicians have suggested that an important component of recovery is

adaptive social functioning. For example, Weissman (1975) called for studies to report both symptoms and social adjustment and argued that knowing more about social functioning in psychological disorders would assist the development of effective psychological treatments.

Noordenbos (2011) carried out a qualitative study in the Netherlands which explored the recovery criteria important to current patients, former patients and health professionals. The study found that patients most commonly endorsed healthy eating and drinking; physical activity and exercising; attitude towards food and weight; body evaluation; relaxation; physical recovery; psychological recovery; emotion regulation; social relations; sexual attitude; and comorbidity as being factors associated with successful recovery and these themes were largely shared by the accounts of former patients and professionals working with people with EDs. In a similar study from the UK which explored the factors associated with being in recovery from an ED, Emanuelli, Waller, Jones-Chester and Otuzzi (2012) administered a checklist to 238 individuals with EDs and ED professionals which explored the importance of somatic, psychological, emotional, social, eating-related and body experience-related factors in terms of what constitutes successful recovery. Their principal components analysis identified a series of meaningful factors associated with recovery. These were: 1) psychological-emotional-social, 2) weight-controlling behaviours, 3) non-life-threatening and life-threatening features and 4) evaluation of one's own appearance. Of relevance to this thesis is the Noordenbos found social relations were an important recovery criterion and Emanuelli et al., found that friends were an important component of the psychological-emotional-social factor associated with recovery. This implies that sufferers, past patients and clinicians working in the field see social life and supportive friendships as significant recovery-related outcome variables.

Further evidence for this conclusion is also provided by qualitative studies. Nilsson and Hägglöff (2006) explored the experience of recovery with 68 women who had been seen in an adolescent clinic 16 years ago. Fifty-eight of these women considered themselves fully recovered and participants stated that a significant factor in their

recovery was having supportive friends (a theme endorsed by 43% of participants) who were able to show them alternative (non-ED) lifestyles and how to enjoy life.

Building on sufferers' accounts that a strong social network is an important factor in recovery, evidence suggests that good friendships can help people to recover. Woods (2004) explored the experience of recovery in 18 US college students who identified themselves as having recovered from either AN or BN in their adolescence without professional treatment. The data were collected using a series of 9 open-ended questions which were completed anonymously in an electronic format. All 18 participants associated the onset of their ED with sociocultural factors, including social functioning difficulties. The participants stated that their recovery was either self-initiated or supported through the efforts of kind friends or family members.

Several studies have followed up groups of patients who received treatment for an ED as an adolescent. In a community sample of 538 young women in their early 20s, Striegel-Moore, Seeley and Lewinsohn (2003) found that those who suffered with EDs as teenagers and now reported few or minimal ED symptoms, reported poorer social functioning in their adult life, including smaller social networks, a lower frequency of social contact (measured using Berkman and Syme's (1979) 3 item self-report measure) and poorer social support (measured using Procidano and Heller's (1983) 10 item self-report measure). The authors suggest that even in a community sample, the evidence suggests that an adolescent ED diagnosis may be "a marker for current and future psychosocial impairment" (Striegel-Moore et al., 2003, p590).

In a community sample of 3034 randomly selected Australian adult volunteers, participants answered questions about their quality of life and whether they had a past history/current ED symptoms. Eighty nine of these participants (2.9%) reported a history of AN. The study found that experiencing current ED symptoms moderated the impact of a history of AN on the outcome variables of social functioning and role limitations (Mitchison, Hay, Mond & Slewa-Younan, 2013). These data suggest that in the community, having past and present ED symptoms may be important predictors of current social functioning.

Darcy et al., (2011) carried out a mixed-methods study using a semi structured interview and validated self-report measures (Eating Disorders Examination Questionnaire; Fairburn & Beglin, 1994; Anorexia Nervosa Stages of Change Questionnaire; Rieger, Touyz & Beumont, 2002; Eating Disorders Quality of Life Instrument; Engel et al., 2006) in 20 women with a history of AN. In line with the empowerment and collaboration ethos of the recovery approach, participants valued working towards autonomy and being involved in decisions around their treatment goals and this resulted in higher motivation to work towards recovery and was associated with fewer self-reported ED symptoms.

Finally, in their paper which discusses the components of treatment that might be iatrogenic maintaining factors for AN, Treasure, Crane, McKnight, Buchanan and Wolfe (2011) explain how negative schema, such as a striving for social value may increase existing ED behaviours and may even initiate new ED psychopathology. They suggest that some services may reinforce social difficulties because whilst they try to provide an accepting, safe and secure environment for recovery, they may also be overly protective and prevent the individual from developing independence, so that rather than coping well in the social world, they avoid social contact.

In summary, the literature indicates that good social functioning, in terms of having social contact, a social network and being able to make and keep interpersonal relationships is an important component of recovery. The data show that once recovered from an ED, people report on-going difficulties with social functioning and this affects both those who successfully recovered as adolescents and as adults. The section below reviews the data available for work functioning in EDs.

#### *13.4 A Review of Work Functioning in Eating Disorders*

In Theander's (1970) observations of 94 AN patients, he noted that people with AN are able to, and do continue to work, despite the illness and of the 7 documented deaths in his study, all were employed until their final hospitalisation. However, although some

people continue to work, which might be related to wanting to avoid failure schema, many studies indicate that it is highly likely for an individual with an ED to have difficulties with work functioning and they are more likely to be out of work than their healthy peers. This evidence is reviewed in the section below.

In Wentz, Gillberg, Anckarsater, Gillberg and Råstam's (2012) 18 year outcome study of adolescent AN in Sweden, at the last follow-up when participants were aged 32, one in four individuals did not have paid employment due to their illness. Another long-term follow-up study carried out in Germany which followed the progress of 50 patients with AN up to 11.5 years post treatment found that 12% reported impaired vocational functioning (Steinhausen, Boyadjieva, Grigoriu-Serbanescu, Seidel & Winkler, 2000). Some studies suggest that a more chronic illness course is associated with poorer work functioning. For example, Ruuska, Koivisto, Rantanen and Kaltiala-Heino (2007) measured overall functioning using the Morgan-Russell Psychosocial Subscales (Morgan & Hayward, 1988) in adolescent patients with AN and BN and report that a longer duration of illness was the best predictor of employment difficulties. In addition to a chronic illness course, age of onset may also be a predictor of work functioning. Halmi, Brodland and Loney (1973) reported that in a US sample of 36 patients with AN, having an early onset of illness was significantly correlated with good prognosis in work functioning. Vomiting and laxative abuse were associated with poorer work functioning.

Studies which have looked at community samples have also provided useful information about work functioning in EDs. In a large sample of 3258 participants randomly selected from the adult population of Edmonton, measured using the Goldberg General Health Questionnaire (Goldberg, 1978), Bland, Stebeksky, Orn and Newman (1988) found individuals with AN, alongside people with antisocial personality disorder, schizophrenia and substance abuse problems had the highest risk of unemployment (2.8 times the average population risk). The study also found that across the disorders identified in this community sample, the experience of being unemployed was related to higher symptom and stress levels relative to those who were in employment.

Similar to the findings previously discussed in section 13.2 by Westermeyer and Speckler (1999) found that having an ED and a substance abuse disorder was associated with better social functioning than having a substance abuse disorder alone, one study which looked at female obese patients with a diagnosed ED found that these individuals were more likely to be working or studying than obese patients without a diagnosable ED (Bergström & Elfhag, 2007). There was no control group in either of these studies, so it is not possible to say whether those with an ED were more or less likely to be in employment (or to suffer social disability) than their healthy peers. Having a form of employment may also be a protective factor in ensuring good work and social functioning outcomes. For example, in a review of 12 large outcome studies of 602 people with AN between 1965 and 1977, Schwartz and Thompson (1981) found those who were in employment had better work and social functioning outcomes.

Difficulties in work functioning in people with psychological illnesses are not just present in samples reported by research groups in major world cities, they are also present in non-urban areas. For example, in Varelo Novo's (1999) study which observed a large community sample of 1000 new presentations over a 12 month period to a neuropsychiatric dispensary in a semi-rural district in Galicia, Spain, 50% were unemployed. Of the 2000 current patients who returned for check-ups during the follow-up period, 25% were unemployed. In the subgroup of young people aged under 25 who were accessing the service and had not yet found employment after completing their studies, AN and BN were common diagnoses. This observational methodology provides us with information that having a mental illness is associated with high rates of unemployment but the data do not allow us to know whether it was the mental illness that resulted in the person having to leave their employment or whether being unemployed is one of the causes of mental health difficulties.

In summary, the data reviewed in this section suggest that having an ED is associated with poorer employment outcomes, such that people are more likely to be out of work and to report difficulties in their work functioning. These findings appear to be the case in community and clinical settings and across different countries. A longer duration of illness may be a factor that makes it more likely for the person to be out of work,

although having an earlier onset and any form of employment may be protective factors. The section below considers studies which have addressed both social and work functioning in populations of people with EDs.

### *13.5 Studies Addressing both Work and Social Functioning in Eating Disorders*

Finally, a small number of studies are available which have collected information on both work and social functioning in people with EDs. For example, Tchanturia et al., (2012b) assessed 77 female patients with AN and compared them to 83 non-ED controls with regards to their self-reported work and social functioning, measured using the Work and Social Adjustment Scale (Mundt, Marks, Shear & Greist, 2002; WSAS). They found that WSAS scores for the AN group were in the severely impaired range (total score mean of 25.31, SD=8.93), whereas the scores of those in the control group indicated very little, or no impairment (total score mean of 0.72, SD=2.80). In their validation study of this measure which was carried out using 577 patients with obsessive compulsive disorder and depression across two sites, Mundt et al., (2002) reported that a WSAS score above 20 is related to severe psychopathology. Scores between 10 and 20 are associated with significant functional impairment but less severe clinical symptomatology. Scores below 10 appear to be associated with subclinical populations. The findings of Tchanturia et al., (2012b) can be contrasted with data reported by Micali et al., (2010) who administered the WSAS to 95 individuals with severe and enduring obsessive compulsive disorder who reported their work and social functioning to be moderately affected (total score mean of 17.1, SD=8.2). These data can also be contrasted with those reported by Mataix-Cols et al., (2005) for people with social and specific phobias. Pre-treatment, those with severe phobias reported a mean WSAS total score of 31 (SD=7.1), whereas those with moderately impairing and distressing phobias reported a mean WSAS total score of 23 (SD=8.1).

Using the same measure, in a sample of 178 patients with AN, BN or ED-NOS, Turner, Bryant-Waugh and Peveler (2010) reported a higher total score for problems with work and social functioning. However, the AN group was the smallest subgroup in the sample



with 14 participants compared to 98 in the ED-NOS and 66 in the BN groups which may have affected the validity and reliability of the data.

In a study of 63 French women with AN or BN, using the Groningen Social Disabilities Schedule (Wiersma, DeJong & Ormel, 1988), 86% of the AN group and 65% of the BN group reported experiencing disability regarding their social functioning and 86% of the AN group and 61% of those with BN reported experiencing disability regarding their occupational functioning. Using logistic regression, the study found that social avoidance and separation anxiety were significant predictors of poor social functioning and a comorbid anxiety disorder and separation anxiety were significant predictors of poor work functioning. (Godart, Flament, Perdereau & Jeammet, 2003) Using the same measure, this research group recruited a larger clinic sample of 166 patients with AN and 105 patients with BN, and found that individuals with AN and BN reported significantly higher social disability in the "social role" (leisure time, time spent with friends) and the "occupational role" (work or educational activities) than a matched group of 271 healthy controls (Godart et al., 2003).

Using the Social Adjustment Scale (Weissman et al., 1978), Herzog, PePOSE, Norman and Rigotti (1985) investigated a group of 121 female medical students who reported a lifetime history of EDs (15%). Students currently ill with AN and BN and those who had previously been unwell with either AN or BN reported greater social and work functioning difficulties than students with no lifetime history of EDs.

Furthermore, using an interview based on the Bulimia Severity Score (Fichter & Quadflieg, 1997), which includes questions on social adaptation, Jäger, Liedtke, Lamprecht and Freyberger (2004) found a sample of 80 women followed up between 7 and 9 years after they had received therapy for BN (61.2% reported no BN symptoms at follow-up) reported adapting well to social roles, work functioning and household functioning when compared with a normative sample. Unlike Herzog et al., (1985) who found those with a past history of both AN and BN reported greater difficulties than those with no experience of an ED, this study suggests that returning to normal levels of social and work functioning when recovered from BN may be more likely than in AN.

### *13.6 Summary of Work and Social Functioning in Eating Disorders*

The data suggest that both work and social functioning are affected in people with AN (for example, Barbarich-Marstelle et al., 2011) and BN (for example, Johnson & Berndt, 1983) and that current and past patients and professionals all consider these features as being important recovery criteria. The data also indicate that relative to other psychological conditions such as obsessive compulsive disorder, people with EDs report more severe levels of functioning difficulties. There is a small amount of evidence to suggest that social functioning problems may be a risk factor for developing an ED and there are several studies available that suggest chronicity may be an important factor in predicting work and social functioning. Several studies also suggest that people recovered from both AN and BN report continuing difficulties in work and social functioning (for example, Striegel-Moore et al., 2003). Many of the studies used mixed samples and community samples and it would be important for future work to explore clinically diagnosed groups with specific illness features (eg AN and BN) to explore whether there are differences in work and social functioning depending on the symptoms reported by different patient groups.

### *13.7 Measurement of Work and Social Functioning*

The section below aims to review the common measures used to explore work and social functioning in psychological disorders.

#### *13.7.1 Morgan-Russell Psychosocial Subscales (Morgan & Hayward, 1988)*

This measure is a guided interview which obtains clinical information from the patient and an additional informant such as their parent, plus an evaluation of mental state, sexual and socio-economic functioning. The schedule consists of 17 items in total and the outcome variables are five subscales which include nutritional concerns and eating patterns, body image concerns and weight, menstrual pattern, mental state, psychosexual state and work and family relations. Van der Ham, Meulman, van Strien

and van Engeland (1997) reported a kappa of 0.60 meaning independent raters agreed around 60% of the time. This measure was later modified by van der Ham, van Strien & van Engeland (1994) to measure psychosocial functioning in BN as well as AN.

### *13.7.2 Groningen Social Disabilities Schedule (Wiersma, DeJong & Ormel, 1988)*

This is a semi-structured interview, which, based on clinical research and a literature review, the authors developed questions in a series of 8 social roles. The definition of a social role was based on Biddle (1979) who describes this as “a complex of expectations which people have as to the behaviour of a person who takes up a certain position.” The social roles explored in this measure are self-care, family, kinship (relationships with family), partner, parental, citizen, and occupational role. The authors aimed to develop a schedule for measuring social disability across a broad range of illnesses with the aim of understanding the social consequences of chronic psychiatric illnesses. The interviewer must be trained in the administration of the schedule and assesses the participants’ role behaviour against the background of normative expectations of the individual’s socio-economic socio-cultural group, taking into account any sanctions placed on the individual’s freedom and the opportunities that are realistically available to the participant. The individual’s functioning is rated by the interviewer on a 5 point scale ranging from excellent, meaning that the person functions extremely well and better than would normally be expected, to maximum disability, meaning that the individual’s behaviour deviates drastically from the commonly accepted pattern and they are incapacitated regarding their social role functioning. This means that the outcome may be more in-depth than some other less complex measures, but there is the possibility of experimenter bias confounding the data. Although the measure is reported to have good validity, the authors report the weighted kappas (the degree to which two independent raters agree on the scores assigned to a participants) do vary across the subscales from 0.63 to 0.93, indicating it may be easier to rate participants on some social roles than it is on others.

### *13.7.3 Social Adjustment Scale (Weissman & Bothwell, 1976)*

This is a 54 item self-report questionnaire that measures performance over the last fortnight across 6 areas which are (1) work, either as a paid worker, unpaid homemaker, or student, (2) social and leisure activities, (3) relationships with extended family, (4) role as a marital partner, (5) parental role, and (6) role within the family unit, including perceptions about economic functioning. Each item is rated using a five point Likert scale and the outcome variables are mean scores for each of the 6 domains, as well as an overall score. Higher scores indicated greater difficulties in functioning. This is a relatively long questionnaire, although a 24 item short version has been developed which correlates highly with the full scale ( $r=0.89$ ; Gameroff, Wickramarante & Weissman, 2011). This questionnaire has been validated to be used in 17 languages and is only available under license and must be purchased from the authors before use.

#### *13.7.4 Work and Social and Social Adjustment Scale (Marks, 1986; Mundt, Marks, Shear & Greist, 2002).*

This is a 5 item self-report questionnaire that is sensitive to change before and after treatment. For this reason it is included as an outcome measure in the Improving Access to Psychological Treatment (IAPT) data collection battery. It was originally developed by Marks (1986) as a 4 item questionnaire designed to measure work and social functioning in people with phobias and was later developed into a 5 item self-report scale by Mundt, Marks, Shear and Greist (2002). The measure asks the participant to consider their current illness and explain the degree to which it prevents them from functioning in the following areas: ability to work, home management, social leisure, private leisure, and ability to form and maintain close relationships. The measure uses a 9-point Likert scale, ranging from 0 indicating no impairment to 8 indicating very severe impairment. The maximum total score is 40, with higher scores representing greater impairment. The scale was developed and validated for a sample of 380 participants with depression and 190 participants with obsessive compulsive disorder (Mundt et al., 2002). Mundt et al., (2002) report a Cronbach's alpha of internal scale consistency ranging from 0.70 to 0.94. Test-retest correlation was 0.73.

#### *13.7.5 Summary of Measures*

There are several measures available which aim to measure difficulties with work and social functioning. For the purposes of this data collected in this thesis, the measure used would need to be brief, so as to reduce patient burden, free of charge due to cost limitations and widely used to permit comparisons with other studies. For this reason, the Work and Social Adjustment Scale (Mundt et al., 2002) was selected.

#### *14.0 Research Questions for this Thesis*

Thus far, this chapter has presented a background into what EDs are, their prevalence and life course, what might cause and maintain them and the extent to which they can take a severe and enduring illness course. Because of their propensity to become severe and enduring illnesses, focusing treatment on broader recovery goals beyond symptom amelioration is important in improving the quality of life for those who suffer with severe and enduring forms of EDs. To this end, the literature on social anhedonia and work and social functioning has been reviewed alongside appropriate measures that have been developed to explore these areas. The research questions that have developed from this are as follows:-

- 1) To what degree do individuals with EDs (namely AN and BN) report social anhedonia compared to a healthy population and to what degree do individuals recovered from an ED report social anhedonia?
- 2) To what degree does having an ED interfere with social and work functioning and how does this compare with a healthy population of a similar age and IQ? What happens to work and social functioning in people who have recovered from an ED?
- 3) Is there a relationship between social anhedonia and work and social functioning, such that difficulties with work and social functioning may be a consequence of high levels of social anhedonia predicted to be present in people with EDs.
- 4) Is there a relationship between illness factors such as length of illness (chronicity), current BMI (weight/height<sup>2</sup>) and symptoms (current severity) and

lowest BMI as an adult (lifetime severity) and social anhedonia and work and social functioning?

- 5) To what extent are the aforementioned illness factors and social anhedonia predictive of work and social functioning difficulties in people with EDs?

#### *14.1 Aims*

The first aim of this study is to explore the employment and relationship status of people with AN and BN and people recovered from an ED relative to non-ED healthy controls (HCs).

The second aim is to measure social anhedonia in people with AN and BN relative to people recovered from an ED and HCs. The third aim of this study is to measure work and social functioning in people with AN and BN and people recovered from an ED relative to HCs.

Fourth, the study aims to explore associations with social anhedonia and work and social functioning in the clinical groups and to indicate which clinical features are associated with higher social anhedonia and poorer work and social functioning in EDs. This will involve explore whether social anhedonia and illness factors (e.g. chronicity and severity) are predictive of work and social functioning difficulties. A further aim of this study will be to explore whether there is a relationship between duration of illness, treatment modality, age of onset and social anhedonia and work and social functioning in individuals currently unwell with EDs.

#### *14.2 Hypotheses*

The first hypothesis is that there will be a significant difference in levels of social anhedonia measured using the Revised Social Anhedonia Scale (Eckbald et al., 1982) between the AN and BN groups and HCs. It is predicted that those recovered from an ED may score in-between those currently unwell and those who have no lifetime history of an ED.

The second hypothesis is that there will be a significant difference in work and social functioning measured using the Work and Social Adjustment Scale (Marks, 1986; Mundt et al., 2002) between the AN and BN groups and HCs. It is predicted that those recovered from an ED may score in-between those currently unwell and those who have no lifetime history of an ED.

The third hypothesis is that there will be a significant positive correlation between social anhedonia, measured using the Revised Social Anhedonia Scale (Eckbald et al., 1982) and difficulties in work and social functioning, measured using the Work and Social Adjustment Scale (Mundt et al., 2002) for the ED groups. It is predicted that a longer duration of illness will be associated with greater work and social adjustment problems and higher social anhedonia and that inpatients will report significantly more work and social functioning problems and higher levels of social anhedonia than those being treated as outpatients, in day patient treatment and those with EDs recruited the community.

The fourth hypothesis is that illness variables such as chronicity (measured using self-reported years of illness) and severity (measured using current BMI, lowest ever BMI as an adult and current Eating Disorders Examination Questionnaire global score (Fairburn and Beglin, 1994) and social anhedonia will explain a significant proportion of variance in work and social functioning.

## **15.0 Methods**

### *15.1 Ethical approval*

Ethical approval was obtained from the National Research Ethics Committee London City Road and Hampstead (Ref: 12/LO/0409). The confirmation letter is provided in appendix 1. Participants were given an information sheet prior to participating. If they consented to taking part, they were asked to provide informed written consent by

signing a consent form. If participants wished to withdraw from the study at any point up until the data was anonymously added to the database, they were free to do so by informing the researcher.

## *15.2 Recruitment*

The participants were recruited from a volunteer, opportunity sample and more detail about how each group was recruited is provided in the section below.

### *15.2.1 Anorexia Nervosa and Bulimia Nervosa Groups*

Participants in the AN and BN groups were recruited from the South London and Maudsley NHS Foundation Trust (SLaM) National Specialist Eating Disorder services by posters advertising the study which were displayed in the waiting room and around the clinic. The poster detailed information about the study which provided the contact details of the researcher for the participant to contact the researcher to find out more and volunteer to take part. Posters were also displayed in the local community and participants who were on a database held by the Eating Disorders Research Unit at the Institute of Psychiatry, King's College London were also contacted and informed about the study and they were then asked to contact the researcher if they wanted more information or to take part. Students and staff of King's College London were also sent an email circular advertising the study and which provided the contact details of the researcher so that they could get in touch if they wished to volunteer to take part.

Participants in the recovered AN group were recruited via posters advertised in the local community, through contacting participants who were on a database held by the Eating Disorders Research Unit at the Institute of Psychiatry, King's College London, via a circular email sent out to the students and staff of King's College London and through personal contacts. The poster, email and newsletter detailed information about the study and provided the contact details of the researcher for the participant to contact to find out more and volunteer to take part.



#### *15.2.1.1 Definition of Recovery*

As discussed above in section 1.3, there are many different possible components and definitions of recovery from AN. Taking these data into account and based on Bardone-Cone et al., (2010), a comprehensive definition of recovery was used to define the inclusion and exclusion criteria for the recovered group recruited to this study. Bardone-Cone et al., (2010) state that full recovery from an ED should be based on a physical index, namely BMI (weight/height<sup>2</sup>), a behavioural index, for example the absence of ED behaviours such as restriction, bingeing and purging and a psychological index which they suggest could be the outcome variables of the Eating Disorders Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994). An additional criterion was added to the physical index suggested by Bardone-Cone et al., (2010) which was having regular menstruation. When the recovered group were recruited to this study, the researcher specifically asked for volunteers who felt they had maintained a healthy BMI (between 18.5 and 24.9), regular menstruation, abstinence from ED behaviours of bingeing, purging and restriction and the absence of excessive negative cognitions about weight, shape and eating for at least the last 12 months. This was to ensure the group, which was self-selecting, were more likely to have been fully recovered from AN. The same recovery criteria were used by large scale genetics research projects in AN (Bloss et al., 2011).

#### *15.2.2 Healthy Control Group*

Participants in the HC group were recruited via posters displayed in the local community in coffee shops and libraries, via a circular email sent out to the staff and students at King's College London and via word of mouth and personal contacts. Once they had been provided with the information about the study, they were asked to contact the researcher if they wished to take part.

#### *15.2.3 Inclusion and Exclusion Criteria*

General inclusion criteria were females aged between 18 and 55 years old with sufficient command of the English language to be able to respond to the measures administered. Adults of working age were selected because the hypotheses include a focus on work functioning and the age range was limited to 18 to 55 to allow a range of ages but also to limit to some extent the dispersion of the data. For the ED groups, participants were included in the study if they had a DSM-IV ED (either AN or BN) diagnosed either by the clinician they were receiving treatment from in the SLaM ED services or, if recruited via the community, using the Structured Clinical Interview for DSM-IV disorders (SCID) Extended Module H (First, Spitzer, Gibbon & Williams, 2002). For the HC group, participants will be excluded if they score within the clinical range of >4 on the Eating Disorders Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994). HCs scoring in the clinical range of >10 on the Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983) were also excluded.

Individuals who met the recovery criteria described in section 15.2.1.1 were included in the study. This meant that individuals were included if they had an EDE-Q global score <4, did not report the use of any ED behaviours on the restriction and bulimic episodes and vomiting subscales of this measure, reported regular menstruation during the past year and had maintained a healthy weight in the BMI range of 18.5-24.9 during the last 12 months. The recovered group were also required to have a prior diagnosis of AN which was assessed using the Structured Clinical Interview for DSM-IV disorders (SCID) Extended Module H (First, Spitzer, Gibbon & Williams, 2002) to be included in the study. This interview clarified whether the individual had experienced, in the past, a clinical episode of AN.

### *15.3 Measures*

The following measures were administered to participants who consented to take part in the study. Copies of the measures can be found in Appendices 4, 5, 6, 7, 8 and 9.

*15.3.1 The Revised Social Anhedonia Scale (RSAS) (Eckblad, Chapman, Chapman, & Mishlove, 1982).*

This scale is a revised version of Chapman, Chapman and Roulin's (1976) physical and social anhedonia scales. The RSAS consists of 40 items in a true/false format and measures social anhedonia in terms of individual differences in participants' drive for associability, lack of social enjoyment and indifference towards others. Sample items include: "having close friends is not as important as many people say; I never had really close friends in high school; I prefer watching television to going out with other people; and just being with friends can make me feel really good." Higher scores indicate higher levels of social anhedonia. The Cronbach alpha for the RSAS has been estimated at 0.95 (Fonseca-Pedrero et al., 2009) and it was 0.92 in this study. This measure has high internal consistency and test-retest reliability (Chapman, Chapman & Roulin, 1976). A cut-off of 12 or more on this measure indicates functionally significant social anhedonia (Pelizza & Ferrarri, 2009).

#### *15.3.2 Work and Social Adjustment Scale (WSAS; Mundt et al., 2002)*

This is a 5 item self-report questionnaire for which the participant responds on a 9 point Likert scale ranging from 0 indicating no impairment to 8 indicating very severe impairment. The maximum total score is 40 and higher scores represent greater difficulties with work and social functioning. An overall score can be calculated, as well as five subscales which provide a measure of functioning across the following domains: 1) ability to work, 2) home management, 3) social leisure, 4) private leisure and 5) ability to form and maintain close relationships. The measure has been found to have good test-retest validity and internal consistency and is sensitive to change before and after treatment (Mundt et al., 2002). Mundt et al., (2002) report a Cronbach's alpha of internal scale consistency ranging from 0.70 to 0.94. Test-retest correlation was 0.73. The Cronbach's alpha for this study was 0.95.

#### *15.3.3 Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983).*

This is a widely used 14 item self-report questionnaire designed to assess the current presence and severity of anxiety and depression during the past 7 days. Each question is

on a 4 point Likert scale from 0-4. The outcome measures form an overall scale and two subscales can also be calculated: one for anxiety and another for depression. The clinical threshold is a score of 10 or above for each subscale. The Cronbach's alpha for this study was 0.88.

#### *15.3.4 Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994)*

The EDE-Q is a 36 item self-report measure which provides a global score of ED behaviours and cognitions over the past 28 days and has four subscales measuring dietary restraint, eating concern, weight concern, and shape concern. Subscale and global scores range from zero to six, with higher scores representing greater ED psychopathology. The EDE-Q also assesses frequency of key behavioural indicators of disordered eating, e.g. number of binges in the last 28 days. The EDE-Q has shown acceptable case detection and concurrent validity in community samples (Luce & Crowther, 1999; Mond, Hay, Rodgers & Owen, 2004). The Cronbach's alpha for this study was 0.87.

#### *15.3.5 Demographic Questionnaire*

A set of questions were designed specifically for this study which asked the participant to provide information about their age, marital status, whether they were in employment or study, their number of years of education received, the length of their illness in years and use of psychiatric medication (if in the clinical groups) and their current, lowest ever and highest ever BMI as an adult.

#### *15.3.6 Estimation of Intelligence*

The National Adult Reading Test (NART) (Nelson & Willison, 1991) is used to provide an estimate of intelligence in this study. This measure requires the participant to read out loud a list of non-phonetic words. A greater number of incorrect pronunciations relates to an increasingly lower pre-morbid IQ estimation score. The NART IQ estimation positively correlates with full score IQ, as measured using the British version of the

Wechsler Adult Intelligence Scale (WAIS R) (Wechsler, 1981), ranging from  $r=0.77$  (Crawford et al., 1992) to  $r=0.81$  (Crawford, Parker and Stewart, Besson & De Lacey, 1989). The participants' pronunciation of the words was audio recorded and this allowed inter-rater reliability to be calculated. A sub set of 25% of the recordings were independently scored by another researcher trained in the administration of this measure. The two raters agreed on 97% of the scores. This measure was collected to provide a variable on which to match the groups, with the hypothesis that IQ may potentially confound work and social functioning.

#### *15.4 Procedure*

Participants contacted the researcher after seeing the advert or email explaining the aims of the study. The participants were given an information sheet which gave details about the study and what participation required. Written informed consent was collected using a consent form. Both the information sheet and consent form are provided in appendices 2 and 3. Once the participant had consented to take part, they were provided paper or electronic copies of the questionnaires, depending on their preference. For participants who were in the clinical group but were not receiving treatment at one of the SLaM ED services, the SCID was carried out to ascertain a DSM-IV (APA, 1994) diagnosis of either AN or BN. The SCID was also conducted to confirm a past diagnosis of AN for those in the recovered group. If convenient to the participant, the NART was conducted in person, otherwise the experimenter telephoned the participant and completed the measure on the phone, having emailed the list of words to them just before making the telephone call. Once the questionnaires had been returned to the researcher, the participant was assigned a code and their responses were entered anonymously into the Statistical Package for the Social Sciences (SPSS; IBM Corp, 2011) Version 20. Weight and height were measured in person by the experimenter on the day the data collection took place. For  $n=10$  participants who were all in the HC group, it was not possible for them to attend the research unit because they lived in other cities. They completed the questionnaires and emailed them to the researcher and then self-reported their height and weight and completed the NART over the telephone as previously described.

### *15.5 Design*

The study utilises a cross-sectional, snapshot, between-groups design comparing, at a single time point, those with EDs (AN and BN) to participants who have recovered from an ED, to those with no lifetime experience of an ED. Within-groups comparisons were also conducted, with the responses of those in the ED group with AN being compared to the responses of those in the ED group with BN.

### *15.6 Data Analysis*

Data were analysed using SPSS version 20 and the analysis was conducted under the supervision of Dr Daniel Stahl, expert statistician at the Institute of Psychiatry, King's College London. Initially, the data were explored for assumptions of normality using histograms and the Kolmogorov-Smirnov test. To explore whether there was a main effect of group for the outcome measures collected, an Analysis of Variance (ANOVA) test was conducted. Post hoc tests (t-tests) were used to explore differences between groups and the Bonferroni correction was applied to reduce the likelihood of Type 1 error occurring. The Pearson Product Moment Correlation Coefficient was used to explore correlations between the variables. Cohen's *D* (Cohen, 1988; 1992) ( $\text{mean}_1 - \text{mean}_2 / \text{pooled standard deviation}$ ) was calculated to provide effect sizes, with an effect size of 0.2 defined as small, 0.5 defined as medium and 0.8 defined as large (Cohen, 1992).

### *15.7 Power Calculation*

Using NQuery software for Windows Version 7.0 (Elashoff, 2007), based on self-report data provided for participants with EDs (AN and BN) collected by Tchanturia et al., (2012a) using the RSAS and Tchanturia et al., (2012b) using the WSAS, the power calculation suggested that for 80% power, with an alpha of <0.05, and to obtain at least a medium effect size ( $D=0.5$ ), a sample of 30 participants will be required per group.

## 16.0 Results

### 16.1 Participants

Three hundred and twenty-two participants were recruited into the study. Two (4.17%) participants in the BN group were excluded because they did not meet diagnostic criteria for the illness as they reported bingeing and purging once fortnightly. Three participants (2.16%) were excluded from the HC group because their scores on the EDE-Q were in the clinical range. Therefore, the final sample consisted of 317 female participants. There were 105 participants with AN, 46 participants with BN, 30 participants recovered from AN and 136 HCs. The recovered group consisted only of individuals recovered from AN because no participants volunteered to take part who reported being in recovery from BN.

### 16.2 Demographic Data

Table 1 below provides demographic data for the AN, BN, recovered AN and HC groups.

The sample self-identified themselves as being predominantly white European (97%,  $n=306$ ) and the remaining participants described themselves as being of Black Caribbean, Indian, or Pakistani origin (3%,  $n=11$ ).

The mean age of onset for the AN group was 14.49 ( $SD=4.56$ ) and for the BN group it was 16.28 (4.06). The mean age of onset for the recovered AN group was 13.96 (3.79).

There were no statistically significant differences between the groups regarding age or IQ.

There was a significant main effect of group for the number of years of education participants reported to have received. Post hoc tests using the Bonferroni post hoc correction ( $0.05/5=0.01$ ) showed that those with AN reported receiving significantly fewer years of education than HCs with a large effect size ( $D=0.72$ ). Those with AN also

reported receiving significantly less years of education than those recovered from AN, with a large effect size ( $D=1.13$ ).

There was a significant main effect of group for the BMI of the participants. Post hoc tests using the Bonferroni post hoc correction ( $0.05/5=0.01$ ) showed that those with AN had a significantly lower BMI than those with BN a very large effect size ( $D=2.8$ ) and those with AN also had a significantly lower BMI than HCs with a very large effect size ( $D=3.08$ ). Those with AN also had a significantly lower BMI than the recovered AN group, with a very large effect size ( $D=3.45$ ).

There was a significant main effect of group for the lowest BMI participants self-reported to have been as an adult. Post hoc tests using the Bonferroni post hoc correction ( $0.05/5=0.01$ ) showed that those with AN had a significantly lower lowest ever BMI than HCs with a very large effect size ( $D=4.01$ ), and compared to those with BN, with a large effect size ( $D=0.87$ ). Those with BN also reported a significantly lower lowest ever BMI than HCs, with a large effect size ( $D=1.47$ ). The recovered AN group reported a significantly lower lowest ever BMI than HCs, with a very large effect size ( $D=2.95$ ).

There was a significant main effect of group for the highest ever BMI participants reported being as an adult. Post hoc tests using the Bonferroni post hoc correction ( $0.05/5=0.01$ ) showed that the HC group reported a significantly higher highest ever BMI than those with AN with a very large effect size ( $D=2.55$ ) and the BN group also reported a significantly higher highest ever BMI compared to those with AN with a large effect size ( $D=1.22$ ). The recovered AN group reported reaching a significantly higher highest ever BMI than the AN group, with a very large effect size ( $D=1.62$ ).

Those with AN and BN were significantly more likely to be single and less likely to be married or in a relationship than those in the HC group and recovered AN groups. Those with AN and BN were more likely to be unemployed or on sick leave than HCs and those who had recovered who were mostly in full or part time work or were studying. There was no difference in age of illness onset for unemployed and employed participants in



the AN group ( $t=1.12$ ,  $df=98$ ,  $p=0.27$ ) or the BN group ( $t=0.76$ ,  $df=42$ ,  $p=0.45$ ). There was also no difference in length of illness (measured in years) for the employed participants in the clinical groups ( $t=0.42$ ,  $df=138$ ,  $p=0.67$ ).

### 16.2.1 Treatment Modality and Employment and Marital Status

Within the ED group ( $n=151$ ),  $n=27$  (17.88%) were being treated as inpatients,  $n=58$  (38.41%) were being treated as outpatients,  $n=13$  (8.61%) were receiving treatment as day patients and  $n=53$  (35.10%) were being treated in the community. Figure 2, below provides frequency data for the number of participants in each treatment modality who were in full or part time work, employed, studying, retired or on sick leave. Figure 3, also below, provides frequency data for the number of participants in each treatment modality who were in a relationship, single, married, divorced or separated.

Figure 2: A Bar Chart to show the Employment Status of Eating Disorder Participants ( $n=151$ ) in each Treatment Modality

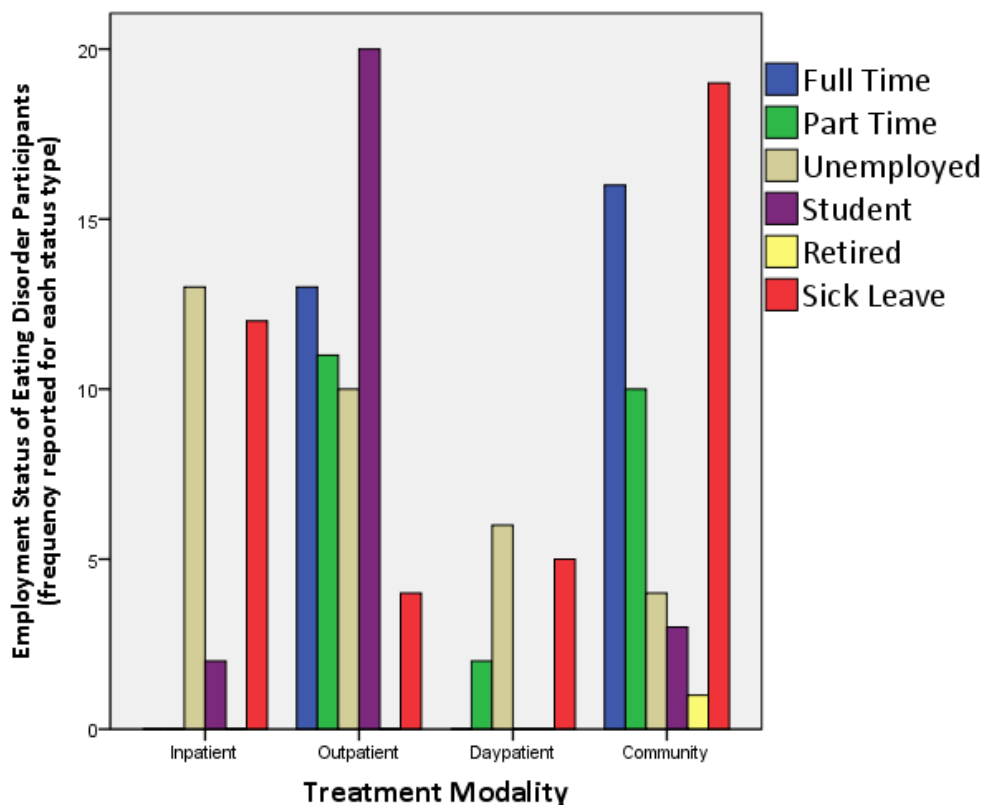
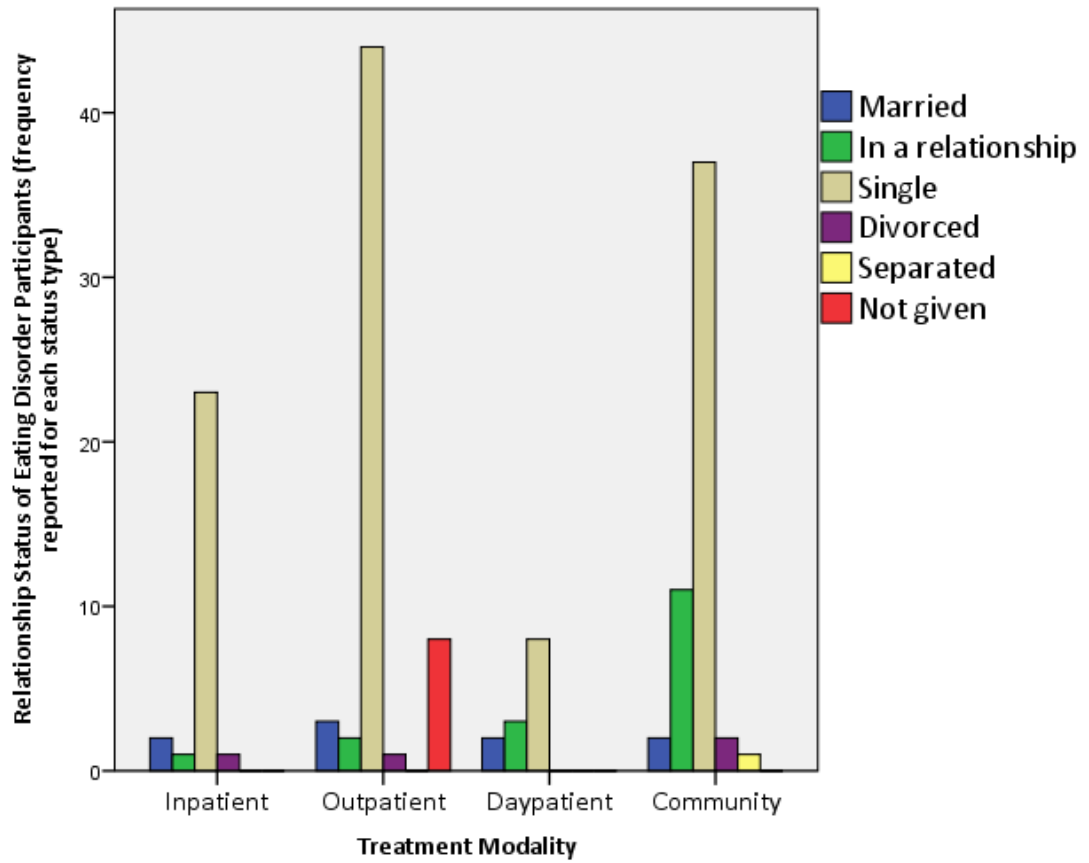


Figure 3: A Bar Chart to show the Relationship Status of Eating Disorder Participants (n=151) in each Treatment Modality



NB: Data were missing regarding marital status for n=8 ED participants.

Table 1: Demographic Characteristics of the Anorexia Nervosa, Bulimia Nervosa, Recovered Anorexia Nervosa and Healthy Control Groups

|                              | Anorexia Nervosa (n=105)                           | Bulimia Nervosa (n=46)                             | Recovered Anorexia Nervosa (n=30)                  | Healthy Control Group (n=136)                      | Test Statistics  |
|------------------------------|--|--|--|--|--|
| Estimated IQ Mean (SD)       | 111.13 (7.36)<br>95% CI 108.88-112.50              | 111.65 (8.28)<br>95% CI 105.81-112.85              | 110.11 (8.53)<br>95% CI 107.45-112.75              | 112.42 (7.22)<br>95% CI 109.16-114.32              | F(3,314)=3.29, p=0.14  |
| Age (years) Mean (SD)        | 26.86 (7.51)<br>95% CI 24.19-29.05<br>Range: 18-51 | 27.89 (9.48)<br>95% CI 23.12-29.97<br>Range: 18-55 | 27.77 (9.91)<br>95% CI 24.64-27.09<br>Range: 19-55 | 28.47 (6.99)<br>95% CI 25.17-27.80<br>Range: 18-55 | F(3, 314)=1.38, p=0.1  |
| Years of Education Mean (SD) | 15.63 (2.13)<br>95% CI 14.85-16.39                 | 16.72 (2.94)<br>95% CI 14.69-16.86                 | 18.13 (2.45)<br>95% CI 17.02-19.45                 | 17.34 (2.85)<br>95% CI 17.18-19.06                 | F(3,314)=7.34, p=0.001<br>AN vs HC: t=3.91, df=239, p=≤0.001<br>AN vs BN: t=1.91, df=149, p=0.06<br>BN vs HC: t=0.94, df=180, p=0.347<br>AN vs Recovered AN: t=3.95, df=133, p=≤0.001<br>Recovered AN vs HC: t=1.02, df=164, p=0.3 |
| Current BMI Mean (SD)        | 14.96 (1.91)<br>95% CI 14.65-15.27                 | 21.66 (3.24)<br>95% CI 20.69-22.62                 | 21.43 (1.4)<br>95% CI 22.24-23.06                  | 22.65 (2.84)<br>95% CI 22.24-23.06                 | F(3,314)=303.46, p=≤0.001<br>AN vs HC: t=-23.55, df=239, p=≤0.001<br>AN vs BN: t=15.71, df=149, p=≤0.001<br>BN vs HC: t=1.95, df=180, p=0.06<br>AN vs Recovered AN: t=16.39, df=133, p=≤0.001                                      |

|                                   |  |  |   |  |  |
|-----------------------------------|--|--|---|--|--|
|                                   |  |  |   |  | Recovered AN vs HC: t=-2.21, df=164, p=0.3   |
| Lowest BMI as an adult Mean (SD)  | 13.63 (1.49)<br>95% CI 13.12-14.08   | 16.22 (4.89)<br>95% CI 15.22-16.37   | 14.73 (2.33)<br>95% CI 13.53-15.94  | 20.44 (1.84)<br>95% CI 20.04-21.08   | F(3,314)=62.64, p≤0.001<br>AN vs HC: t=16.33, df=239, p=≤0.001<br>AN vs BN: t=2.74, df=149, p=0.009<br>BN vs HC: t=4.34, df=180, p=≤0.001<br>AN vs Recovered AN: t=-1.86, df=133, p=0.07<br>Recovered AN vs HC: t=8.67, df=164, p=≤0.001 |
| Highest BMI as an adult Mean (SD) | 19.98 (2.68)<br>95% CI 18.94-20.61   | 25.04 (6.38)<br>95% CI 20.71-2.82  | 24.33 (2.74)<br>95% CI 22.32-26.34  | 26.33 (2.34)<br>95% CI 22.46-23.77   | F(3,314)=12.58, p≤0.001<br>AN vs HC: t=5.28, df=239, p=≤0.001<br>AN vs BN: t=3.74, df=149, p=0.001<br>BN vs HC: t=-1.49, df=180, p=0.143<br>AN vs Recovered AN: t=-3.87, df=133, p=≤0.001<br>Recovered AN vs HC: t=-1.01, df=164, p=0.32 |
| Marital Status % in each category | Married 4%, n=4<br>In a relationship 12%, n= 12<br>Single 84%, n=84<br>Divorced 0%, n=0<br>Separated 0%, n=0 | Married 9.3%, n=4<br>In a relationship 13.95%, n=6<br>Single 65.12%, n= 28<br>Divorced 9.3%, n= 4<br>Separated 2.33%, n= 1 | Married 20%, n=6<br>In a relationship 46.67%, n=14<br>Single 33.33%, n= 10<br>Divorced 0%, n= 0<br>Separated 0%, n= 0 | Married 18.6%, n=24<br>In a relationship 42.64%, n=55<br>Single 37.21%, n=48<br>Divorced 1.55%, n= 2<br>Separated 0%, n= 0 | $\chi^2=26.38$ , df=15, p=0.001  |

|                                      |  |  |  |  |   |
|--------------------------------------|--|--|--|--|---|
| Employment status % in each category | Employed full time 13.33%, n=14<br>Employed part time 21.9%, n=23<br>Unemployed 17.14%, n=18<br>Student 11.43%, n=12<br>Retired 0%, n=0<br>Sick Leave 36.2%, n=38<br>Housewife 0%, n=0 | Employed full time 32.61%, n=15<br>Employed part time 0%, n=0<br>Unemployed 32.61%, n=15<br>Student 28.26%, n=13<br>Retired 2.17%, n=1<br>Sick Leave 4.35%, n=2<br>Housewife 0%, n=0 | Employed full time 46.66%, n=14<br>Employed part time 6.67%, n=2<br>Unemployed 0%, n=0<br>Student 33.33%, n=10<br>Retired 6.67%, n=2<br>Sick Leave 0%, n=0<br>Housewife 6.67%, n=2 | Employed full time 58.82%, n=80<br>Employed part time 17.65%, n=24<br>Unemployed 7.35%, n=10<br>Student 11.76%, n=16<br>Retired 1.48%, n=2<br>Sick Leave 0%, n=0<br>Housewife 2.94%, n=4 | $\chi^2=82.15$ , df=15, p= $\leq 0.001$ |
|--------------------------------------|--|--|--|--|---|

Test statistics relates to ANOVA for all variables aside from the marital status and employment status for which the test statistic relates to Chi Square. Post hoc comparisons are based on t-tests. IQ= intelligence quotient estimated using the National Adult Reading Test (Nelson and Willison, 1991); SD=standard deviation; Body mass index (BMI) = weight/height<sup>2</sup> AN = anorexia nervosa; BN=bulimia nervosa; RAN=recovered anorexia nervosa; HC=healthy control; df=degrees of freedom; BMI= body mass index; CI= confidence interval. Data was missing regarding marital status for n=7 (5.15%) HCs, n=5 (4.76%) participants with AN and n=3 (6.52%) participants with BN.

### 16.3 Clinical Data

Table 2, below provides the clinical data for the AN, BN, recovered AN and HC groups.

There was a significant main effect of group for depression, measured using the HADS. There was a large sized difference between the AN and HC groups ( $D=2.11$ ), with those with AN self-reporting significantly higher levels of depressive symptoms than HCs. There was a medium sized difference when the AN and BN groups were compared ( $D=0.64$ ), and those with AN reported significantly greater levels of depression than those with BN. There was a large sized difference between the BN and HC groups ( $D=1.81$ ), and those with BN reported significantly higher levels of depression than HCs. There was a very large sized difference between the AN and recovered AN groups ( $D=2.21$ ), such that those with AN reported experiencing significantly more symptoms of depression than those recovered from AN. These differences remained statistically significant once the Bonferroni post hoc correction ( $0.05/5=0.01$ ) was applied.

There was a significant main effect of group for anxiety symptoms, measured using the HADS. Those with AN reported significantly more anxiety symptoms than HCs, with a large effect size ( $D=1.6$ ). Those with BN reported significantly more anxiety symptoms than HCs, with a large effect size ( $D=1.52$ ). There was a large sized difference between the AN and recovered AN groups ( $D=1.86$ ), with those with AN reporting significantly more symptoms of anxiety than those recovered from AN. These differences remained statistically significant once the Bonferroni post hoc correction ( $0.05/5=0.01$ ) was applied.

There was no significant difference between the AN and BN groups in terms of the self-reported length of illness they had experienced. Those recovered from AN reported a significantly shorter illness duration than those currently ill with AN, with a medium effect size ( $D=0.61$ ).

There was a significant main effect of group for the eating restraint subscale of the EDE-Q. There was a large sized difference for the AN and HC groups ( $D=2.2$ ), such that

those with AN reported significantly greater eating restraint than HCs. There was a large sized difference for the BN and HC groups ( $D=3.83$ ), such that those with BN reported significantly greater eating restraint than HCs. There was a large sized difference in eating restraint for the AN and recovered AN groups ( $D=0.96$ ), such that those with AN reported significantly greater levels of eating restraint than those recovered from AN. These differences remained statistically significant once the Bonferroni post hoc correction ( $0.05/5=0.01$ ) was applied.

There was a significant main effect of group for the objective bulimic episodes subscale of the EDE-Q. There was a large sized difference for the AN and HC groups ( $D=2.26$ ), with the AN group reporting a significantly greater number of objective bulimic episodes. There was a large sized difference for the AN and BN groups ( $D=1.19$ ), with the BN group reporting significantly more objective bulimic episodes than the AN group. There was a very large sized difference for the BN and HC groups ( $D=3.47$ ), with the BN group reporting a significantly greater number of objective bulimic episodes than HCs. There was a large sized difference for the AN and recovered AN groups ( $D=0.89$ ), such that those with AN reported a significantly greater number of objective bulimic episodes in the past 28 days than those recovered from AN. With the exception of the latter difference, these differences remained statistically significant once the Bonferroni post hoc correction ( $0.05/5=0.01$ ) was applied.

There was a significant main effect of group for the EDE-Q global score. There was a very large sized difference for the AN and HC groups ( $D=2.74$ ), such that those in the AN group reported significantly higher overall eating disorder psychopathology than HCs. There was a very large sized difference for the BN and HC groups ( $D=2.7$ ), such that those with BN reported significantly greater overall eating disorder psychopathology than HCs. There was a large sized difference for the AN and recovered AN groups ( $D=1.77$ ), such that those with AN reported significantly more ED symptoms than those who had recovered from AN. There was also a large sized difference for the recovered AN and HC groups ( $D=0.83$ ), such that those recovered from AN reported experiencing more ED symptoms than those in the HC group. These

differences remained statistically significant once the Bonferroni post hoc correction ( $0.05/5=0.01$ ) was applied.

A Chi Square test showed that those with AN and BN were significantly more likely to be taking anti-depressant or anti-anxiolytic medication than HCs and those recovered from AN.



Table 2: Clinical Characteristics of the Anorexia Nervosa, Bulimia Nervosa, Recovered Anorexia Nervosa and Healthy Control Groups

|                               | Anorexia Nervosa<br>(n=105)            | Bulimia Nervosa<br>(n=46)         | Recovered<br>Anorexia Nervosa<br>(n=30) | Healthy Control<br>Group (n=136) | Test Statistics   |
|-------------------------------|--|-----------------------------------|---|----------------------------------|---|
| Depression<br>Mean (SD)       | 10.38 (4.44)<br>95% CI 9.04-11.71      | 7.85 (2.41)<br>95% CI 4.66-7.89   | 1.94 (1.84)<br>95% CI 1.13-2.75         | 2.44 (3.15)<br>95% CI 1.88-3.01  | F(3,314)=-52.69, p=≤0.001<br>AN vs HC: t=-10.28, df=239, p=≤0.001<br>AN vs BN: t=2.75, df=149, p=0.009<br>BN vs HC: t=-1.23, df=180, p=0.021<br>AN vs Recovered AN: t=6.18, df=133, p=≤0.001<br>Recovered AN vs HC: t=-1.58, df=164, p=0.12 |
| Anxiety<br>Mean (SD)          | 15.03 (3.85)<br>95% CI 13.88-<br>16.18 | 12.75 (3.59)<br>95% CI 2.52-10.98 | 8.06 (3.32)<br>95% CI 6.61-9.52         | 4.45 (3.19)<br>95% CI 3.70-5.20  | F(3,314)=-52.97, p=≤0.001<br>AN vs HC: t=-10.41, df=239, p=≤0.001<br>AN vs BN: t=3.90, df=149, p=0.07<br>BN vs HC: t=-4.77, df=180, p=0.004<br>AN vs Recovered AN: t=6.18, df=133, p=≤0.001<br>Recovered AN vs HC: t=-1.58, df=164, p=0.12  |
| Years of illness<br>Mean (SD) | 9.65 (7.39)<br>95% CI 8.41-10.89       | 11.81 (9.09)<br>95% CI 9.45-14.16 | 5.5 (4.18)<br>95% CI 4.18-6.82          | -----                            | F(2,178)=6.22, p=0.001<br>AN vs BN: t=-1.47, df=149, p=0.14<br>AN vs Recovered AN: t=2.88, df=133, p=0.005<br>Recovered AN vs BN: t=3.48, df=74, p=0.001  |
| EDE-Q Eating<br>Restraint     | 3.58 (1.75)<br>95% CI 3.53-6.27        | 3.57 (1.57)<br>95% CI 3.65-4.25   | 1.75 (1.44)<br>95% CI 1.29-2.19         | 0.81 (0.65)<br>95% CI 0.69-1.03  | F(3,314)=-137.57, p=≤0.001<br>AN vs HC: t=-15.49, df=239, p=≤0.001  |

|  |                                  |                                  |                                 |                                 |  |
|--|----------------------------------|----------------------------------|---------------------------------|---------------------------------|--|
| Subscale<br>Mean (SD)  |                                  |                                  |                                 |                                 | AN vs BN: t=0.02, df=149, p=0.142<br>BN vs HC: t=-13.80, df=180, p=≤0.001<br>AN vs Recovered AN: t=5.23, df=133, p=≤0.001<br>Recovered AN vs HC: t=-4.35, df=164, p=≤0.001   |
| EDE-Q Bulimic<br>Episodes<br>Subscale<br>Mean (SD)               | 5.91 (6.41)<br>95% CI 0.99-10.82 | 17.00 (6.00)<br>95% CI 9.4-24.06 | 0.67 (3.65)<br>95% CI 0.47-1.79 | 0.37 (0.14)<br>95% CI 0.39-0.98 | F(3,314)=-24.57, p=≤0.001<br>AN vs HC: t=-5.33, df=239, p=≤0.001<br>AN vs BN: t=2.16, df=149, p=0.003<br>BN vs HC: t=-8.59, df=180, p=≤0.001<br>AN vs Recovered AN: t=-2.27, df=133, p=0.02<br>Recovered AN vs HC: t=-1.23, df=164, p=0.22   |
| EDE-Q Global<br>Score<br>Mean (SD)                               | 3.91 (1.17)<br>95% CI 3.56-4.27  | 3.89 (1.64)<br>95% CI 1.96-5.81  | 1.78 (1.33)<br>95% CI 1.37-2.19 | 0.98 (0.86)<br>95% CI 0.83-1.14 | F(3,314)=-233.50, p=≤0.001<br>AN vs HC: t=-20.89, df=239, p=≤0.001<br>AN vs BN: t=1.26, df=149, p=0.21<br>BN vs HC: t=-15.75, df=180, p=≤0.001<br>AN vs Recovered AN: t=7.72, df=133, p=≤0.001<br>Recovered AN vs HC: 4.39, df=164, p=≤0.001 |
| Percentage<br>taking anti-<br>depressants or<br>anti-anxiolytics | 14.29%, n=15                     | 10.87%, n=5                      | 0%, n=0                         | 0%, n=0                         | $\chi^2=11.98$ , df=2, p=0.003   |

Test statistics relate to ANOVAS for all variables aside from the percentage taking anti-depressants for which the test statistic relates to Chi Square. Post hoc comparisons are based on t-tests. SD=standard deviation; AN = anorexia nervosa; BN=bulimia nervosa; RAN=recovered anorexia nervosa; HC=healthy control; df=degrees of freedom;

BMI= body mass index; CI= confidence interval. EDE-Q=Eating Disorder Examination Questionnaire (Fairburn & Beglin, 1994). Depression and anxiety were measured using the Hospital Anxiety and Depression Scale (Zigmond & Snaith, 1983).

*16.4 Results for the Revised Social Anhedonia Scale and the Work and Social Adjustment Scale*

Table 3 below provides the findings for the RSAS and the WSAS for the AN, BN, recovered AN and HC groups. These data relate to the testing of hypotheses 1 and 2.

*Table 3: Results for the Anorexia Nervosa, Bulimia Nervosa, Recovered Anorexia Nervosa and Healthy Control Groups for the Social Anhedonia Scale and the Work and Social Adjustment Scale*

|  | Anorexia Nervosa (n=105)            | Bulimia Nervosa (n=46)              | Recovered Anorexia Nervosa (n=30)  | Healthy Control Group (n=136)    | Test Statistics   |
|--|-------------------------------------|-------------------------------------|------------------------------------|----------------------------------|---|
| Social Anhedonia Scale<br>Mean (SD)                            | 16.16 (8.76)<br>95% CI: 14.74-17.59 | 15.26 (8.39)<br>95% CI: 10.56-17.14 | 11.20 (8.44)<br>95% CI: 8.58-13.82 | 6.14 (5.20)<br>95% CI: 5.40-6.88 | F(3,314)=65.40, p=≤0.001<br>AN vs HC: t=-11.05, df=239, p=≤0.001<br>AN vs BN: t=0.59, df=150, p=0.556<br>BN vs HC: t=-8.69, df=180, p=≤0.001<br>AN vs Recovered AN: t=2.76, df=133, p=0.007<br>Recovered AN vs HC: t=-4.25, df=164, p=≤0.001  |
| Work and Social Adjustment Scale<br>Total score<br>Mean (SD)   | 26.28 (6.63)<br>95% CI: 24.30-28.27 | 12.41 (7.58)<br>95% CI: 9.41-15.41  | 5.56 (6.73)<br>95% CI: 2.61-8.51   | 0.69 (2.27)<br>95% CI: 0.30-1.08 | F(3,314)=362.48, p=≤0.001<br>AN vs HC: t=32.35, df=239, p=≤0.001<br>AN vs BN: t=7.50, df=150, p=≤0.001<br>BN vs HC: t=13.13, df=180, p=≤0.001<br>AN vs Recovered AN: t=9.61, df=133, p=≤0.001<br>Recovered AN vs HC: t=-2.42, df=164, p=0.002 |
| Work and Social Adjustment Scale<br>Work subscale<br>Mean (SD) | 5.94 (1.99)<br>95% CI: 5.34-6.54    | 2.59 (1.53)<br>95% CI: 1.99-3.20    | 0.75 (1.73)<br>95% CI : 0.26-1.24  | 0.2 (0.77)<br>95% CI: 0.07-0.34  | F(3,314)=249.27, p=≤0.001<br>AN vs HC: t=-23.19, df=239, p=≤0.001<br>AN vs BN: t=7.12, df=150, p=≤0.001<br>BN vs HC: t=-11.04, df=180, p=≤0.001<br>AN vs Recovered AN: t=10.16, df=133, p=≤0.001  |

|  |                                  |                                 |                                  |                                  |  |
|--|----------------------------------|---------------------------------|----------------------------------|----------------------------------|--|
|  |                                  |                                 |                                  |                                  | Recovered AN vs HC: $t=-5.49$ , $df=164$ , $p\leq 0.001$   |
| Work and Social Adjustment Scale Home management subscale Mean (SD)            | 3.44 (2.21)<br>95% CI: 2.77-4.10 | 2.59 (1.80)<br>95% CI:1.88-3.31 | 0.81 (1.47)<br>95% CI: 0.17-1.46 | 0.18 (0.64)<br>95% CI: 0.07-0.29 | F(3,314)=83.49, $p\leq 0.001$<br>AN vs HC: $t=-12.79$ , $df=239$ , $p\leq 0.001$<br>AN vs BN: $t=1.59$ , $df=150$ , $p=0.118$<br>BN vs HC: $t=-10.82$ , $df=180$ , $p\leq 0.001$<br>AN vs Recovered AN: $t=4.28$ , $df=133$ , $p\leq 0.001$<br>Recovered AN vs HC: $t=-2.87$ , $df=164$ , $p=0.005$          |
| Work and Social Adjustment Scale Social leisure subscale Mean (SD)             | 6.41 (1.76)<br>95% CI: 5.88-6.93 | 2.44 (1.63)<br>95% CI:1.80-3.09 | 1.81 (2.59)<br>95% CI: 0.68-2.95 | 0.13 (0.45)<br>95% CI: 0.05-0.21 | F(3,314)=386.79, $p\leq 0.001$<br>AN vs HC: $t=-31.79$ , $df=239$ , $p\leq 0.001$<br>AN vs BN: $t=8.93$ , $df=150$ , $p\leq 0.001$<br>BN vs HC: $t=-12.33$ , $df=180$ , $p\leq 0.001$<br>AN vs Recovered AN: $t=.328$ , $df=133$ , $p\leq 0.001$<br>Recovered AN vs HC: $t=-3.89$ , $df=164$ , $p=0.001$     |
| Work and Social Adjustment Scale Private leisure subscale Mean (SD)            | 4.91 (2.36)<br>95% CI: 4.20-5.61 | 2.37 (1.52)<br>95% CI:1.77-2.97 | 0.63 (1.31)<br>95% CI: 0.05-1.20 | 0.10 (0.36)<br>95% CI: 0.03-0.16 | F(3,314)=174.69, $p\leq 0.001$<br>AN vs HC: $t=-19.14$ , $df=239$ , $p\leq 0.001$<br>AN vs BN: $t=4.80$ , $df=150$ , $p\leq 0.001$<br>BN vs HC: $t=-13.28$ , $df=180$ , $p\leq 0.001$<br>AN vs Recovered AN: $t=7.27$ , $df=133$ , $p\leq 0.001$<br>Recovered AN vs HC: $t=-5.90$ , $df=164$ , $p\leq 0.001$ |
| Work and Social Adjustment Scale Families and relationships subscale Mean (SD) | 5.59 (1.88)<br>95% CI: 5.03-6.16 | 1.96 (1.63)<br>95% CI:1.32-2.61 | 1.56 (2.03)<br>95% CI: 0.67-2.45 | 0.08 (0.37)<br>95% CI: 0.01-0.14 | F(3,314)=365.03, $p\leq 0.001$<br>AN vs HC: $t=-27.02$ , $df=239$ , $p\leq 0.001$<br>AN vs BN: $t=7.85$ , $df=150$ , $p\leq 0.001$<br>BN vs HC: $t=-10.39$ , $df=180$ , $p\leq 0.001$  |

|           |  |  |  |  |  |
|-----------|--|--|--|--|--|
| subscale  |  |  |  |  | AN vs Recovered AN: $t=6.73$ , $df=133$ , $p \leq 0.001$ |
| Mean (SD) |  |  |  |  | Recovered AN vs HC: $t=3.28$ , $df=164$ , $p=0.001$      |

SD=standard deviation; CI=confidence interval. Test statistics relate to ANOVAS with post hoc comparisons based on t-tests. AN=anorexia nervosa; BN=bulimia nervosa; RAN=recovered anorexia nervosa; HC= healthy control participants.

### 16.5 Social Anhedonia Scale (RSAS)

There was a significant main effect of group for the RSAS. There were large sized differences for the AN and HC groups ( $D=1.44$ ) and the BN and HC groups ( $D=1.48$ ), with both clinical groups scoring significantly higher than HCs. There was a medium sized difference for the AN and recovered AN groups ( $D=0.57$ ), such that those in the AN group reported significantly higher levels of social anhedonia than those who had recovered from AN. There was a large sized difference for the recovered AN and HC groups ( $D=0.86$ ), such that those who had recovered from AN reported significantly higher levels of social anhedonia than HCs. These differences remained significant after correcting for multiple testing using the Bonferroni post hoc correction ( $0.05/5=0.01$ ).

Of those with AN, 70 participants (66.67%) scored above the suggested clinical cut-off for social anhedonia. Of those with BN, 27 participants (58.71%) scored above the suggested clinical cut-off for social anhedonia. A Chi square test showed that the number of individuals in the AN group scoring above the clinical cut-off for social anhedonia ( $>12$ ; Pelizza & Ferrari, 2009) was not significantly different to the number of individuals in the BN group scoring above the clinical cut-off for social anhedonia ( $\chi^2=1.04$ ,  $df=1$ ,  $p=0.31$ ). Of those recovered from AN, 9 (30%) scored above the suggested clinical cut-off of  $<12$  for social anhedonia. A Chi square test showed that the number of individuals in the AN group scoring above the clinical cut-off for social anhedonia was significantly different to the number of individuals in the recovered AN group scoring above the clinical cut-off for social anhedonia ( $\chi^2=13.39$ ,  $df=1$ ,  $p=\leq 0.001$ ).

Given that a subgroup of individuals in the recovered AN group (30%,  $n=9$ ) scored above the clinical cut-off of  $>12$  for social anhedonia, a t-test was carried out to compare work and social functioning difficulties (WSAS total score) reported by these individuals with the remaining 21 (70%) recovered participants in the recovered group who scored below the clinical cut-off ( $>12$ ) for social anhedonia. Those in the recovered group scoring above the clinical cut-off for social anhedonia reported significantly higher levels of difficulty in work and social functioning (mean=11.29,



SD=6.29), than those scoring below the clinical cut-off for social anhedonia (mean=1.11, SD=2.09);  $t=-4.58$ ,  $df=29$ ,  $p \leq 0.001$ , with a very large effect size ( $D=2.76$ ). When the same groups were compared for each of the subscales of the WSAS, the data indicate that scoring in the clinical range for social anhedonia is related to greater self-reported problems with work ( $t=-3.33$ ,  $df=29$ ,  $p=0.005$ ), social leisure ( $t=-3.88$ ,  $df=29$ ,  $p=0.002$ ) and family and close relationships ( $t=4.55$ ,  $df=29$ ,  $p \leq 0.001$ ). These comparisons remained significant after controlling for multiple testing using the Bonferroni correction ( $0.05/6=0.008$ ).

Given that the AN and BN groups did not differ regarding their social anhedonia scores, they were combined into one group and a Chi Square test was used to explore whether there were significantly more individuals scoring above the clinical cut-off of  $>12$  (Pelizza & Ferrari, 2009) for social anhedonia who were not in a relationship or employment than those scoring below the cut-off. There was no significant difference for employment status ( $\chi^2=7.52$ ,  $df=5$ ,  $p=0.19$ ). However, those who scored above the clinical cut-off for social anhedonia were significantly less likely to be in a relationship than those who scored below the clinical cut-off for social anhedonia ( $\chi^2=11.99$ ,  $df=5$ ,  $p=0.04$ ).

#### *16.6 Work and Social Adjustment Scale Total Score*

There was a significant main effect of group for the total score of the WSAS. There was a very large sized difference between the AN and HC groups ( $D=5.45$ ), with the AN group reporting significantly greater impairment in their work and social adjustment. There was a large sized difference for the AN and BN groups ( $D=2$ ), with the AN group reporting significantly greater difficulties in work and social adjustment than those with BN. There was a very large sized difference for the BN and HC groups ( $D=2.75$ ), with the BN group reporting significantly greater impairment in work and social adjustment than HCs. There was a very large sized difference for the AN and recovered AN groups ( $D=3.11$ ), such that those with AN reported significantly more difficulties across all domains of work and social functioning than those recovered from AN. There was a large sized difference for the HC and recovered AN groups ( $D=1.39$ ), such that

those recovered from AN reported significantly more difficulties across all domains of work and social functioning than HCs. These differences remained significant after correcting for multiple testing using the Bonferroni post hoc correction ( $0.05/5=0.01$ ).

#### *16.7 Work and Social Adjustment Scale: Work Subscale*

There was a significant main effect of group for the work subscale of the WSAS. There was a very large sized difference between the AN and HC groups ( $D=4.0$ ), with those with AN reporting significantly higher impairment in their work functioning than HCs. Those with AN also reported significantly greater impairment in their work functioning than those with BN, with a large effect size ( $D=1.8$ ). Although less impaired than the AN group, the BN group reported significantly more work functioning difficulties than HCs, with a very large effect size ( $D=2.36$ ). There was a large sized difference for the AN and recovered AN groups ( $D=1.76$ ), such that those with AN reported significant more difficulties with their work functioning than those who had recovered from AN. There was very large sized difference for the recovered AN and HC groups ( $D=2.52$ ), such that those who had recovered from AN reported greater difficulties in their work functioning than those in the HC group. These differences remained significant after correcting for multiple testing using the Bonferroni post hoc correction ( $0.05/5=0.01$ ).

#### *16.8 Work and Social Adjustment Scale: Home Management Subscale*

There was a significant main effect of group for the home management subscale of the WSAS. There was a very large sized difference for the AN and HC groups ( $D=2.12$ ), with the AN group reporting significantly greater impairment in home management than HCs. There was a very large sized difference for the BN and HC groups ( $D=2.28$ ), with those with BN reporting significant greater impairment in home management than HCs. The AN and BN groups did not differ significantly in the difficulties they reported in home management. There was a large sized difference for the AN and recovered AN groups ( $D=1.27$ ), such that those with AN reported significantly greater difficulties in home management than those recovered from AN. There was a medium sized difference for the recovered AN and HC groups ( $D=0.74$ ), such that those recovered

from AN reported significantly more difficulties with home management than those in the HC group. These differences remained significant after correcting for multiple testing using the Bonferroni post hoc correction ( $0.05/5=0.01$ ).

#### *16.9 Work and Social Adjustment Scale: Social Leisure Subscale*

There was a significant main effect of group for the social leisure subscale of the WSAS. There was a very large sized difference ( $D=5.19$ ) between the AN and HC groups, with those with AN reporting significantly greater impairment in their social leisure activities. There was a very large sized difference between the AN and BN groups ( $D=2.31$ ), with the AN group reporting significantly greater impairment in social leisure than those with BN. There was also a very large sized difference for the BN and HC groups ( $D=2.56$ ), with the BN group reporting significantly greater impairment in social leisure than HCs. There was a very large sized difference for the AN and recovered AN groups ( $D=2.33$ ), such that those with AN reported significantly more difficulties with social leisure than those in the recovered AN group. There was a large sized difference for the recovered AN and HC groups ( $D=1.44$ ), such that those who had recovered from AN reported significantly more difficulties with social leisure than HCs. These differences remained significant after correcting for multiple testing using the Bonferroni post hoc correction ( $0.05/5=0.01$ ).

#### *16.10 Work and Social Adjustment Scale: Private Leisure Subscale*

There was a significant main effect of group for the private leisure subscale of the WSAS. There was a very large sized difference ( $D=3.04$ ) between the AN and HC groups, with those with AN reporting significantly greater impairments in private leisure than HCs. There was a large sized difference ( $D=1.19$ ) for the AN and BN groups, with those with AN reporting significantly greater impairments in private leisure than those with BN. There was a very large sized difference for the BN and HC groups ( $D=2.76$ ), with those with BN reporting significantly greater impairments in private leisure than HCs. There was a large sized difference for the AN and recovered AN groups ( $D=1.97$ ), such that those with AN reported significantly greater difficulties with

private leisure than those who had recovered from AN. There was a large sized difference for the recovered AN and HC groups ( $D=0.83$ ), such that those who had recovered from AN reported significantly more difficulties with private leisure than those in the HC group. These differences remained significant after correcting for multiple testing using the Bonferroni post hoc correction ( $0.05/5=0.015$ ).

#### *16.11 Work and Social Adjustment Scale: Close Relationships Subscale*

There was a significant main effect of group for the close relationships subscale of the WSAS. There was a very large sized difference between the AN and HC groups ( $D=4.34$ ), with those with AN reporting significantly greater difficulties with close relationships than HCs. There was a large sized difference for the AN and BN groups ( $D=2.01$ ), with those with AN reporting significantly greater impairments in their close relationships than those with BN. There was also a large sized difference for the BN and HC groups ( $D=2.15$ ), with those with BN reporting significantly greater difficulties in their close relationships than HCs. There was a very large sized difference for the AN and recovered AN groups ( $D=2.11$ ), such that those with AN reported significantly more difficulties with family and other close relationships than those recovered from AN. There was a large sized difference for the recovered AN and HC groups ( $D=1.61$ ), such that those who had recovered from AN reported significantly more difficulties with family and other close relationships than those with AN. These differences remained significant after correcting for multiple testing using the Bonferroni post hoc correction ( $0.05/5=0.01$ ).

#### *16.12 Effect of Treatment Modality of Social Anhedonia and Work and Social Functioning Score in the Eating Disorder Groups*

Within the AN group, 22.9% ( $n=24$ ) were inpatients, 27.6% ( $n=29$ ) were outpatients, 39% ( $n=41$ ) were recruited from the community and 10.5% ( $n=11$ ) were day patients. Within the BN group, 6.5% ( $n=3$ ) were inpatients, 63% ( $n=29$ ) were outpatients, 26.2% ( $n=12$ ) were recruited from the community and 4.3% ( $n=2$ ) were day-patients.

There was no main effect of group (inpatient, daypatient, outpatient or community based participants) for social anhedonia ( $F(3,146)=0.18, p=0.91$ ).

There was however a significant main effect of group for the total WSAS score:  $F(3, 146)=10.22, p\leq 0.001$ . Post hoc tests using the Bonferroni post hoc correction ( $0.05/6=0.008$ ) revealed that those in the inpatient group (mean=27.94, SD=6.45) scored significantly higher for work and social functioning difficulties than those in outpatient treatment (mean=17.31, SD=8.39) ( $t=4.51, df=83, p\leq 0.001$ ), with a large effect size ( $D=1.36$ ), and those in the inpatient group (mean=27.94, SD=6.45) also reported significantly greater levels of work and social functioning problems than those recruited from the community (mean=12.41, SD=9.76) ( $t=4.97, df=78, p\leq 0.001$ ), with a large effect size ( $D=1.77$ ).

These findings are summarised in Table 4, below, which provides the effects sizes for each outcome variable for each group compared with non-ED controls.

*Table 4: Effect Sizes for the Anorexia Nervosa, Bulimia Nervosa and Recovered Anorexia Nervosa Group Compared to Healthy Controls for the Revised Social Anhedonia Scale and Work and Social Adjustment Scale*

|  | Anorexia Nervosa Group (n=105) | Bulimia Nervosa Group (n=46) | Recovered Anorexia Nervosa Group (n=30) |
|--|--------------------------------|------------------------------|---|
| Effect Size Relative to Healthy Controls – Social Anhedonia Scale  | 1.44                           | 1.48                         | 0.86                                    |
| Effect Size Relative to Healthy Controls – Work and Social Functioning Scale Total Score                 | 5.45                           | 2.75                         | 1.39                                    |
| Effect Size Relative to Healthy Controls – Work and Social Functioning Scale Work Subscale               | 4.0                            | 2.36                         | 2.52                                    |
| Effect Size Relative to Healthy Controls – Work and Social Functioning Scale Home Management Subscale    | 2.12                           | 2.28                         | 0.74                                    |
| Effect Size Relative to Healthy Controls – Work and Social Functioning Scale Private Leisure Subscale    | 5.19                           | 2.56                         | 1.44                                    |
| Effect Size Relative to Healthy Controls – Work and Social Functioning Scale Social Functioning Subscale | 3.04                           | 2.76                         | 0.38                                    |

|  |      |      |      |
|--|------|------|------|
| Social Functioning Scale Social Leisure Subscale   |      |      |      |
| Effect Size Relative to Healthy Controls – Work and Social Functioning Scale Family and Close Relationships Subscale | 4.34 | 2.15 | 1.61 |

Data presented are effect sizes for each group relative to non-ED controls. Estimations of effect size are calculated based on Cohen’s D (Cohen, 1988) (Cohen, 1988; 1992) ( $\text{mean}_1 - \text{mean}_2 / \text{pooled standard deviation}$  with an effect size of 0.2 defined as small, 0.5 defined as medium and 0.8 defined as large (Cohen, 1992).

### 16.13 Analysis of Covariance

Table 3, above, which provided the demographic and clinical data for the sample, indicated that there was a significant difference between the AN and HC groups regarding the years of education received. Therefore, the above comparisons were re-run, including this variable as a covariate using analysis of covariance (ANCOVA). The results of the ANCOVA showed that when years of education was included as a covariate, the significant main effect of group remained for the Social Anhedonia Scale  $F(1,146)=14.15, p \leq 0.001$ , the WSAS total score  $F(2,146)=3.933, p=0.049$  and the social leisure  $F(2,146)=9.80, p=0.002$  and private leisure  $F(2,146)=3.58, p=0.04$  subscales of the WSAS.

#### 16.13.1 Anxiety and Depression as Covariates

To explore the potential effects of depression and anxiety on the outcome variables, the analysis was also re-run including depression and anxiety, measured using the HADS as covariates. The significant main effects remained for each of the variables with depression as a covariate: Social Anhedonia Scale  $F(1,126)=8.429, p=0.004$ ; WSAS total score  $F(1,126)=15.97, p \leq 0.001$ ; the work subscale of the WSAS  $F(1,126)=10.34, p=0.02$ , the home management subscale of the WSAS  $F(1,126)=6.82, p=0.01$ ; the social leisure subscale of the WSAS  $F(1,126)=15.13, p \leq 0.001$ , the private leisure subscale of the WSAS  $F(1,126)=6.14, p=0.01$ ; and the families and relationships subscale of WSAS  $F(1,126)=21.21, p \leq 0.001$ . The same was true where anxiety was included as a

covariate, as the significant main effects reported above remained for all variables: Social Anhedonia Scale  $F(1,126)=3.14$ ,  $p=0.008$ ; WSAS total score  $F(1,126)=8.82$ ,  $p=0.005$ ; the work subscale of the WSAS  $F(1,126)=2.82$ ,  $p=0.05$ , the home management subscale of the WSAS  $F(1,126)=3.71$ ,  $p=0.05$ ; the social leisure subscale of the WSAS  $F(1,126)=7.55$ ,  $p=0.007$ , the private leisure subscale of the WSAS  $F(1,126)=2.86$ ,  $p=0.03$ ; and the families and relationships subscale of WSAS  $F(1,126)=7.41$ ,  $p=0.007$ .

#### *16.14 Correlation Analysis*

The following analyses relate to the testing of hypothesis 3.

##### *16.14.1 Entire Sample*

A Pearson Product Moment Correlation Coefficient was calculated to explore associations between the clinical variables (depression and anxiety, measured using the HADS), the ED variables (EDE-Q restraint subscale, EDE-Q objective bulimic episodes subscale, EDE-Q global score, BMI and years of illness) and the outcome variables of the WSAS and RSAS for the entire sample. Table 5, below, shows the correlation coefficients for these relationships.

There were significant negative correlations between all subscales and the total score of the WSAS and BMI, indicating that lower BMI was associated with greater reported difficulties across all domains of work and social functioning. There was also a significant negative correlation between self-reported social anhedonia and BMI, indicating that a lower BMI was associated with higher levels of social anhedonia. All subscales of the WSAS and the total score, as well as the SAS were significantly and positively associated with anxiety and depression measured using the HADS, and the eating restraint and objective bulimic episodes subscales of the EDE-Q and the EDE-Q global score, indicating that higher levels of eating and mood symptomatology were associated with higher reported difficulties across all domains of work and social functioning and higher levels of self-reported social anhedonia.

#### *16.14.2 Eating Disorder Sample*

In Table 6, also below, the Pearson Product Moment Correlation Coefficients are displayed for associations between the clinical variables (depression and anxiety, measured using the HADS), the ED variables (EDE-Q restraint subscale, EDE-Q objective bulimic episodes subscale, EDE-Q global score, BMI and years of illness) and the outcome variables of the WSAS and RSAS for the ED sample only.

There were significant negative correlations between BMI and the work, social and private leisure and close relationships subscales of the WSAS subscales and the WSAS total score, indicating that a lower BMI is associated with greater difficulties in work and social functioning for the ED participants across all domains. There was a significant, positive correlation between years of illness and social anhedonia, indicating that a more chronic illness is associated with higher levels of self-reported social anhedonia. There were significant, positive correlations between anxiety, measured using the HADS and the work, social leisure and close relationships subscales of the WSAS and the WSAS total score, indicating that higher levels of anxiety were associated with greater difficulties across work and interpersonal functioning. There were also significant positive correlations between depression, measured using the HADS and the social leisure and close relationships subscales of the WSAS and the WSAS total score, suggesting that higher levels of depression were associated with greater difficulties in social functioning in terms of participants' social leisure activities and close relationships. The EDE-Q eating restraint subscale was significantly and positively correlated with the home management, private leisure and close relationships subscales of the WSAS and the total WSAS score, as well as with self-reported social anhedonia, indicating that a higher level of eating restriction was related to increased problems in managing the home, engaging in private leisure and maintaining close relationships, as well as with higher levels of social anhedonia. Finally, the global subscale of the EDE-Q was significantly and positively correlated with the work, home management, private leisure and close relationships subscales of the WSAS, the total WSAS score and with self-reported social anhedonia, indicating that a greater severity of ED symptoms was associated with more difficulties in work



functioning, managing the home, engaging in private leisure and making and maintaining close relationships, as well as the experience of higher levels of social anhedonia.

When the above correlational analyses were repeated in the AN group, the same findings were noted, with the exception of the significant negative correlations between BMI and the WSAS home management subscale.

#### *16.14.3 Relationship between Social Anhedonia and Work and Social Functioning in the Recovered Group*

A Pearson Product Moment Correlation Coefficient was calculated for the association between the RSAS score, the total score of the WSAS and the five subscales of the WSAS for the recovered group. This showed that there was a strong, positive relationship between social anhedonia and overall difficulties with work and social functioning ( $r=0.85$ ,  $p \leq 0.001$ ), the work subscale of the WSAS ( $r=0.78$ ,  $p \leq 0.001$ ), the home management subscale of the WSAS ( $r=0.69$ ,  $p=0.003$ ) and the social leisure subscale of the WSAS ( $r=0.81$ ,  $p \leq 0.001$ ). The relationship between social anhedonia and the family and close relationships subscale of the WSAS ( $r=0.60$ ,  $p=0.01$ ) did not remain significant after correcting for multiple testing using the Bonferroni post hoc correction ( $0.05/6=0.008$ ) and there was no significant association found for social anhedonia and the private leisure subscale of the WSAS.

Table 5: Correlations between Eating Disorder Measures, Body Mass Index, Depression and Anxiety and Work and Social Adjustment and Social Anhedonia for the Entire Sample of Anorexia Nervosa, Bulimia Nervosa, Recovered Anorexia and Healthy Control Participants (n=317)

|   | BMI | Years of Illness | HADS - Anxiety | HADS - Depression | EDEQ – Eating Restraint subscale | EDEQ- Objective Bulimic Episodes subscale | EDEQ – Global Score | WSAS – Work subscale | WSAS – Home management subscale | WSAS – Social leisure subscale | WSAS – Private leisure subscale | WSAS – Close relationships subscale | WSAS Total score | Social Anhedonia Scale total score |
|---|-----|------------------|----------------|-------------------|----------------------------------|---|---------------------|----------------------|---------------------------------|--------------------------------|---------------------------------|-------------------------------------|------------------|------------------------------------|
| BMI                                       | 1   | -.067            | -.490**        | -.528**           | -.406**                          | -.114                                     | -.476**             | -.595**              | -.412**                         | -.607**                        | -.547**                         | -.613**                             | -.590**          | -.367**                            |
| Years of Illness                          |     | 1                | -.085          | .318              | .194*                            | .103                                      | .049                | -.186                | -.029                           | .060                           | -.008                           | .043                                | -.009            | .399**                             |
| HADS - Anxiety                            |     |                  | 1              | .794**            | .608**                           | .181*                                     | .648*               | .647**               | .553**                          | .685**                         | .623**                          | .688**                              | .682**           | .422**                             |
| HADS - Depression                         |     |                  |                | 1                 | .588**                           | .243**                                    | .631**              | .630**               | .584**                          | .706**                         | .648**                          | .728**                              | .704**           | .484**                             |
| EDEQ –Eating Restraint subscale           |     |                  |                |                   | 1                                | .364*                                     | .902**              | .677**               | .647**                          | .683**                         | .676**                          | .698**                              | .732**           | .482**                             |
| EDEQ- Objective Bulimic Episodes subscale |     |                  |                |                   |                                  | 1   | .411**              | .259**               | .274**                          | .210*                          | .260**                          | .231**                              | .267**           | .278**                             |
| EDEQ – Global Score                       |     |                  |                |                   |                                  |   | 1                   | .715**               | .677**                          | .701**                         | .703**                          | .685*                               | .754**           | .542**                             |
| WSAS – Work subscale                      |     |                  |                |                   |                                  |   |                     | 1                    | .798**                          | .897**                         | .872**                          | .822**                              | .950**           | .409**                             |
| WSAS – Home management subscale           |     |                  |                |                   |                                  |   |                     |                      | 1                               | .744**                         | .793**                          | .714**                              | .870**           | .409**                             |
| WSAS – Social leisure subscale            |     |                  |                |                   |                                  |   |                     |                      |                                 | 1                              | .859**                          | .888**                              | .954**           | .536**                             |
| WSAS – Private leisure subscale           |     |                  |                |                   |                                  |   |                     |                      |                                 |                                | 1                               | .815**                              | .937**           | .446**                             |
| WSAS – Close relationships subscale       |     |                  |                |                   |                                  |   |                     |                      |                                 |                                |                                 | 1                                   | .909**           | .523**                             |
| WSAS Total score                          |     |                  |                |                   |                                  |   |                     |                      |                                 |                                |                                 |                                     | 1                | .504**                             |
| Social Anhedonia Scale total score        |     |                  |                |                   |                                  |   |                     |                      |                                 |                                |                                 |                                     |                  | 1                                  |

\*\* . Correlation is significant at the 0.01 level (2-tailed). WSAS = Work and Social Adjustment Scale; HADS = Hospital Anxiety and Depression Scale; BMI = Body mass index

Table 6: Correlations between Eating Disorder Measures, Body Mass Index, Depression and Anxiety and Work and Social Adjustment and Social Anhedonia for the Eating Disorder Sample n=151 (Anorexia Nervosa and Bulimia Nervosa Participants)

|   | BMI | Years of Illness | HADS - Anxiety | HADS - Depression | EDEQ – Eating Restraint subscale | EDEQ- Subjective Bulimic Episodes subscale | EDEQ – Global Score | WSAS – Work subscale | WSAS – Home management subscale | WSAS – Social leisure subscale | WSAS – Private leisure subscale | WSAS – Close relationships subscale | WSAS Total score | Social Anhedonia Scale total score |
|---|-----|------------------|----------------|-------------------|----------------------------------|--|---------------------|----------------------|---------------------------------|--------------------------------|---------------------------------|-------------------------------------|------------------|------------------------------------|
| BMI                                       | 1   | -.037            | -.557**        | -.431**           | .070                             | .182*                                      | -.055               | -.511**              | -.102                           | -.514**                        | -.388**                         | -.567**                             | -.479**          | -.091                              |
| Years of Illness                          |     | 1                | -.085          | .318              | .164                             | .095                                       | .001                | -.186                | -.029                           | .060                           | -.008                           | .043                                | -.009            | .397**                             |
| HADS - Anxiety                            |     |                  | 1              | .709**            | .288                             | -.217                                      | .310                | .343*                | .154                            | .496**                         | .319                            | .602**                              | .491**           | .180                               |
| HADS - Depression                         |     |                  |                | 1                 | .292                             | -.049                                      | .197                | .280                 | .298                            | .585**                         | .365*                           | .699**                              | .605**           | .309                               |
| EDEQ –Eating Restraint subscale           |     |                  |                |                   | 1                                | .195*                                      | .789**              | .207                 | .263*                           | .228                           | .286*                           | .354**                              | .335*            | .188*                              |
| EDEQ- Objective Bulimic Episodes subscale |     |                  |                |                   |                                  | 1  | .259**              | -.062                | .016                            | -.155                          | -.038                           | -.087                               | -.078            | .125                               |
| EDEQ – Global Score                       |     |                  |                |                   |                                  |  | 1                   | .305*                | .342**                          | .251                           | .343**                          | .278*                               | .381**           | .244**                             |
| WSAS – Work subscale                      |     |                  |                |                   |                                  |  |                     | 1                    | .531**                          | .725**                         | .688**                          | .560**                              | .862**           | .002                               |
| WSAS – Home management subscale           |     |                  |                |                   |                                  |  |                     |                      | 1                               | .395**                         | .552**                          | .374**                              | .701**           | .071                               |
| WSAS – Social leisure subscale            |     |                  |                |                   |                                  |  |                     |                      |                                 | 1                              | .640**                          | .719**                              | .867**           | .296*                              |
| WSAS – Private leisure subscale           |     |                  |                |                   |                                  |  |                     |                      |                                 |                                | 1                               | .553**                              | .846**           | .100                               |
| WSAS – Close relationships subscale       |     |                  |                |                   |                                  |  |                     |                      |                                 |                                |                                 | 1                                   | .768**           | .295*                              |
| WSAS Total score                          |     |                  |                |                   |                                  |  |                     |                      |                                 |                                |                                 |                                     | 1                | .193                               |
| Social Anhedonia Scale total score        |     |                  |                |                   |                                  |  |                     |                      |                                 |                                |                                 |                                     |                  | 1                                  |

\*\* . Correlation is significant at the 0.01 level (2-tailed). WSAS = Work and Social Adjustment Scale; HADS = Hospital Anxiety and Depression Scale; BMI = Body mass index

### *16.15 Regression Analysis*

This analysis relates to the testing of hypothesis 4.

To explore whether illness factors such as severity and chronicity, as well as social anhedonia were significant predictors of work and social adjustment difficulties, the data were entered into a linear regression model. The data used were from the eating disorder participants (n=151). The enter method was selected in SPSS.

Length of illness (an estimation of chronicity), current BMI, the EDE-Q global score (an estimation of current illness and symptom severity), lowest ever BMI as an adult (an estimation of lifetime severity) and a measurement of social anhedonia (RSAS) were entered into the model as predictors. The dependent variable was the total score of the WSAS. The model was significant ( $F=17.79$ ,  $df=5$ ,  $51$   $p \leq 0.001$ ) and predicted 48.94% of the variance in work and social functioning difficulties. Social anhedonia ( $B=0.26$ ,  $t=1.98$ ,  $p=0.05$ ), current illness severity (BMI) ( $B=-3.04$ ,  $t=-8.10$ ,  $p \leq 0.001$ ) and lifetime severity (lowest BMI as an adult) ( $B=1.26$ ,  $t=3.08$ ,  $p=0.003$ ) were significant predictors. Chronicity ( $B=1.15$ ,  $t=1.24$ ,  $p=0.2$ ) and current illness and symptom severity ( $B=0.6$ ,  $t=0.67$ ,  $p=0.5$ ) were not significant predictors.

## **17.0 Discussion**

### *17.1 Summary of Findings*

The overall aim of the study was to explore social anhedonia and work and social functioning in people with AN or BN, compared to individuals recovered from AN and non-ED controls of a similar age and IQ. In addition to this, the study also aimed to explore whether social anhedonia and illness factors such as chronicity and severity were predictors of work and social functioning difficulties. The observational component of the study indicated that individuals with EDs were more likely than HCs to be out of work and not in a relationship. Having successfully recovered from AN,

individuals were more likely to be in a relationship and in employment or further study than those currently unwell.

The first hypothesis, which was that there would be a significant difference in levels of social anhedonia measured using the Revised Social Anhedonia Scale (Eckbald et al., 1982) between the AN and BN groups and HCs, was supported by the data. Those with AN and BN reported significantly higher levels of social anhedonia than HCs, with large effect sizes. There was no difference between the clinical groups regarding self-reported social anhedonia and a similar number of individuals in each of the clinical groups scored within the clinical range for social anhedonia. It was also predicted that those recovered from AN would score in-between those currently unwell and those who have no lifetime history of an ED and this hypothesis was supported by the data, as there was a large sized difference between the recovered AN group and HCs, and a medium sized difference between the recovered AN group and those currently unwell with AN. There were significantly more individuals in the ED groups scoring above the clinical cut-off for social anhedonia who were not in a relationship than those scoring below the clinical cut-off.

The second hypothesis, which was that there would be a significant difference in work and social functioning measured using the Work and Social Adjustment Scale (Marks, 1986; Mundt et al., 2002) between the AN and BN groups and HCs, was supported by the data. For the total score calculated for this measure, there was a huge sized difference for the AN and HC groups and there was a large sized difference for the BN and HC groups, such that participants with EDs reported significantly greater difficulties in work and social functioning than HCs. However, relative to those with BN, those with AN reported significantly greater overall difficulties with work and social functioning. For work functioning, both clinical groups reported significantly greater difficulties than HCs, although relative to the BN group, those with AN reported greater difficulties. The same pattern of results was observed for difficulties attributed to social leisure, private leisure and close relationships. Regarding home management, both clinical groups reported similar levels of difficulty and they reported being significantly more difficulties than HCs. It was also predicted that those recovered from

AN would score in-between those currently unwell and those who have no lifetime history of an ED. This was supported by the data, as those recovered from AN reported more difficulties than HCs for the total score, with a large effect size and for all subscales, with a small sized effect for the social leisure subscale, a medium sized effect for the home management subscale and large to very large sized effects for the remaining work and social functioning subscales. Furthermore, the recovered AN group reported significantly fewer difficulties than those currently ill with AN, with a very large sized difference for the total score and large to very large sized differences for all subscales. It was interesting to note that a subgroup of participants in the recovered group scored in the clinical range for social anhedonia and these individuals reported significantly more work and social functioning problems than other recovered participants scoring below the clinical cut-off.

The third hypothesis, which was that there would be a significant positive correlation between social anhedonia, measured using the Revised Social Anhedonia Scale (RSAS; Eckbald et al., 1982) and difficulties in work and social functioning, measured using the Work and Social Adjustment Scale (WSAS; Mundt et al., 2002) for the ED groups, was supported in part by the data. There were moderate ( $r=0.3$ ) significant positive correlations between social anhedonia and the social leisure and close relationships subscales of the WSAS for the clinical groups, meaning that higher levels of social anhedonia were associated with experiencing greater difficulties with social leisure and in close relationships. It was also predicted that a longer duration of illness would be associated with greater work and social adjustment problems and higher social anhedonia and this was supported in part by the data. There was a significant moderate correlation between years of illness and social anhedonia, indicating that a more chronic illness is associated with higher levels of self-reported social anhedonia. However, there were no significant associations between years of illness and work and social functioning difficulties. In addition, it was hypothesised that inpatients would report significantly more work and social functioning problems and higher levels of social anhedonia than those being treated as outpatients, in day patient treatment and those with EDs recruited the community. There was no difference in treatment modality for social anhedonia scores, but inpatients reported significant greater work

and social functioning difficulties than outpatients and individuals with an ED recruited from the community.

The fourth hypothesis, which was that social anhedonia and illness factors including chronicity (measured using self-reported years of illness) and current and lifetime severity (measured using current BMI, current Eating Disorders Examination Questionnaire global score (Fairburn & Beglin, 1994) and lowest ever BMI as an adult respectively) would explain a significant proportion of variance in work and social functioning, was supported by the data. The linear regression analysis indicated that social anhedonia, lifetime severity and current illness severity were significant predictors of current work and social functioning difficulties.

#### *17.2 Work and Social Adjustment Scale: Comparisons with Studies Using the Same Measure*

This study replicates the findings of Tchanturia et al., (2012b), who, using the same measure, reported significant greater difficulties in work and social functioning in 77 women with AN relative to 83 HCs, with similar very large effect sizes to this study. This study adds a larger sample to the existing data and has also contributed to better understanding of work and social functioning in people with BN which was a patient group lacking from Tchanturia et al's (2012b) study. Unlike Tchanturia et al's finding that EDE-Q global score (indicating current illness severity) was the only significant predictor of work and social functioning difficulties, this study also found that current BMI (an additional indicator of illness severity) was a significant predictor of such difficulties. The differences may be due to the greater power provided by the larger sample size in the present study. On the other hand, both this study and Tchanturia et al's study did not find that duration of illness was a significant predictor of work and social functioning difficulties and the consistency of these findings indicate that difficulties in these domains are likely to be caused more by current severity than illness chronicity, such that how an individual is able to function in the work and social domains is related to how severe their illness currently is. This study also replicates the

findings of Turner et al., (2010) whose sample of 178 patients, mainly with ED-NOS, also reported the presence of work and social functioning difficulties using the same measure. Taken together, there are now three studies who have used the WSAS to look at the work and social functioning of individuals with AN and BN and there is a consistent finding that these individuals are reporting significant difficulties in all domains of work and social functioning, with extremely large effect sizes relative to HCs in the domains of work functioning, social leisure and close relationships.

### *17.3 Work Functioning Findings: Comparisons with Previous Studies*

This study found that individuals with either AN or BN were more likely to be currently unemployed than those without an ED of the same gender, and a similar age and IQ. However, unlike Ruuska et al., (2007) who found a longer duration of illness was a significant predictor of employment difficulties, the regression model did not find chronicity (illness duration) to be a significant predictor of work and social functioning difficulties, as the model indicated these problems were better predicted by current severity, lifetime severity and social anhedonia. Unlike Halmi, Brodland and Loney's (1973) data, this study did not find a difference between those who were employed and those who were unemployed and the age of onset of their illness. It is also interesting to note that whilst there was no effect of treatment modality (inpatient, outpatient/day-patient, community) on social anhedonia, those receiving inpatient treatment reported more work and social functioning difficulties than outpatients and participants living in the community. This finding might be explained by the idea that inpatient treatment can limit work and social opportunities, whereas receiving treatment as an outpatient or living independently in the community may allow greater opportunities for employment, building of social networks and private hobbies. This implies that inpatient units may need to work with patients to enhance their engagement in voluntary work around the hospital campus and to increase their social contact and leisure opportunities to account for the barriers that inpatient treatment may place on vocational opportunities and social interactions.

This study found that those in the clinical groups had received fewer years of education than their healthy peers. One hypothesis for this finding might be that they



may have missed some of their schooling due to the illness. This point is supported by the observation that individuals were on average in their late 20s and the confidence intervals for years of illness suggest that those with AN may have been ill for between 8.41 and 10.89 years and those with BN may have been ill for between 9.45 and 14.16 years. This suggests that the illness onset would have likely coincided with the years during which they completed their secondary and university education. The participants in the clinical groups in this study are on average a few years younger than those in Wentz et al's., (2012) 18 year outcome study who were on average 32 years old, but the percentage of those who are unemployed is very similar across the studies. Wentz and colleagues found 25% of their participants were not in paid employment and in this study the rate was 17.14% for those with AN and 28.26% for those with BN. Like Godart et al's., (2003) study which measured social functioning using the Groningen Social Disabilities Schedule (Wiersma, DeJong & Ormel, 1988), this study also found a significant positive relationship between anxiety and difficulties with work functioning.

Whilst this finding also corroborates the observations of Theander (1970) which revealed that these individuals tended to continue working despite their serious illnesses, these rates of unemployment are more than double that of the London average which was reported to be 7% for working age adults in 2011 (Labour Force Survey, Office for National Statistics). Unlike in Ruuska et al's (2007) study which found a more chronic illness was associated with poorer work functioning, this study did not find a significant correlation between years of illness and work functioning measured using the WSAS. This difference may be due to the use of different methodologies for measuring this variable, as Ruuska et al., used a different measure (the Morgan-Russell Psychosocial Subscales; Morgan & Hayward, 1988) and unlike this study which recruited adults, their participants were adolescents who had had AN. Conversely, this study showed that lifetime severity measured using the lowest ever BMI of participants and current severity, measured using the current BMI were significant predictors of poor work (and social) functioning and the correlation analysis highlighted a significant, positive relationship between current ED symptoms, measured using the EDE-Q global scale and the work subscale of the WSAS. These

findings contribute the variable of current illness severity to the present literature base as significant factor in poor work functioning.

#### *17.4 Social Functioning Difficulties: Comparisons with Previous Studies*

This study replicates the findings of Herzog et al., (1985) who, using the Social Adjustment Scale (Weissman et al., 1978) found the subsample of 18 female medical students who reported a lifetime history of AN reported poorer social functioning during their illness. Similar to Wiersma et al's., (1988) study of 63 French women with AN and BN which found a greater proportion of individuals with AN than BN reported experiencing social functioning difficulties, this study also found that whilst reporting significant greater difficulties than HCs, those with BN reported significantly fewer difficulties than those with AN. However, in this study, those with BN were no less likely than those with AN to score in the clinical range for social anhedonia which may indicate that although the drive to seek out and enjoy social contact is reduced for those with BN, it may not impact on their social functioning as strongly as it does in AN. This study and the findings of Wiersma et al., (1988) differ to the findings of Godart et al., (2004) who found that in a clinic sample of 166 patients with AN and 105 patients with BN, both clinical groups reported the same level of difficulty functioning in the "social role" (leisure time, time spent with friends) and the "occupational role" (work or educational activities). It is possible that these differences between studies may be due to different measurement tools being used.

#### *17.5 Social Anhedonia Findings: Comparisons with Previous Studies Using the Revised Social Anhedonia Scale and Other Measures*

One strength of this study is that it adds to the currently small literature base on the direct measurement of social anhedonia in EDs. This study replicates the findings of Tchanturia et al., (2012a) who collected the same measure of social anhedonia (RSAS) from 72 women with AN, 19 women with BN and 43 HCs. Their study, like this one,

found that those with AN and BN reported significantly higher rates of social anhedonia than HCs, with large effect sizes reported by both studies ( $D=1.28$  in Tchanturia et al's study and  $D=1.44$  in this study for AN and  $D=1.52$  in Tchanturia et al's study and  $D=1.48$  in this study for BN). Like this study, Tchanturia et al., reported no significant difference between clinical groups.

This study also supports the findings reported by Deborde et al., (2006), who, using the Social Anhedonia Scale from the Scales for Physical and Social Anhedonia (Chapman et al., 1976), found that a group of 46 individuals with EDs reported significantly greater social anhedonia than 198 HCs. Unlike in Deborde et al's., study which did not separate the ED group into ED subtypes, this study was able to explore the relative levels of social anhedonia in individuals with AN and BN. A third study by Eiber et al., (2002) who, like Deborde et al., used the original Social Anhedonia Scale from the Scales for Physical and Social Anhedonia, also found that those with AN and BN did not differ significantly regarding levels of social anhedonia, although there was a trend towards those with more restricting type AN presentations reporting greater social anhedonia than those with BN, supported by a small effect size ( $D=0.36$ ). However, Eiber et al's., sample size (20 participants with each ED subtype) was much smaller than the sample reported in this study and this small sample size may have affected the reliability of the data. Taken together, this study plus the three other studies discussed which have measured social anhedonia in individuals with EDs demonstrate a consistent finding of significantly higher levels of self-reported social anhedonia in these patient groups.

#### *17.6 Comparison with other Studies Exploring Work and Social Functioning in People Recovered from Anorexia Nervosa*

This study replicates the findings of Striegel-Moore et al's., (2003) community-based follow-up study which found people with an experience of an ED reported poorer

social functioning as adults. This is because in this study, the recovered group reported more difficulties than their healthy peers. Unlike Striegel-Moore et al's., study, however, the present study included a group of individuals reporting complete, long-term recovery from AN, whereas their study included people in partial remission from the illness. It is possible that recovery, whether full or partial, may contribute to an improvement in social functioning compared to the acute phase of illness but that despite some degree of recovery, social functioning continues to be affected relative to healthy peers.

In contrast to Wentz et al's., (2012) 18 year follow-up study which found that aged 32, 25% of individuals in their cohort who had experienced an ED as an adolescent were not currently in paid employment, there were no unemployed individuals in the recovered group recruited for this study. This may be because the recovered individuals in this study, unlike the mixed group in Wentz et al's., study which comprised of individuals who continued to experience symptoms of the illness, had achieved, on average, 4 years of recovery from AN and they may represent a different, less chronic subgroup of patients whose work and social functioning outcomes are better due to a less severe and enduring illness. This is in line with the finding that a more severe illness predicted greater work and social functioning problems. The findings of this study do support those of Steinhausen et al., (2000) who found that 11.5 years post treatment, 12% of people who had been treated for AN reported impaired vocational functioning. Indeed, the data collected in this study show that there was a subgroup of recovered individuals who despite being in employment or training, continued to report difficulties with their work functioning at around 4 years after recovery. One strength of the present study was that participants in the recovered group were required to meet defined recovery criteria, whereas Steinhausen et al's., study used a mix of participants at different stages of symptom recovery. However, even when the potential confound of symptoms was reduced by including these strict exclusion/inclusion criteria, the recovered group continued to report difficulties with their work and social functioning which were present to a greater degree than their non-ED peers even though they had successfully secured employment or further training post illness.

It is notable that the employment status of the recovered group was more likely to be given as 'student' than in the other groups. This may reflect the opportunity nature of the sample, as it may have been biased by the proximity of the researcher to the student population. On the other hand, it could be suggested that recovering from an ED may be supported by participating in further study, or that one outcome of recovery is an increased interest in further study. This latter point may be supported by the data for the acute AN group which showed this group had received fewer years of education than those who had recovered. It could be suggested that succeeding in further and higher education is important for individuals with EDs and that once recovered, a notable subgroup of individuals return to education to pursue this goal and interest. Further work would be needed to investigate these predictions in more depth.

#### *17.7 Comparison with other Studies Exploring Social Anhedonia in People Recovered from Anorexia Nervosa*

This study contributes to the small current literature base on the presence of social anhedonia in individuals who have recovered from AN. It replicates, using a larger sample, the findings of Tchanturia et al., (2012a) whose 14 participants recovered from AN also showed an intermediate profile, with scores below those of an acute AN group, but above those of healthy peers, with both studies reporting medium to large effect sizes.

As stated in section 13.3, in a systematic review of randomised controlled trials (RCTs) of treatment for chronic AN, Hay, Touyz and Sud (2012, p1136) assert that "complete cure' in chronic AN is extremely difficult to effect and attempts at such have been argued to be futile." Because of the often severe and enduring nature of eating disorders, research in the field has moved to including recovered samples to learn more about the profile of people who have successfully recovered. In the absence of studies offering longitudinal designs, including recovered groups can provide clues or further information as to what potential characteristics or traits are associated with

vulnerability to developing an eating disorder. Thus, if such factors are observed in people who have recovered from the illness, one might tentatively suggest that this factor may be associated with a vulnerability to developing an eating disorder. It is interesting to note that the data collected in the thesis indicate despite being recovered from the illness, and having an occupation (either work or study), people continued to report elevated levels of social anhedonia (with those continuing to score in the clinical range for social anhedonia reporting high levels of work and social difficulties than those who had recovered and did not score in the clinical range for social anhedonia). Tentatively, one could therefore conclude that social anhedonia is associated with a vulnerability to developing an eating disorder, perhaps because a reduced drive to seek out social contact allows the individual more time and greater ability to focus on influencing their weight and shape in isolation from a social network, such that during the acute phase of the illness, social anhedonia becomes heightened. On the other hand, it could be suggested that higher than typical levels of social anhedonia are a scar of the illness, such that starvation may actively alter the social reward system and causes longer-term reductions in the individuals drive to seek out and experience pleasure from social interaction. Furthermore, it could be suggested that, being isolated from social networks because of the physical and psychological components of the illness, as discussed in the cognitive interpersonal maintenance model (Schmidt & Treasure, 2006; 2013) may impact an individuals' social skills and this may result in them continuing to show a reduction in the drive to seek out and experience pleasure from social contact even when they have successfully beaten the illness.

### *17.8 Relevance of Findings in Relation to Current Literature on Eating Disorders*

The findings reported in this thesis contribute, using large samples and ED subgroup analyses, to a growing literature on the work and social functioning and levels of social anhedonia in people with EDs (e.g. Herzog et al., 1985; Wiersma et al., 1988; Striegel-Moore et al., 2003; Turner et al., 2010; Tchanturia et al., 2012a, 2012b). The data also

contribute to the literature on recovery from EDs, corroborating those of Tchanturia et al., (2012a) with greater power as a result of the larger recovered group.

Furthermore, the data contribute to the literature on severe and enduring EDs, as both those with AN and BN reported an illness duration of approximately 10 years, which is considered indicative of a severe and enduring illness form (Robinson, 2006). The findings demonstrate that these severe and enduring patients experience a high degree of interference in their work and social lives, and 64.24% (n=97) of participants with EDs (70 AN participants (66.67%) and 27 BN participants (58.71%) reported clinical levels of social anhedonia. Given that past data shows that social support, social networks and being employed are important in creating successful recovery (Stice, 2002; Woods, 2004, Schmidt et al., 2012), these data contribute to enhancing understanding of the illness factors that may be predictive of work and social adjustment difficulties (current BMI and lowest BMI as an adult) and social anhedonia, and one suggestion might be that as well as working to increase the individual's weight in treatment to reduce the impact of starvation on their ability to work and participate in a social life, at the same time it is important to look at broader areas of functioning, including social anhedonia, to further reduce work and social functioning difficulties.

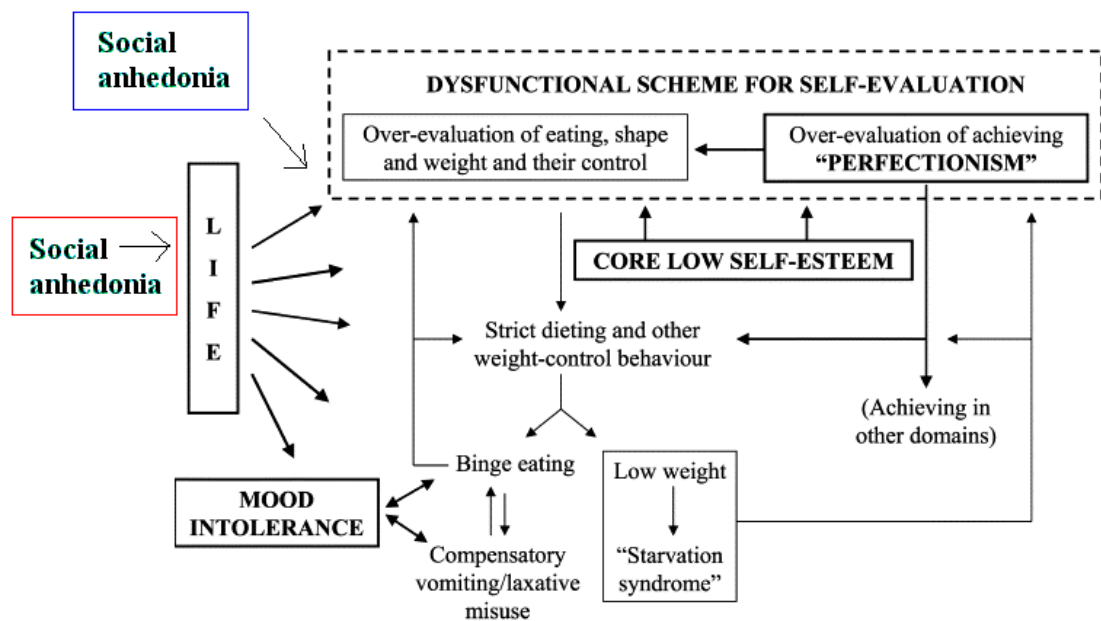
### *17.9 How the Findings of the Thesis Inform Understanding of Eating Disorders*

Two cognitive models of EDs were explored in section 8.0. The data collected can be considered to inform these models as they highlight the additional maintenance factor of social anhedonia.

In relation to the Transdiagnostic Model of EDs (Fairburn, Cooper & Shafran, 2003; Fairburn, 2008) reviewed in section 8.0, there was a significant, positive association between social anhedonia and years of illness and overall ED symptoms (global EDE-Q score) for the ED participants, suggesting that social anhedonia may be an additional perpetuating factor missing from the current model which maintains symptoms and contributes to an enduring form of the illness. The finding from the regression analysis

that social anhedonia was also a significant predictor of work and social functioning difficulties for the ED participants also suggests that a reduced drive to seek out and experience pleasure from social contact may play a significant role in causing the interpersonal difficulties the model suggests maintain the illness. These suggested revisions to the model are highlighted in figure 4 below.

Figure 4: Revisions Suggested to the Transdiagnostic Model of Eating Disorders Based on the Data Collected in the Thesis



In line with the transdiagnostic nature of this model, the high levels of social anhedonia were transdiagnostic, as social anhedonia was found to be present to the same degree in both those with AN and those with BN.

In relation to Schmidt and Treasure's (2006; 2013) cognitive interpersonal maintenance model, it was predicted that the model could be improved by elucidating further the social emotional difficulties which contribute to the overall maintenance based conceptualisation of the illness and social anhedonia might be one factor that



significantly predicted the interpersonal difficulties discussed in the model. The data from the regression analysis showed that social anhedonia was a significant predictor of problems in work and social functioning for people with EDs and therefore, the model may need revising further to account for this finding. The model also suggests that the illness is highly valued and these data indicate that one potential consequence of the desire to hold onto the illness might be significant difficulties in the patient's work and social life.

#### 17.9.1 Role of Work and Social Functioning in Recovery

Given the high mortality rates associated with the illness discussed in section 5.1, it is of great importance to the field to understand factors associated with successful recovery. Currently, several reports indicate the importance of social recovery in overall recovery from an ED (e.g. Darcy et al., 2011) alongside other prognostic factors such as higher impulsivity (Zerwas et al., 2013). Whilst the design of this study does not permit a complete understanding of whether work and social functioning improvements played an active role in helping people to successfully recover, the data from this study indicate that employment and improved social life were associated with being in recovery from AN, and it is possible that these factors may play a part in preventing future relapse, as those in the recovered group had remained well for an average of approximately 4 years.

#### *17.10 Putting the Findings into the Context of Findings for Other Psychological Disorders*

Relative to findings for people with severe and enduring obsessive compulsive disorder (Micali et al., 2010), individuals with EDs report more severe difficulties with work and social functioning. The scores of individuals with EDs in these studies (AN=16.16, SD=8.76; BN=15.26, SD=8.39) for social anhedonia are similar to those reported for patients with schizophrenia by Blanchard et al., (1998; mean=15.11 (SD=5.75) and Zhornitsky et al., (2012; mean=13.80, SD=7.0). This corroborates Arkell & Robinson's

(2008) report that people with severe and enduring EDs have similar levels of social debilitation to people with schizophrenia.

### *17.11 Limitations*

There are a number of limitations which need to be taken into account when interpreting the findings of the studies reported in the thesis. These are discussed in the section below and suggestions are made as to how these could be overcome in future work.

#### *17.11.1 Gender Bias*

The studies conducted in this thesis used only women participants and excluded male participants. This was in part because of the opportunity nature of the sample which meant that the participants were recruited from ED services where there tended to be a greater proportion of female patients relative to male patients. Given that epidemiological studies such as Hudson, Hiripi, Pope and Kessler (2007) who found the lifetime prevalence of EDs among men to be 3% for AN and 5% for BN, it will be important to administer these measures to male patients in future research to explore whether the findings can be generalised to males with EDs. This may be particularly pertinent given that studies have reported that being unemployed has a greater impact on the mental health of men than women (Artazcoz, Benach, Borrell & Cortès, 2004). Therefore, it is possible there may be a stronger relationship between symptoms and unemployment in men with EDs than female patients.

#### *17.11.2 Cultural Bias*

The data were collected predominantly from participants from the South East London area as it was an opportunity sample and the ED clinics in this area were closest to the candidate's place of study. Some participants were recruited through personal contacts and through the research unit's volunteer database which meant that they may have been located in other parts of the country. It is possible that regional

differences in unemployment may have biased the sample. The geographical location may also explain the high proportion of individuals in the recovered group who were pursuing further training or education because London accommodates over 40 higher education institutions and has offers one of the largest concentrations of universities in the world (Higher Education Funding Council for England, 2013). With a population of approximately 400,000 students (Higher Education Statistics Agency, 2005) out of a population of around 8 million residents, this may have made it more likely that participants responding to the advert would be students. Because the sample was predominantly white British, this may limit the external validity of the findings, such that the conclusions may not be generalised to samples of other ethnic and cultural backgrounds.

#### *17.11.3 Sampling Methods*

The sample was an opportunity sample which permitted a large number of participants to be recruited into the study. On the other hand, this may reduce the external validity of the data because the sample may be biased by being based on patients recruited from only one location. This confound could be solved in future by including more sites and using random sampling. However, this may increase financial and time costs. The sample was also a volunteer sample and this may have introduced additional confounding variables as there may be characteristics present in those who volunteer to take part that differ from those who choose not to. This may have reduced the internal validity of the data.

#### *17.11.4 Definition of Recovery*

The definition of recovery used in this study was based on Bardone-Cone et al., (2010) and although this permitted the use of clear and objective inclusion and exclusion criteria for the recovered group, this may have reduced the reliability and external validity of the data. This is because the recovery criteria used are largely based on a medical view of recovery and may have excluded individuals who may be in a state of subjective recovery in which they are functioning well despite living with some of the

symptoms of AN. This is an important limitation to consider, particularly in the context of the recovery approach because some individuals with experience of AN may consider themselves recovered in a more subjective sense, but may not meet the more rigorous medical criteria. Another caveat to consider is that it may have been possible that using these medical recovery criteria reduced the potential for recovered BN participants to be recruited into the study as they did not identify with the medical criteria set out in the study which might explain why few participants recovered from BN responded to the recruitment materials. Further work would be required to follow this up.

#### *17.11.5 Confounding Variables*

One important confound to discuss in this section is that of illness duration. Whilst length of illness was not a significant predictor of work and social functioning difficulties, one caveat of the findings is that the acute AN and recovered AN groups were not matched for length of illness. This may indicate that the acute AN group may represent a more chronic illness subgroup, whereas the recovered group were a less unwell group who recovered more quickly from the illness due to some characteristic that was not controlled for in the analysis. However, it could be argued that it was important to match the groups for age, to reduce the possible confound of this factor on the employment and relationship status of participants. Matching the participant groups for age may have reduced the potential for the groups to be matched for duration of illness. This is because ensuring that the recovered group had had several years of recovery meant that it was more likely that they would have had a shorter illness otherwise they would have recovered very recently.

Ten of the participants in the HC group were not able to attend the research unit because they lived too far away to feasibly travel to the unit. Their data were collected remotely and this may have confounded the data, particularly as they self-reported their height and weight and it is possible that they did not provide an accurate measurement, either due to measurement error or social desirability bias.

#### *17.11.6 Measures*

Collecting the data using quantitative questionnaire measures may have increased the internal validity of the findings because the data were based on well validated measures which also showed high Cronbach's alphas for the participant groups reported in this thesis. However, using self-report measures may have biased the data because the answers may be affected by social desirability bias, with participants responding in the way they felt the experimenter wanted them to. This may have reduced the internal validity and reliability of the data. Conversely, using questionnaires may have reduced the potential confound of interpreter and experimenter bias in the studies which may have increased the quality of the data.

#### *17.11.7 Design*

The design was cross-sectional and the data were collected at one time point so they only provide a snap shot of participants' scores at a single point in time. Whilst this increased the feasibility of the study and reduced participant burden, this type of design may have impacted the internal and external validity and the reliability of the findings. Future work could include a longitudinal design to follow up participants over time to explore any temporal changes in social anhedonia and work and social adjustment and to increase internal validity.

#### *17.11.8 Measurement of Intelligence Quotient (IQ)*

IQ was measured using the National Adult Reading Test (NART, (Nelson & Willison, 1991) and this measure correlates positively with full score IQ, as measured using the British version of the Wechsler Adult Intelligence Scale Revised (WAIS-R) (Wechsler, 1981), ranging from  $r=0.77$  (Crawford et al., 1992) to  $r=0.81$  (Crawford, et al., 1989). However, it would have been ideal to have used a full IQ score measure such as the WAIS for more accurate assessment of IQ. This may have increased the reliability of the data for IQ but would have increased participant burden, the time taken to collect the data and the study costs incurred, as the WAIS is a more expensive measure than

the NART. Furthermore, it was not possible to conduct the NART with non-native English speakers which meant that potential participants had to be excluded from the study and this may have biased the sample and reduced external validity.

#### *17.11.9 Selection of Measures*

It may have improved the external validity of the findings to have used several questionnaires which purported to measure the same outcome. For example, additional measures of social anhedonia could have been administered to improve the reliability of the findings.

It may have been a limitation not to have included a measure of physical anhedonia to compare to the social anhedonia data. Given that contemporary models of EDs such as the Cognitive Interpersonal Maintenance Model (Schmidt & Treasure, 2006; 2013), reviewed in section 8.2 on page 37 of the Introduction, emphasise the role of interpersonal difficulties and isolation in maintaining the illness, it was a focus of this thesis to explore whether anhedonia was present in the social domain for people with EDs and what contribution a reduced drive to seek out and experience pleasure from social contact might make to self-reported difficulties in the work and social life of people with EDs. Furthermore, anhedonia in the social domain has been relatively understudied in people with EDs compared to physical anhedonia (see for example Davies and Woodside, 2002) and anhedonia as a component of depression (for a review of the comorbidity of depression and EDs, please refer to section 6.3, p27). Nonetheless, it may be of use for future work to include a measure of physical anhedonia to allow comparisons with anhedonia in the social domain to be made amongst the same participant group.

In addition, the external validity could have also been limited by using only self-report measures and it may have been of benefit to have used more observational or functional measures, such as asking participants to count the number of individuals in their social network, or to record the number of times and for long they had contact with friends in the past week, or to calculate a continuous variable based on a diary

kept by the participant noting down the number of hours the participant had engaged in vocational activities during the past week. Including this type of measurement would have improved upon the arbitrary categories of full and part-time work, for example, used in this study because it is possible that some participants indicating that they were working part-time work were working for 5 hours per week, whereas for others, their part-time work may have been around 20 hours per week, which is perhaps closer to full-time hours. This may improve the reliability of the data.

#### *17.11.10 Lack of a Psychiatric Control Group*

The findings are limited by the fact that a psychiatric control group was not included. For practical reasons (time and resources), it was not possible to include a psychiatric control group and this does not allow for an understanding of whether social anhedonia is a symptom specific to EDs or whether it is a feature that is also present in other illnesses. In response to this, in section 17.10, comparisons are made between the means reported for the ED participants in this sample and published data for individuals with schizophrenia. However, these comparisons may be limited by the fact that the individuals in Zhornitsky et al's (2012) study were not matched for age to the individuals in this study and the patients with schizophrenia were on average 10 years older (mean age in years =39.9, SD=12.7) than the individuals with EDs recruited into this study. Future work should consider including a psychiatric control group.

#### *17.12 Strengths of the Studies Reported in the Thesis*

Alongside the limitations discussed above, there were also some strengths of the study reported in the thesis which are discussed further below.

##### *17.12.1 Sample Size*

The sample size provided adequate power based on the power analysis to detect differences between groups. It extends the findings of Tchanturia et al (2012a) and Tchanturia et al (2012b) in that it has provided data for a greater number of

participants in all groups and it also combines the measures used in both of Tchanturia et al's studies which has allowed the exploration of associations between social anhedonia and work and social functioning. The large sample size also made it possible to run a regression analysis with greater than 10 participants per predictor which is the recommended minimum requirement for this type of analysis.

#### *17.12.2 Sample*

The sample was formed of a mixed group of patients with AN and BN, with some accessing inpatient treatment, some accessing day-patient treatment, some accessing outpatient treatment and others were recruited from the community. If the type of treatment being accessed is considered an analogue or proxy of severity, including a heterogeneous sample may increase the external validity of the findings as they may be more representative of the wide range of illness severities in the broader population of people with EDs. On the other hand, it may also reduce the reliability and internal validity of the data because inpatients are, as a result of their hospitalisation, unable to continue working and they are removed from their usual social networks, a situation that may confound their answers on the WSAS. It could be argued however that there are still opportunities for making friends and for social interaction on the ward and that as part of the occupational therapy programme offered to patients, they may be able to work in a voluntary capacity in the hospital shop, art gallery, gardens and café. Furthermore, the WSAS asks about in general, how the illness has affect work and social life, rather than requiring the participant to report on their current situation the day they complete the measure. Nonetheless, this potential confound is an important caveat to consider when interpreting the findings.

#### *17.13 Clinical Implications*

In general, the findings suggest that it would be of benefit for clinicians working with individuals with EDs to make themselves aware of their patient's vocational and relationship status and to encourage patients to take small risks in both of these areas to improve their functioning and overall satisfaction in terms of their work and social



functioning. Most clinicians will already be asking about these factors in their initial assessment and the data suggest that it may be of benefit to collect information about the patient's level of social anhedonia, perhaps by administering the RSAS at the assessment to explore whether clinical levels of social anhedonia are a feature of the patient's presentation and to target these in treatment, particularly in the context of the findings that social anhedonia was a significant predictor of work and social adjustment problems. Patients could be signposted to vocational services and organisations that offer activities related to social hobbies.

Another clinical implication relates to enhancing a current evidence-based treatment for social emotional difficulties in AN with a higher dose of interventions targeting difficulties with work and social functioning. This treatment is called Cognitive Remediation and Emotion Skills Training (CREST; Money, Davies & Tchanturia, 2011a; Money, Genders, Treasure, Schmidt & Tchanturia, 2011b) and CREST has been shown to improve social emotional processing skills (Davies, Fox, Nauman, Treasure, Schmidt & Tchanturia, 2012). This low intensity, brief treatment module is currently comprised of ten 45 minute one-to-one treatment sessions. CREST uses a curious and collaborative stance, a motivational communication style where small successes are reinforced and a psycho-educational approach to help patients to implement small, meaningful, real-life experiments with the aim of obtaining new skills and understanding around social emotional functioning. The first two sessions focus on the patient's cognitive style and use pen and paper exercises to help the patient to reflect on their preferred thinking styles and brainstorm other ways of approaching everyday tasks. This exercise based format is then used in the remaining sessions which focus on identifying and developing the skills required to recognise emotions in both the self and others, emotion regulation skills both in an individual and a social context, skills required to tolerate emotions in the self and others and to express emotions and emotional needs, and finally practicing noticing positive emotions. The research reported in this thesis suggests that it may be of benefit in terms of improving social anhedonia to extend and enhance the noticing positive emotions component of CREST. This may encompass interventions from the field of positive psychology which aim to enhance the sense of connection with others, increase positive emotion and shift one's

attention from a negative bias towards attending to positive information in the environment. A systematic review and meta-analysis of 51 studies found that individuals who participated in positive intentional activities such as thinking gratefully, taking part in novel hobbies with others and focusing attention purposefully on information that increases optimism such as counting one's blessings reported significantly higher levels of well-being, positive emotion and happiness (Sin & Lyubomirsky, 2009). Examples of these interventions might include the favourite person exercise in which the patient is asked to look at a picture or image of their favourite person. Matsunaga et al., (2008) found that simply looking at an image of a significant person produces enhanced immune function, improved mood states, improved experience of positive emotion and the positive feeling of invigoration. Another positive psychology intervention that might be a relevant addition to the CREST manual in the context of the findings of this thesis might be to encourage patients to try doing novel activities which are shared with others with the prediction that this may help to reduce social anhedonia. This intervention might work first by providing behavioural activation, and also by improving well-being by helping the individual connect with others. For example, Kahneman et al., (2004) used an experience sampling method and asked people to write down what they were doing during the day and how much positive or negative emotion they were experiencing. The results indicated that people were happiest when they were doing activities with others, and they were least happy when they were doing mundane activities on their own. Another positive psychology intervention that might be suitable would be increasing the number of positive experiences the patient has during the day relative to the number of negative experiences of stimuli in their environment. Fredrickson and Losada (2005) found that for optimal happiness levels, a ratio of 3 positive interactions to one negative interaction is required. This exercise might involve the patient keeping a log of positive experiences, events, stimuli, feelings or thoughts that they experience during the day to become aware of the ratio at which they are operating, increase their awareness of positives, with the aim of working towards a more favourable ratio. These interventions would be designed to enhance patients' experience of their vocational and social life, and reduce social anhedonia.

### *17.14 Future Work*

Future work could include three components. The first component might involve exploring levels of social anhedonia and work and social functioning in people who have recovered from BN to see whether the intermediate profile of the AN group generalises to participants who have recovered from other types of EDs. The second component might involve following up the recovered group in another four years' time to explore whether they continue to report less social anhedonia and work and social functioning difficulties than those acutely ill and more social anhedonia and work and social functioning difficulties than non ED controls, or, whether their scores become more like those of non-ED controls once recovered for 100% longer (e.g. 8 years in total) than the average recovery time in this study. It would also be of interest to extend the study to a longitudinal design to explore whether the subgroup of recovered individuals with clinical levels of social anhedonia are more likely to relapse than those scoring outside the clinical range for social anhedonia. The third component of future research might be to investigate whether enhancing current interventions, such as CREST, described in section 17.13, by offering a higher treatment dose, and a broader range of interventions to target the social anhedonia and work and social difficulties found in these studies, would be associated with improved vocational and social adjustment and shorter treatment duration.

### *17.15 Closing Remarks*

The data collected for this thesis contribute to a growing body of evidence that work, and social emotional functioning are severely affected in people with EDs, continue to affect a subgroup of people recovered from AN and may be maintaining factors, as well as consequences of long-term starvation and the use of other ED behaviours. The data suggest that whilst these factors may ameliorate to some degree in many sufferers through successful recovery, working to reduce social anhedonia and improve work and social adjustment, particularly in severe and enduring forms of the illness, may contribute to improving quality of life in those suffering from EDs.

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## **APPENDIX – Main Research Project**

## Appendix 1 – Ethical Approval



# Health Research Authority

NRES Committee London - City Road & Hampstead

Bristol Research Ethics Centre

Level 3, Block B

Whitefriars

Lewins Mead

Bristol

BS1 2NT

Telephone: 0117 342 1339

Facsimile: 0117 342 0445

17 May 2012

Dr Amy Harrison  
Trainee Clinical Psychologist  
Camden and Islington NHS Foundation Trust/ King's College London  
DClin Psy Programme, 3rd Floor, Addiction Sciences Building  
4 Windsor Walk, Institute of Psychiatry  
London  
SE5 8AF

Dear Dr Harrison

**Study title:** An Investigation into Social Anhedonia in Eating Disorders  
**REC reference:** 12/LO/0409

Thank you for your letter of 25 April 2012, responding to the Committee's request for further information on the above research and submitting revised documentation.

The further information has been considered on behalf of the Committee by the Chair.

### Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised, subject to the conditions specified below.

### Ethical review of research sites

#### NHS sites

The favourable opinion applies to all NHS sites taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office prior to the start of the study (see "Conditions of the favourable opinion" below).

#### Non-NHS sites

### Conditions of the favourable opinion

The favourable opinion is subject to the following conditions being met prior to the start of the study.

Management permission or approval must be obtained from each host organisation prior to the start of the study at the site concerned.

*Management permission ("R&D approval") should be sought from all NHS organisations involved in the study in accordance with NHS research governance arrangements.*

Guidance on applying for NHS permission for research is available in the Integrated Research Application System or at <http://www.rdforum.nhs.uk>.

*Where a NHS organisation's role in the study is limited to identifying and referring potential participants to research sites ("participant identification centre"), guidance should be sought from the R&D office on the information it requires to give permission for this activity.*

*For non-NHS sites, site management permission should be obtained in accordance with the procedures of the relevant host organisation.*

*Sponsors are not required to notify the Committee of approvals from host organisations*

**It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).**

### Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

| <i>Document</i>                                       | <i>Version</i> | <i>Date</i>      |
|---|----------------|------------------|
| Advertisement   | 1              | 17 February 2012 |
| Advertisement   | 1              | 17 February 2012 |
| Advertisement   | 2              | 13 April 2012    |
| Covering Letter                                       |                | 13 April 2012    |
| Evidence of insurance or indemnity                    |                |                  |
| GP/Consultant Information Sheets                      | 1              | 13 April 2012    |
| Investigator CV                                       |                |                  |
| Letter from Statistician                              |                | 15 December 2011 |
| Other: Supervisor Dr Kate Tchanturia                  |                |                  |
| Other: Copy of IRAS form- A22                         |                | 25 April 2012    |
| Other: Copy of IRAS form - A30-1                      |                | 25 April 2012    |
| Other: Victoria Mountford's CV                        |                | 13 April 2012    |
| Participant Consent Form                              | 1              | 17 February 2012 |
| Participant Consent Form                              | 2              | 13 April 2012    |
| Participant Information Sheet                         | 1              | 17 February 2012 |
| Participant Information Sheet: Healthy Control Group  | 2              | 13 April 2012    |
| Participant Information Sheet: Eating Disorders Group | 2              | 13 April 2012    |
| Participant Information Sheet: Recovered Group        | 2              | 25 April 2012    |

|  |   |                  |
|--|---|------------------|
| Protocol   | 1 | 17 February 2012 |
| Questionnaire: Validated - HADS                      |   |                  |
| Questionnaire: Validated - SAS                       |   |                  |
| Questionnaire: Validated - work & social adjustment  |   |                  |
| Questionnaire: Validated - EDE-Q                     |   |                  |
| Questionnaire: Non-validated - demographic questions | 1 | 17 February 2012 |
| REC application                                      |   | 13 February 2012 |
| Referees or other scientific critique report         |   | 14 February 2012 |
| Response to Request for Further Information          |   | 25 April 2012    |

### Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

### After ethical review

#### Reporting requirements

The attached document "*After ethical review – guidance for researchers*" gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Notification of serious breaches of the protocol
- Progress and safety reports
- Notifying the end of the study

The NRES website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

#### Feedback

You are invited to give your view of the service that you have received from the National Research Ethics Service and the application procedure. If you wish to make your views known please use the feedback form available on the website.

Further information is available at National Research Ethics Service website > After Review

|                   |   |
|-------------------|---|
| <b>12/LO/0409</b> | <b>Please quote this number on all correspondence</b> |
|-------------------|---|

With the Committee's best wishes for the success of this project

Yours sincerely



**Dr David Slovic**

**Chair**

Email: christinehobson@nhs.net

*Enclosures:* "After ethical review – guidance for researchers"

*Copy to:* Ms Jennifer Liebscher, King's College London

## Appendix 2 - Information Sheet

### Social Anhedonia in Eating Disorders

**Please read the following information before you decide whether to participate in this research**

You are being invited to take part in a research study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. **Your participation is in this study is completely voluntary and will not affect your current or future access to treatment. Thank you for reading this.**

What is the purpose of the study?

**You are reading this information because you have expressed an interest in taking part on a post graduate research project investigating social interaction in people with eating disorders. The aim of this project is to explore whether the drive to seek out social contact and to experience pleasure from social interaction is the same in people currently unwell with an eating disorder as it is in people who have recovered from an eating disorder and a comparison sample of people who have no history of eating difficulties.**

- We have some evidence to suggest that people with eating disorders might not seek out and gain pleasure from social interaction in the same way of people without eating disorders do. Someone who has a low drive to seek out social contact and experiences reduced pleasure from social contact might be said to score high on a personality characteristic called social anhedonia.
- We are asking for your help to assist us in exploring social anhedonia further to see whether it might be something that is experienced by patients with eating disorders and whether it might remain in those who have recovered from an eating disorder.

**Why have you been chosen?**

- We are inviting you to participate in this research because you are currently suffering with an eating disorder, have suffered with an eating disorder in the past or have never suffered from an eating
- Exclusion criteria (people who should not participate in this study): i) Volunteers aged less than 18, ii) volunteers who are unable to provide informed consent regarding their ability to take part in the study; iii) Volunteers who are not able to read and write English to a sufficient standard that they cannot read and respond to a questionnaire.
- We are looking for female volunteers please.

**Do I have to take part?**

- It is up to you to decide whether or not to take part. If you decide to take part you will be given this information sheet and we will ask you to sign a consent form. If you decide to take part you are still free to stop your participation and to have your data withdrawn without giving any reason up until your data has been anonymised and added to the database of responses.



**What will I have to do if I take part?**

- Firstly we will collect some background data from you to see if you have any of the exclusion criteria listed above.
- We will send you 4 questionnaires which you can complete in your own time and return to us.
- The questionnaires will ask about symptoms of eating disorders, your current levels of depression, stress and anxiety, your drive to seek out and experience pleasure from social contact and your current work and social functioning.
- We will ask you to return your completed questionnaires via email.
- The total participation in this study will be no more than 25 minutes.

**What are the possible disadvantages and risks of taking part?**

- There are no major risks in taking part in the study. Completing the questionnaires can be tiring. Please feel free to take rest breaks during these. It might be embarrassing to answer questions about yourself.

**What are the possible benefits of taking part?**

- We hope that participating in the study will be interesting for you, but the main reason for participating in this study is that the information we will obtain may help us to treat future patients with eating disorders.

**Confidentiality**

All information which you provide during the course of the research will be kept strictly confidential. We do not require you to provide your name on the questionnaire. The information will be made anonymous (any identifiable details will be removed) and then will be entered anonymously onto the computer. Confidential information will only be accessible to authorised people (i.e. members of staff employed on the project). No individual participant will be mentioned in any published results from the study. If any publication results from this research, you will not be identified by name.

**What if something goes wrong?**

- We don't envisage any major risk associated with taking part in this study. In the event of you suffering any adverse effects as a consequence of your participation in this study, you will be compensated through the King's College London 'No Fault' Compensation Scheme. This scheme includes payment of damages or compensations in respect of any claim made by research participants for bodily injury arising out of participation in any clinical trial.

**What will happen to the results of the research study?**

- Please ask the researcher if you would like to receive a copy of the research report once the data has been analysed and written up. You will also be able to access the general outcomes of the study as they will be submitted for publishing to public journals.
- This study will be written up as the research component of my Doctorate in Clinical Psychology thesis.

**Who is organising and funding the research?**

- The research is being organised by the Eating Disorder Research Unit at the Institute of Psychiatry and is funded by King's College London.

**Who has reviewed the study?**

- The study has been subject to review by expert referees at the Institute of Psychiatry and the NHS Research Ethics Committee has granted ethical approval.

Please ask if there is anything you do not understand or if you would like more information. If you should have any further questions please contact Dr Amy Harrison, Trainee Clinical Psychologist, Institute of Psychiatry, 3<sup>rd</sup> Floor Addiction Sciences Building, 4 Windsor Walk, London SE5 8AF; email: [amy.harrison@kcl.ac.uk](mailto:amy.harrison@kcl.ac.uk) or telephone 020 7144 0168.

You can contact the Patient Advice and Liason Service at the South London and Maudsley NHS Foundation Trust (<http://www.slam.nhs.uk/media/302412/pals.pdf>) email: [pals@slam.nhs.uk](mailto:pals@slam.nhs.uk); tel: 0800 731 2864 if you wish to seek independent advice on whether to take part. Participants could also contact their local Citizen's Advice Bureau (branch locator at [www.citizensadvice.org.uk/](http://www.citizensadvice.org.uk/)) for advice on whether to take part. Participants can also contact the supervisor of this project, Dr Kate Tchanturia, [kate.tchanturia@kcl.ac.uk](mailto:kate.tchanturia@kcl.ac.uk); tel: 0207 848 0134 for further, specific information about the project.

Appendix 3 - Consent form

Institute of Psychiatry  
at the Maudsley



Dr Amy Harrison, Trainee Clinical Psychologist  
Institute of Psychiatry, 3<sup>rd</sup> Floor Addiction Sciences Building  
4 Windsor Walk  
London SE5 8AF  
Email: [amy.harrison@kcl.ac.uk](mailto:amy.harrison@kcl.ac.uk)  
Telephone 020 7144 0168.

**To participate in this research, please read and sign the form below**

**Title of project:** Social Anhedonia in Eating Disorders  
**Researcher:** Dr Amy Harrison, Trainee Clinical Psychologist

Please tick boxes

**I have read the information sheet**, and I have been given a copy. I was given the opportunity to ask questions. I understand why the research is being done and the risks involved.

**I consent to coming to completing the demographic questions and the 4 questionnaires described in the information sheet**

**I agree that the information gathered about me can be looked at and stored at the Institute of Psychiatry for a period of seven years after the study is completed.** Any future work, and any extension of the project, will be subject to review by a research ethics committee.

**I consent to the input of anonymous data obtained from the information gathered about me into a computer**, to be used for statistical analysis and research.

**I would like to receive a copy of the research report once the data has been analysed**

**I understand that I am free to stop my participation in this study and to have my data withdrawn without giving any reason**

I consent to you informing my GP that I am taking part in this study and have provided my GP's name and address here (OPTIONAL):

Name of volunteer

Date

Signature

.....  
Name of researcher

.....  
Date

.....  
Signature

## Appendix 4 - Eating Disorder Examination Questionnaire

The following questions are concerned with the past four weeks only (28 days). Please read each question carefully and tick the appropriate box.

**Please answer all the questions.**

| On how many days out of the past 28 days...  | No days                       | 1-5 days                      | 6-12 days                     | 13-15 days                    | 16-22 days                    | 23-27 days                    | Every day                     |
|--|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| 1. Have you been deliberately trying to limit the amount of food you eat to influence your shape or weight?  | 0<br><input type="checkbox"/> | 1<br><input type="checkbox"/> | 2<br><input type="checkbox"/> | 3<br><input type="checkbox"/> | 4<br><input type="checkbox"/> | 5<br><input type="checkbox"/> | 6<br><input type="checkbox"/> |
| 2. Have you gone for long periods of time (8 hours or more) without eating anything in order to influence your shape or weight?  | 0<br><input type="checkbox"/> | 1<br><input type="checkbox"/> | 2<br><input type="checkbox"/> | 3<br><input type="checkbox"/> | 4<br><input type="checkbox"/> | 5<br><input type="checkbox"/> | 6<br><input type="checkbox"/> |
| 3. Have you <u>tried</u> to avoid eating foods which you like in order to influence your shape or weight?  | 0<br><input type="checkbox"/> | 1<br><input type="checkbox"/> | 2<br><input type="checkbox"/> | 3<br><input type="checkbox"/> | 4<br><input type="checkbox"/> | 5<br><input type="checkbox"/> | 6<br><input type="checkbox"/> |
| 4. Have you tried to follow definite rules regarding your eating in order to influence your shape or weight; for example, a calorie limit, a set amount of food, or rules about what or when you should eat? | 0<br><input type="checkbox"/> | 1<br><input type="checkbox"/> | 2<br><input type="checkbox"/> | 3<br><input type="checkbox"/> | 4<br><input type="checkbox"/> | 5<br><input type="checkbox"/> | 6<br><input type="checkbox"/> |
| 5. Have you wanted your stomach to be empty?   | 0<br><input type="checkbox"/> | 1<br><input type="checkbox"/> | 2<br><input type="checkbox"/> | 3<br><input type="checkbox"/> | 4<br><input type="checkbox"/> | 5<br><input type="checkbox"/> | 6<br><input type="checkbox"/> |
| 6. Has thinking about food or its calorie content made it much more difficult to concentrate on things you're interested in; for example, read, watch TV or follow a conversation?                           | 0<br><input type="checkbox"/> | 1<br><input type="checkbox"/> | 2<br><input type="checkbox"/> | 3<br><input type="checkbox"/> | 4<br><input type="checkbox"/> | 5<br><input type="checkbox"/> | 6<br><input type="checkbox"/> |
| 7. Have you been afraid of losing control over eating?   | 0<br><input type="checkbox"/> | 1<br><input type="checkbox"/> | 2<br><input type="checkbox"/> | 3<br><input type="checkbox"/> | 4<br><input type="checkbox"/> | 5<br><input type="checkbox"/> | 6<br><input type="checkbox"/> |
| 8. Have you had episodes of binge eating?  | 0<br><input type="checkbox"/> | 1<br><input type="checkbox"/> | 2<br><input type="checkbox"/> | 3<br><input type="checkbox"/> | 4<br><input type="checkbox"/> | 5<br><input type="checkbox"/> | 6<br><input type="checkbox"/> |
| 9. Have you eaten in secret? (Do not count binges)   | 0<br><input type="checkbox"/> | 1<br><input type="checkbox"/> | 2<br><input type="checkbox"/> | 3<br><input type="checkbox"/> | 4<br><input type="checkbox"/> | 5<br><input type="checkbox"/> | 6<br><input type="checkbox"/> |

| On how many days out of the past 28 days... |  | No days                   | 1-5 days                  | 6-12 days                 | 13-15 days                | 16-22 days                | 23-27 days                | Every day                 |
|---|--|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| 10.   | Have you definitely wanted your stomach to be flat?  | 0<br><input type="text"/> | 1<br><input type="text"/> | 2<br><input type="text"/> | 3<br><input type="text"/> | 4<br><input type="text"/> | 5<br><input type="text"/> | 6<br><input type="text"/> |
| 11.   | Has thinking about shape or weight made it more difficult to concentrate on things you are interested in; e.g., read, watch TV or follow a conversation? | 0<br><input type="text"/> | 1<br><input type="text"/> | 2<br><input type="text"/> | 3<br><input type="text"/> | 4<br><input type="text"/> | 5<br><input type="text"/> | 6<br><input type="text"/> |
| 12.   | Have you had a definite fear that you might gain weight or become fat?   | 0<br><input type="text"/> | 1<br><input type="text"/> | 2<br><input type="text"/> | 3<br><input type="text"/> | 4<br><input type="text"/> | 5<br><input type="text"/> | 6<br><input type="text"/> |
| 13.   | Have you felt fat?   | 0<br><input type="text"/> | 1<br><input type="text"/> | 2<br><input type="text"/> | 3<br><input type="text"/> | 4<br><input type="text"/> | 5<br><input type="text"/> | 6<br><input type="text"/> |
| 14.   | Have you had a strong desire to lose weight?   | 0<br><input type="text"/> | 1<br><input type="text"/> | 2<br><input type="text"/> | 3<br><input type="text"/> | 4<br><input type="text"/> | 5<br><input type="text"/> | 6<br><input type="text"/> |

| Over the past 4 weeks (28 days) |   | None of the times         | A few of the times        | Less than ½ the time      | Half the time             | More than ½ the time      | Most of the time          | Every time                |
|---------------------------------|---|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| 15.                             | On what proportion of times that you have eaten have you <u>felt guilty</u> because of the effect on your shape or weight? (Do not count binges)              | 0<br><input type="text"/> | 1<br><input type="text"/> | 2<br><input type="text"/> | 3<br><input type="text"/> | 4<br><input type="text"/> | 5<br><input type="text"/> | 6<br><input type="text"/> |
| 16.                             | Have there been any times when you have felt that you have eaten what other people would regard as an unusually large amount of food given the circumstances? |                           | 0<br>No                   | <input type="text"/>      |                           | 1<br>Yes                  | <input type="text"/>      |                           |
| 17.                             | How many such episodes have you had over the past four weeks?   |                           |                           | <input type="text"/>      |                           |                           |                           |                           |
| 18.                             | During how many of these episodes of overeating did you have a sense of having lost control over your eating?   |                           |                           | <input type="text"/>      |                           |                           |                           |                           |

19. Have you had other episodes of eating in which you have had a sense of having lost control and eaten too much, but have not eaten an unusually large amount of food given the circumstances?

0

No

1

Yes

20. How many such episodes have you had over the past four weeks?
21. Have you made yourself sick (vomit) as a means of controlling your shape or weight? 0  1
22. How many times have you done this over the past four weeks?
23. Have you taken laxatives as a means of controlling your shape or weight? 0  1
24. How many times have you done this over the past four weeks?
25. Have you taken diuretics (water tablets) as a means of controlling your shape or weight? 0  1   
No Yes
26. How many times have you done this over the past four weeks?
27. Have you exercised hard as a means of controlling your shape or weight? 0  1   
No Yes
28. How many times have you done this over the past four weeks?

| <b>Over the past 4 weeks (28 days)</b>  | <i>Not at all</i>             | <b>Slightly</b>               |                               |                               | <b>Moderately</b>             |                               | <b>Markedly</b>               |                          |
|---|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|--------------------------|
| 29. Has your weight influenced how you think about (judge) yourself as a person?  | 0<br><input type="checkbox"/> | 1<br><input type="checkbox"/> | 2<br><input type="checkbox"/> | 3<br><input type="checkbox"/> | 4<br><input type="checkbox"/> | 5<br><input type="checkbox"/> | 6<br><input type="checkbox"/> | <input type="checkbox"/> |
| 30. Has your shape influenced how you think about (judge) yourself as a person?   | 0<br><input type="checkbox"/> | 1<br><input type="checkbox"/> | 2<br><input type="checkbox"/> | 3<br><input type="checkbox"/> | 4<br><input type="checkbox"/> | 5<br><input type="checkbox"/> | 6<br><input type="checkbox"/> | <input type="checkbox"/> |
| 31. How much would it upset you if you had to weigh yourself once a week for the next four weeks?   | 0<br><input type="checkbox"/> | 1<br><input type="checkbox"/> | 2<br><input type="checkbox"/> | 3<br><input type="checkbox"/> | 4<br><input type="checkbox"/> | 5<br><input type="checkbox"/> | 6<br><input type="checkbox"/> | <input type="checkbox"/> |
| 32. How dissatisfied have you felt about your weight?   | 0<br><input type="checkbox"/> | 1<br><input type="checkbox"/> | 2<br><input type="checkbox"/> | 3<br><input type="checkbox"/> | 4<br><input type="checkbox"/> | 5<br><input type="checkbox"/> | 6<br><input type="checkbox"/> | <input type="checkbox"/> |
| 33. How dissatisfied have you felt about your shape?  | 0<br><input type="checkbox"/> | 1<br><input type="checkbox"/> | 2<br><input type="checkbox"/> | 3<br><input type="checkbox"/> | 4<br><input type="checkbox"/> | 5<br><input type="checkbox"/> | 6<br><input type="checkbox"/> | <input type="checkbox"/> |
| 34. How concerned have you been about other people seeing you eat?  | 0<br><input type="checkbox"/> | 1<br><input type="checkbox"/> | 2<br><input type="checkbox"/> | 3<br><input type="checkbox"/> | 4<br><input type="checkbox"/> | 5<br><input type="checkbox"/> | 6<br><input type="checkbox"/> | <input type="checkbox"/> |
| 35. How uncomfortable have you felt seeing your body; for example, in shop window reflections, while undressing or taking a bath or shower?         | 0<br><input type="checkbox"/> | 1<br><input type="checkbox"/> | 2<br><input type="checkbox"/> | 3<br><input type="checkbox"/> | 4<br><input type="checkbox"/> | 5<br><input type="checkbox"/> | 6<br><input type="checkbox"/> | <input type="checkbox"/> |
| 36. How uncomfortable have you felt about others seeing your body; for example, in communal changing rooms, when swimming or wearing tight clothes? | 0<br><input type="checkbox"/> | 1<br><input type="checkbox"/> | 2<br><input type="checkbox"/> | 3<br><input type="checkbox"/> | 4<br><input type="checkbox"/> | 5<br><input type="checkbox"/> | 6<br><input type="checkbox"/> | <input type="checkbox"/> |



## Appendix 5 - Revised Social Anhedonia Scale

Please answer each item true or false. Please do not skip any items. It is important that you answer every item, even if you are not quite certain which the best answer is. An occasional item may refer to experiences which you have had only when taking drugs. Unless you have had the experience at other times, mark it as if you have not had that experience.

Some items may sound like others, but all of them are slightly different. Answer each item individually, and don't worry about how you answered previous items that were somewhat similar.

Circle either: T = True or F = False

- |   |   |   |
|---|---|---|
| 1. Having close friends is not as important as many people say  | T | F |
| 2. I attach very little importance to having close friends  | T | F |
| 3. I prefer watching television to going out with other people  | T | F |
| 4. A car ride is much more enjoyable if someone is with me  | T | F |
| 5. I like to make long distance phone calls to friends and relatives  | T | F |
| 6. Playing with children is a real chore  | T | F |
| 7. I have always enjoyed looking at photographs of friends  | T | F |
| 8. Although there are things that I enjoy doing by myself, I usually seem to have more fun when I do things with other people | T | F |
| 9. I sometimes become deeply attached to people I spend a lot of time with  | T | F |
| 10. People sometimes think that I am shy when I really just want to be left alone   | T | F |
| 11. When things are going really good for my close friends, it makes me feel good too   | T | F |
| 12. When someone close to me is depressed, it brings me down also   | T | F |
| 13. My emotional responses seem very different from those of other people   | T | F |
| 14. When I am home alone, I often resent people telephoning me or knocking on my door   | T | F |

- |   |   |   |
|---|---|---|
| 15. Just being with friends can make me feel really good  | T | F |
| 16. When things are bothering me, I like to talk to other people about it                                     | T | F |
| 17. I prefer hobbies and leisure activities that do not involve other people                                  | T | F |
| 18. It's fun to sing with other people  | T | F |
| 19. Knowing that I have friends who care about me gives me a sense of security                                | T | F |
| 20. When I move to a new city, I feel a strong need to make new friends                                       | T | F |
| 21. People are usually better off if they stay aloof from emotional involvements with most others             | T | F |
| 22. Although I know I should have affection for certain people, I don't really feel it                        | T | F |
| 23. People often expect me to spend more time talking with them than I would like                             | T | F |
| 24. I feel pleased and gratified as I learn more and more about the emotional life of my friends              | T | F |
| 25. When others try to tell me about their problems and hangups, I usually listen with interest and attention | T | F |
| 26. I never had really close friends in high school   | T | F |
| 27. I am usually content to just sit alone, thinking and daydreaming  | T | F |
| 28. I'm much too independent to really get involved with other people   | T | F |
| 29. There are few things more tiring than to have a long, personal discussion with someone                    | T | F |
| 30. It made me sad to see all my high school friends go their separate ways when high school was over         | T | F |
| 31. I have often found it hard to resist talking to a good friend, even when I have other things to do        | T | F |
| 32. Making new friends isn't worth the energy it takes  | T | F |
| 33. There are things that are more important to me than privacy   | T | F |

- |  |   |   |
|--|---|---|
| 34. People who try to get to know me better usually give up after a while                                  | T | F |
| 35. I could be happy living alone in a cabin in the woods or mountains                                     | T | F |
| 36. If given the choice, I would much rather be with others than be alone                                  | T | F |
| 37. I find that people too often assume that their daily activities and opinions will be interesting to me | T | F |
| 38. I don't really feel very close to my friends   | T | F |
| 39. My relationships with other people never get very intense  | T | F |
| 40. In many ways, I prefer the company of pets to the company of people                                    | T | F |

## Appendix 6 - Work and Social Adjustment Scale

Please rate each of the following questions on a 0 to 8 scale: 0 indicates no impairment at all and 8 indicates very severe impairment. If you are not currently experiencing any physical or mental health problems, please answer the questions anyway.

1. Because of my disorder, my ability to work is impaired. 0 means not at all impaired and 8 means very severely impaired to the point that I can not work. (please circle)

0      1      2      3      4      5      6      7      8

2. Because of my disorder, my home management (cleaning, tidying, shopping, cooking, looking after home or children, paying bills) is impaired. 0 means not at all impaired and 8 means very severely impaired.

0      1      2      3      4      5      6      7      8

3. Because of my disorder, my social leisure activities (with other people, such as parties, bars, clubs, outings, visits, dating, and home entertainment) are impaired. 0 means not at all impaired and 8 means very severely impaired.

0      1      2      3      4      5      6      7      8

4. Because of my disorder, my private leisure activities (done alone, such as reading, gardening, collecting, sewing, walking alone) are impaired. 0 means not at all impaired and 8 means very severely impaired.

0      1      2      3      4      5      6      7      8

5. Because of my disorder, my ability to form and maintain close relationships with others, including those I live with, is impaired. 0 means not at all impaired and 8 means very severely impaired.

0      1      2      3      4      5      6      7      8

## Appendix 7 – Hospital Anxiety and Depression Scale

Read each item below and mark the reply which comes closest to how you have been feeling in the past week. Don't take too long over your replies, your immediate reaction to each item will probably be more accurate than a long, thought out response.

|  |                                   |   |   |
|--|-----------------------------------|---|---|
| <b>I feel tense or "wound up"</b>  |                                   | <b>I feel as if I am slowed down</b>                                      |   |
| 3  | Most of the time                  | Nearly all of the time  | 3 |
| 2  | A lot of the time                 | Very often  | 2 |
| 1  | From time to time, occasionally   | Sometimes   | 1 |
| 0  | Not at all                        | Not at all  | 0 |
| <b>I still enjoy the things I used to enjoy</b>                                    |                                   | <b>I get a sort of frightened feeling like butterflies in the stomach</b> |   |
| 0  | Definitely as much                | Not at all  | 0 |
| 1  | Not quite so much                 | Occasionally  | 1 |
| 2  | Only a little                     | Quite often   | 2 |
| 3  | Hardly at all                     | Very often  | 3 |
| <b>I get a sort of frightened feeling as if something awful is about to happen</b> |                                   | <b>I have lost interest in my appearance</b>                              |   |
| 3  | Very definitely and quite badly   | Definitely  | 3 |
| 2  | Yes, but not too badly            | I don't take as much care as I should                                     | 2 |
| 1  | A little, but it doesn't worry me | I may not take quite as much care   | 1 |
| 0  | Not at all                        | I take just as much care as ever  | 0 |
| <b>I can laugh and see the funny side of things</b>                                |                                   | <b>I feel restless as if I have to be on the move</b>                     |   |
| 0  | As much as I always could         | Very much indeed  | 3 |
| 1  | Not quite so much now             | Quite a lot   | 2 |
| 2  | Definitely not so much            | Not very much   | 1 |
| 3  | Not at all                        | Not at all  | 0 |
| <b>Worrying thoughts go through my mind</b>  |                                   | <b>I look forward with enjoyment to things</b>                            |   |
| 3  | A great deal of time              | As much as I ever did   | 0 |
| 2  | A lot of the time                 | Rather less than I did  | 1 |
| 1  | Not too often                     | Definitely less than I used to  | 2 |
| 0  | Very little                       | Hardly at all   | 3 |
| <b>I feel cheerful</b>   |                                   | <b>I get a sudden feeling of panic</b>                                    |   |
|  |                                   |   | A |

|   |                  |                   |   |
|---|------------------|-------------------|---|
| 3 | Never            | Very often indeed | 3 |
| 2 | Not often        | Quite often       | 2 |
| 1 | Sometimes        | Not very often    | 1 |
| 0 | Most of the time | Not at all        | 0 |

---

|   |   |   |          |
|---|---|---|----------|
|   | <b>I can sit at ease and feel relaxed</b> | <b>I can enjoy a good book or radio or television programme</b> | <b>D</b> |
| 0 | Definitely                                | Often   | 0        |
| 1 | Usually                                   | Sometimes   | 1        |
| 2 | Not often                                 | Not often   | 2        |
| 3 | Not at all                                | Very seldom   | 3        |

## Appendix 8 – Demographic Questionnaire

The information that you give us on this sheet will be treated as strictly confidential.

It is optional to provide your name

Thank you for participating in this study.

Name (optional):.....

Email (optional):.....

### Questions for all participants:

Today's Date: \_\_/\_\_/\_\_

Date of birth: \_\_/\_\_/\_\_ Age:\_\_\_\_

Sex:     Male     Female

Is English your first language? Yes / No

What is your ethnicity?.....

Are you currently receiving any medication: Yes / No

If yes, please give details .....

Have you ever been diagnosed with a neurological condition? Yes / No

If yes, please give details.....

What is your current or most recent occupation?

.....

What is your current employment status?

- |                                  |  |
|----------------------------------|--|
| <input type="radio"/> Full time  | <input type="radio"/> Retired              |
| <input type="radio"/> Part time  | <input type="radio"/> Sick leave           |
| <input type="radio"/> Unemployed | <input type="radio"/> House wife / husband |
| <input type="radio"/> Student    | <input type="radio"/> Other .....(please   |
- specify)

If you are unemployed, please indicate for how long you have been unemployed for and what your previous occupation was.....

What is the highest level of education you completed?

- No qualifications
- O Level / GCSE
- A Level / NVQ
- Diploma / BTEC
- University Degree
- Postgraduate Degree
- Other.....(please specify)

How many years of education have you received? .....

What is your marital status?

- Married
- Living together
- Single
- In a relationship
- Divorced
- Separated
- Widowed

Who lives in your household with you? (e.g. mum, brother, 2 friends)

.....

Has anyone in your family been diagnosed with a psychiatric condition? Yes / No

If yes, please give details.....

Who is this person to you?.....

**Participants currently suffering from an eating disorder:**

If you have an eating disorder, is it

- anorexia nervosa
- bulimia nervosa
- other – please specify \_\_\_\_\_

If you have an eating disorder at the moment, for how many years have you had an eating disorder?.....

Have you had a previous hospital admission for an eating disorder? Yes/No

If so, how many? .....

**Participants recovered from an eating disorder:**

If you have recovered from an eating disorder, for how many years do you consider yourself to be recovered \_\_\_\_\_

If you have recovered from an eating disorder, have you previously experienced:

- anorexia nervosa
- bulimia nervosa
- other – please specify \_\_\_\_\_

If you have recovered from an eating disorder, for how many years in total were you unwell with the eating disorder? \_\_\_\_\_

Have you had a previous hospital admission for an eating disorder? Yes/No

If so, how many? .....



**Appendix 9 - National Adult Reading List – List of Words**

|           |  |             |  |
|-----------|--|-------------|--|
|           |  |             |  |
| CHORD     |  | SUPERFLUOUS |  |
| ACHE      |  | SIMILE      |  |
| DEPOT     |  | BANAL       |  |
| AISLE     |  | QUADRUPED   |  |
| BOUQUET   |  | CELLIST     |  |
| PSALM     |  | FACADE      |  |
| CAPON     |  | ZEALOT      |  |
| DENY      |  | DRACHM      |  |
| NAUSEA    |  | AEON        |  |
| DEBT      |  | PLACEBO     |  |
| COURTEOUS |  | ABSTEMIOUS  |  |
| RAREFY    |  | DETENTE     |  |
| EQUIVOCAL |  | IDYLL       |  |
| NAIVE     |  | PUERPERAL   |  |
| CATACOMB  |  | AVER        |  |
| GAOLED    |  | GAUCHE      |  |
| THYME     |  | TOPIARY     |  |
| HEIR      |  | LEVIATHAN   |  |
| RADIX     |  | BEATIFY     |  |
| ASSIGNATE |  | PRELATE     |  |
| HIATUS    |  | SIDEREAL    |  |
| SUBTLE    |  | DEMESNE     |  |
| PROCREATE |  | SYNCOPE     |  |
| GIST      |  | LABILE      |  |
| GOUGE     |  | CAMPANILE   |  |

### Appendix 10 – National Adult Reading Test scoring key

| Number of errors | IQ score |
|------------------|----------|
| 0                | 131      |
| 1                | 129      |
| 2                | 127      |
| 3                | 126      |
| 4                | 124      |
| 5                | 123      |
| 6                | 122      |
| 7                | 121      |
| 8                | 120      |
| 9                | 118      |
| 10               | 117      |
| 11               | 116      |
| 12               | 116      |
| 13               | 115      |
| 14               | 113      |
| 15               | 112      |
| 16               | 111      |
| 17               | 110      |
| 18               | 108      |
| 19               | 107      |
| 20               | 106      |
| 21               | 105      |
| 22               | 103      |
| 23               | 102      |
| 24               | 101      |
| 25               | 100      |
| 26               | 98       |
| 27               | 97       |
| 28               | 96       |
| 29               | 95       |
| 30               | 94       |
| 31               | 92       |
| 32               | 92       |
| 33               | 90       |
| 34               | 89       |
| 34               | 87       |
| 35               | 86       |
| 36               | 85       |
| 36               | 84       |
| 37               | 82       |
| 36               | 86       |
| 37               | 85       |

|    |    |
|----|----|
| 38 | 84 |
| 39 | 82 |
| 40 | 81 |
| 41 | 80 |
| 42 | 79 |
| 43 | 77 |
| 44 | 76 |
| 45 | 75 |

**PART TWO: Service Evaluation Project**

**Treatment Fidelity in a Motivational Interviewing Intervention Provided to Carers of  
People with Eating Disorders**

**Supervised by Prof Janet Treasure**

## **Acknowledgements**

I would like to express my gratitude and thanks to Janet for supervising this project and for her wisdom, support and guidance. Thank you to Dr Pam McDonald, Gill Todd and Becky Hibbs who Janet and myself worked with to write up this work up for publication. Thank you to the carer coaches who gave their time to be trained in motivational interviewing and provide the coaching sessions to carers of people with eating disorders who deal with really difficult illnesses and are truly phenomenal people. I hope the feedback from this project will encourage us all to keep working on our MI skills.

## **Abstract**

The South London and Maudsley NHS Foundation Trust Eating Disorders Service routinely offers a 10 session telephone based intervention for carers of people with eating disorders using the Motivational Interviewing directive, client-centred model of counselling style which is designed to reduce the carer's expressed emotion and improve carer and patient mental health outcomes. This service evaluation aimed to explore treatment integrity which relates to whether the intervention was delivered as intended. The 20 minute transcripts of 33 carers (22 mothers, 9 fathers and 2 male partners) of 28 patients with anorexia nervosa, 2 patients with bulimia nervosa and 3 patients with eating disorder not otherwise specified anorexia type were coded for treatment integrity using the Motivational Interviewing Treatment Integrity Code 2.0. There were small to medium sized effects for treatment integrity, with carers receiving sessions with higher treatment integrity tending to have greater reductions in anxiety and depression and expressed emotion and patients whose carers received sessions higher in treatment integrity also tended to have greater improvements in depression and anxiety, eating disorder symptoms and body mass index, with small to medium effect sizes. Carers receiving the MI intervention from coaches who had coached more families had significantly reduced expressed emotion and hostility and criticism and patients whose carer was coached by a more experienced coach with a greater number of years of training in MI had significantly greater improvements in eating disorder symptoms and body mass index. The service should continue to invest in the training and supervision of those providing the MI intervention as it may improve health outcomes and reduce costs associated with repeated hospitalisation and carer burden.

## **1.0 Introduction**

The overall aim of this service evaluation project was to explore how closely therapists adhered to a Motivational Interviewing (MI) treatment provided routinely to carers of people using the eating disorder (ED) service at the South London and Maudsley NHS Foundation Trust and to examine whether greater treatment fidelity was associated with better mental health outcomes for both carers and patients. This section of the report aims to introduce the concept of treatment fidelity, explain the treatment context and describe the treatment for which fidelity is to be examined before finally exploring the reasons why it was useful to explore treatment fidelity in this service.

## **2.0: Treatment Fidelity**

The term ‘treatment fidelity’ is used to describe a methodological strategy that is used to monitor interventions. Essentially, it involves exploring how closely a therapist adheres to and is aligned to the techniques, style and guidelines within a particular therapeutic intervention. The goal of this methodology is to enhance the reliability and validity of the intervention (Borrelli et al. 2005). By enhancing treatment fidelity, it then becomes possible to have a higher level of confidence that the dependent variable (changes in outcome) can be attributed to the independent variable (the intervention). Examining treatment fidelity also contributes to improved external validity, as it can reduce random effects and other confounds. This in turn may increase the likelihood of generalisation to other settings (Moncher & Prinz, 1991). If treatment fidelity is not assessed, potentially powerful interventions may be subsequently rejected by the scientific community (Henggeler et al. 1997). Specifically, this service evaluation is concerned with exploring an aspect of treatment fidelity termed ‘treatment integrity,’ which refers to whether an intervention is delivered as intended (Borrelli et al. 2005).

## **3.0 Description of Treatment**

The treatment that will be explored in this service evaluation is called Motivational Interviewing (MI). MI was first described by Miller & Rollnick (1991) and can be defined as a directive, patient-centred counselling style that aims to help patients explore and resolve their ambivalence about behaviour change (Miller & Rollnick, 2001; Treasure, 2004). MI is delivered using a particular therapeutic style using praise, warmth and empathy and also encompasses particular techniques, including directive listening, summaries and the development of discrepancy.

A central component of MI is that the client's motivation to change is enhanced only when they themselves explore the benefits and costs associated with change and thus the therapist works collaboratively with the client to facilitate the client to produce and gently negotiate their own arguments for and against change. This avoids conflict and the client putting up defences which prevent change and the therapist's role is then to use the four core principles of MI to enhance motivation to change. These are:-

1) Express empathy through reflective listening which enables the therapist to show understanding of the client's position and facilitates the client's exploration of their motivations to change (e.g.: Client: It feels like I've hit rock bottom and I am paralysed, Therapist: You've hit rock bottom and you are paralysed. I can really get a sense of just how tough things are at the moment);

2) Develop discrepancy, which involves helping the client to explore differences between their current behaviour and their core values (e.g.: Client: I hate the fact that I'm still drinking but I can't think about giving up, Therapist: Part of you wants to stop drinking and part of you wants to hold onto this behaviour);

3) Side stepping or rolling with resistance, which relates to using empathy and understanding to avoid conflict and at times, going along with the client's resistance to change to help them further develop discrepancy (e.g.: Client: I don't feel I can ever change, Therapist: So there's nothing you can do to make things different?);



4) Supporting self-efficacy through building confidence in the client that change can happen (e.g.: Client: I'll try my best to make this small change, Therapist: I really trust in your ability and desire to make this change).

The therapist aims to enhance 'change talk' which means that they will listen out for, attend to and differentially reinforce statements made by the client in which they begin to discuss their intention to change. Other MI techniques include open questions, affirmations, summaries and praise to elicit statements that encourage change, including problem recognition, and the expression of desire, ability, concern and intention to change. For example, the reflective listening style uses simple and complex reflections and summaries to amplify change statements over and above statements which reflect the status quo. The therapist remains accepting and affirming of the client's freedom to choose to change or to remain the same and of the direction in which the client may choose to change.

The therapist watches carefully for the client's position in the stages of change cycle (pre-contemplation, contemplation, preparation, action and maintenance) described by Prochaska and DiClemente (1983) and matches their interventions to the stage of change of the client. For example, if the client is in the contemplation stage of change, the therapist may use a decisional balance exercise to help the client to explore the pros and cons of changing or keeping the status quo. How well the therapist adheres to MI as a treatment can be assessed using the Motivational Interviewing Treatment Integrity Code 2.0 (MITI) (Moyers et al., 2003) which is a validated and reliable coding system (Pierson et al. 2007) used to assess treatment integrity in MI. The MITI can be used as a training tool to provide feedback to therapists with the aim of enhancing the use of MI skills in sessions. It can also be used as a way to audit practice or as a research tool and treatment integrity to MI has recently been reported for a school nurse led intervention aimed at increasing physical activity (Robbins et al., 2012) and for a nurse led intervention to increase adherence to treatment in diabetes (Maissi et al., 2011). Daeppen, Bertholet and Gaume (2010) have shown that for people with alcoholism accessing an MI brief intervention, there were better physical and mental health outcomes for clients at 12 month follow-up for clients whose counsellor had

greater MI treatment fidelity. Counsellors with poorer treatment fidelity were only effective where the client was more motivated to change and in the action phase.

### **3.1 The Use of Motivational Interviewing in Helping People to Change Behaviour**

Although MI was originally used to help people with substance abuse problems, its use has rapidly expanded to patients with other mental and physical health difficulties (Westra et al., 2011). MI has been used to increase adherence to medication in people who are HIV positive (Hill & Kavookjian, 2012), those with bipolar disorder (Laakso, 2012) and diabetes (Maissi et al., 2011) and to increase healthy eating and exercise in teenagers who are overweight or obese (Macdonell et al., 2012) and adults (Armstrong et al., 2011).

### **3.2 The Role of Motivational Interviewing in Helping People with Eating Disorders to Change their Behaviours**

MI has also been used to help people with EDs to change their behaviour. For example, using a group based MI intervention, Cassin et al (2008) found a greater proportion of women with binge eating disorder (27.8%) were able to abstain from binge eating compared to those in a self-help treatment control group (11.1%) and 87% of those participating in MI no longer met diagnostic criteria for binge eating disorder compared to 57.4% of the control group. In inpatients with anorexia nervosa (AN), Wade et al (2009) found that MI was associated with less treatment drop out, a higher readiness to change and improved symptomatology compared to treatment as usual. It has also been suggested that delivering MI to carers looking after a loved one with an ED may help to reduce the high levels of depression and anxiety present in around 50% of carers to a degree that constitutes clinical levels of psychological illness (Zabana et al., 2009), high carer burden and the high expressed emotion (criticism, hostility and emotional over-involvement), a factor related to poorer outcome in people suffering from EDs (Kyriacou et., 2008) which can be reduced using an MI based skills training programme (Sepulveda et al., 2010). Given that EDs can often have a severe and enduring illness course, with a subgroup of individuals who remain ill and

find it extremely difficult to change (Vrabel et al., 2008) and the lack of first line evidence based treatments for adults with AN in the NICE Guidelines (National Institute of Clinical Excellence, 2004), specialist ED treatment centres are increasingly offering a motivational enhancement approach, incorporating the principles of MI (Bauer & Treasure, 2003).

### **3.3 Using Motivational Interviewing to Help Carers of People with Eating Disorders**

At the national specialist eating disorder services of the South London and Maudsley NHS Foundation Trust, in line with current guidelines that family intervention may contribute to successful recovery from AN (National Institute of Clinical Excellence, 2004; Schmidt & Treasure, 2006), families are routinely offered an MI based intervention which involves supporting carers by providing knowledge and skills, helping them to recognise and change any behaviours they may be doing which inadvertently maintain the ED, as well as facilitating them to help their loved one change their ED behaviours. This is based on evidence that suggests supporting carers has a positive impact on the recovery of their loved one with an ED (Goddard et al. Submitted, Goddard et al., In press) and also that receiving support improves the well-being of the carer themselves (Sepulveda et al. 2008; Sepulveda et al. 2010).

### **3.4 Description of the Motivational Interviewing Intervention Examined in this Service Evaluation**

The MI intervention consists of 10 sessions of telephone coaching delivered by an experienced carer coach using Motivational Interviewing (MI). The experienced carer coaches currently providing the intervention are predominantly carers of service users who have previously recovered from an eating disorder, but coaches can also be professional carers who may work academically and/or clinically within SLaM. The coaches receive intensive training through regular half day or full day face to face workshops and a distance learning course provided by King's College London. Supervision is provided by a Clinical Nurse Specialist who is an expert in treating EDs. The MI sessions are offered to anyone who identifies themselves as the main carer for

the SLaM patient, and this tends to be the parents, with five sessions being offered to the mother and five to the father. The 10 sessions offered to the family begin with an exploration of current problems and what the carer has tried before, and then focus on using MI to facilitate the carer to change their behaviours and communication style. For example, open questions and reflective listening could be used to help the carer explore whether driving around to several supermarkets to obtain a particular food item might be inadvertently accommodating the ED and the carer could be helped to develop discrepancy around whether or not they are able and willing to change this behaviour with the aim of helping them to think of other options that reduce ED behaviours and the burden of care they experience. Carers also have access to a skills-based book written specifically for carers of individuals with EDs (Treasure et al. 2007) which explains how best to help the sufferer using MI principals. The carers are also given 5 DVDs which provide both psychoeducation on EDs, scenarios depicting common difficulties experienced by people with EDs and those who are caring for them (for example, remaining consistent with following a meal plan after discharge) and an idea of how to use MI skills to communicate better with the person they are caring. The 10 MI coaching sessions are delivered over the telephone, last for 40 minutes and they are digitally recorded, with written consent collected from those receiving the phone calls. The coach aims to deliver the sessions within a 4 month period.

### **3.5 Justification for Exploring Motivational Interviewing Treatment Fidelity in this Service**

It would be helpful for the service to know whether or not they should invest the same, more or less time, training and expense in the MI intervention for carers and one way of exploring whether it is possible to train experienced carer coaches to deliver MI to a sufficient degree of treatment fidelity, and whether higher treatment fidelity is associated with better carer and patient mental well-being outcomes. It would also help the service in planning its future teaching and training for the MI intervention to know whether those with a greater length of training and more

experience in terms of the number of individuals they have worked with using MI is related to better outcomes for service users.

#### **4.0 Aims**

Therefore, the aim of this service evaluation is to explore treatment integrity using the MITI of coaches delivering the MI intervention to carers of patients with EDs accessing treatment at the South London and Maudsley NHS Foundation Trust eating disorder services. This will enable the service to audit its treatment quality and will provide feedback on how well the coaches are using MI techniques in the sessions. The service evaluation also aims to explore whether the outcomes of the carer and their loved one (the patient) differ if the treatment integrity is high compared to if the treatment integrity is low. This second aim seeks to address whether, if treatment integrity is associated with a greater improvement in the psychological difficulties reported by the carer and the patient, extra training should be provided to the coaches to enhance their treatment integrity, or, if there is no association between treatment integrity and carer and patient outcome, whether the service could consider spending less time and money on training the carers in the MI intervention. The outcome measures this second aim refers to are (for the carer) change in expressed emotion, criticism and hostility and emotional over-involvement, measured using the Family Questionnaire (Wiedemann et al., 2002), changes in depression and anxiety, measured using the Depression Anxiety and Stress Scale (DASS) (Lovibond & Lovibond, 1995a) and (for the patient) changes in depression and anxiety, measured using the DASS, change in ED symptoms measured using the global score of the Eating Disorders Examination Questionnaire (EDE-Q) (Fairburn & Beglin, 1994) and change in body mass index (weight/height<sup>2</sup>).

#### **5.0 Hypotheses**

There will be a difference in outcome (depression and anxiety, measured using the DASS and expressed emotion, measured using the Family Questionnaire for carers

whose intervention is associated with higher levels of treatment integrity, measured using the MITI, compared to lower treatment integrity.

Secondly, there will be a difference in outcome (depression and anxiety, measured using the DASS, change in body mass index and ED symptoms, measured using the EDE-Q for clients whose carer receives an intervention assessed to have higher levels of treatment integrity, measured using the MITI, compared to those sessions assessed to have lower treatment integrity.

Thirdly, it was predicted that coaches with a greater number of years of training in MI and greater experience of using MI in terms of the number of families they had worked with using this intervention would have greater treatment fidelity and the carers they were coaching and their loved ones (patients within the service) would have better outcomes (measured using DASS-21, EDE-Q, Family Questionnaire, body mass index) than those coached by carers with less experience and training.

## **6.0 Method**

### **6.1 Inclusion and Exclusion Criteria**

Inclusion criteria were that both baseline and follow-up data was required to have been collected and entered into the database at the time the service evaluation was being conducted and that at least one reasonable quality tape recording of one of the coaching sessions was available for the assessment of treatment integrity. Families for whom data was available from both the assessment and 12 month follow-up period were included in the analysis to permit an exploration of the impact of treatment integrity on outcome.

### **6.2 Measures**

The outcome data were collected on assessment and at 12 month follow-up, after the coaching had been delivered to the carer. The carer and the patient were given paper

copies of the measures and handed these into the clinic after completion. The following measures administered routinely by the clinic were used in the service evaluation and copies are available in the Appendix at the end of this section of the thesis.

#### *6.2.1 The Family Questionnaire (Wiedemann et al., 2002)*

This is a 20 item self-report questionnaire with responses provided on a Likert scale from 1 to 4. The measure is designed to measure the emotional climate in families (expressed emotion) and the scale provides a quantitative measure of the levels of emotional over involvement, criticism and hostility shown by the carer. It is a widely used and well validated measure and has shown good internal consistency of subscales (ranging from 0.78 to 0.80 for emotional over-involvement and from 0.91 to 0.92 for criticism. Higher scores relate to high levels of emotional over involvement, criticism and hostility. The difference between levels of expressed emotion, criticism and hostility and emotional over involvement at 12 month follow-up compared to assessment were calculated and used as the outcome variables in this service evaluation.

#### *6.2.2 Depression, Anxiety and Stress Scale (DASS) – 21 Item Version (Lovibond & Lovibond, 1995a).*

This 21 item self-report measure assesses levels of depression, anxiety (and stress, not included as an outcome in this service evaluation project), each assessed using 7 items. The DASS-21 uses a three point scale which ranges from 0: did not apply to me over the past week to 2: applied to me very much or most of the time over the past week. The clinical cut-offs suggested for the measure are >5 for depression, and >4 for anxiety. The measure has been found to offer good internal consistency, with Lovibond and Lovibond (1995b) reporting Cronbach's alpha's of 0.91 for depression and 0.84 for anxiety. The differences between anxiety and depression at assessment and 12 month follow-up were used as the outcome variables in this service evaluation

### *6.2.3 Eating Disorder Examination Questionnaire (EDE-Q) Fairburn and Beglin (1994)*

The EDE-Q is a 36-item self-report measure focusing on ED behaviours and cognitions during the past 28 days. Items addressing ED attitudes are scored using a 7-point scale. Subscales and a global score are calculated, with scores of four or higher on key items considered within the clinical range. Mond et al (2004) found the measure has good concurrent validity and acceptable criterion validity. The difference between the global EDE-Q score and assessment and 12 month follow-up was the outcome variable used in this service evaluation.

### *6.2.4 Body Mass Index (BMI)*

Patients are regularly weighed when attending treatment programmes within the service and their BMI on assessment and at 12 month follow-up were used in the service evaluation. This is calculated by taking their weight and dividing it by their height<sup>2</sup>. A BMI change outcome variable was calculated by subtracting BMI at 12 month follow-up from BMI at the start of the MI intervention.

### *6.2.5 Motivational Interviewing Treatment Integrity Code 2.0 (MITI) (Moyers et al. 2003)*

This well validated and reliable coding system (Pierson et al. 2007) was used to assess treatment integrity of the MI intervention delivered by the coaches. One 15 minute portion of one session per carer was selected at random from the available tape recordings. The 15 minute segment of the session was selected randomly from the session but was not started until at least 5 minutes into the phone call and did not encompass the last 5 minutes. This was to allow the coach adequate time to establish the session and to arrange the next session at the end of the current one and to increase the potency of the recording, as recommended by Waltz et al., (1993). A Trainee Clinical Psychologist (the candidate) who also holds a PhD in the psychology of eating disorders was trained to code the session segments using the MITI. This training included studying the training materials provided with the MITI and coding some



practice session segments and comparing them with another trained coder. Inter-rater reliability was ensured through comparing the coder's ratings of 10 session segments with two other coders, one a PhD student also investigating the psychology of eating disorders and another highly experienced coder who holds a PhD in psychology which explored the delivery of MI interventions to carers of people with EDs. There was a concordance rate of 87% between the three coders. The coding is recorded on a standardised form and the coder is trained to examine each utterance made by the coach and a behaviour count score is calculated based on the number of times the coach gives information, uses MI adherent (asking permission, affirming, emphasising control, support) and non MI adherent behaviours (advising, confronting and directing), the number of closed and open questions and the number of simple and complex reflections. The coder then provides two global ratings which are empathy/understanding (ranging from 1 (low) to 7 (high) and spirit (ranging from 1 (low) to 7 (high)). The global ratings and the behaviour counts were used as the outcome measures in this service evaluation. A suggested cut-off above which the individual is adherent to the principles and spirit of MI is above 4. An addition to the standardised form was made in which the coder identified the overall stage of change of the carer during the part of the session coded based on Prochaska and DiClemente's (1983) trans-theoretical model of change. The outcome variable here was a categorical one and related to whether the carer was in the pre-contemplation, contemplation, preparation, action or maintenance stages of change.

### **6.3 Procedure**

Transcripts of the MI sessions were collected from the coaches delivering the intervention and coded as described above. Inter rater reliability was obtained by double coding 10 of the session recordings. The outcome data for the carer and patients on assessment and at 12 month follow-up were obtained from the ED clinic database.

### **7.0 Results**

The final sample consisted of 33 carers. Within this group, 66.67% were mothers (n=22), 27.27% were fathers (n=9) and 6.06% (n=2) were partners of the individual they were caring for.

Of the 33 patients who were being cared for, 28 had AN, 3 had AN type EDNOS and 2 had BN. There were 30 female patients (90.9%) and 3 male patients (9.09%). The average age of the patients was 24.65 (SD=9.97) and their mean BMI when admitted to hospital was 14.48 (SD=1.48). They represented a relatively severe group, with a lowest ever BMI of 13.13 (SD=1.19) and an average of 2.04 (SD=1.58) previous hospital admissions, and an average duration of illness of 7.38 years (SD=7.68). Their self-reported age of onset was at 15.59 years (SD=2.46). The majority were inpatients (69.7%, n=23), with the others accessing day patient services (30.3%, n=10)

These 33 carers were coached by 10 different coaches who were mostly female (90%, n=9), and were predominantly experienced carers (70%, n=7) who had received the MI training having cared for a loved one with an ED. The remaining 3 coaches had all received some form of clinical training prior to the MI training provided for this intervention. One individual was a Trainee Clinical Psychologist, one was a Trainee Counselling Psychologist and the other had a diploma in Counselling. One coach had a personal experience of an ED and had fully recovered. Between them, the coaches had coached 72 families in total and the mean number of families coached was 8.03 (SD=3.49). The coaches had been receiving ongoing training in, and practicing MI for an average of 3.44 years (SD=0.79). The coaches received a mean of 2 supervision sessions per family (SD=1).

The overall MITI components for the coded sessions are displayed in Table 1, below

Table 1: Means (standard deviations) for the Motivational Interviewing Treatment Integrity Code

| MITI Components         | Mean (SD)    |
|-------------------------|--------------|
| <b>Global Ratings</b>   |              |
| Empathy/Understanding   | 5.5 (1.05)   |
| Spirit                  | 5.00 (1.32)  |
| <b>Behaviour Counts</b> |              |
| Giving information      | 1.56 (1.79)  |
| MI adherent             | 11.34 (7.14) |
| Non MI adherent         | 2.75 (4.93)  |
| Closed Questions        | 2.84 (2.82)  |
| Open questions          | 7.06 (4.75)  |
| Simple reflections      | 1.88 (1.68)  |
| Complex reflections     | 10.69 (4.87) |
| Total reflections       | 12.56 (5.59) |

### 7.1 Carer Variables

Of the 33 carers coached, 9.09% (n=3) were in the pre-contemplation stage of change, 21.21% (n=7) were at the contemplation stage, 36.36% (n=12) were preparing for change, 27.27% (n=9) were in the action stage and 6.06% (n=2) were at the maintenance stage.

### 7.2 Coach Variables: *Motivational Interviewing Treatment Integrity Code Results*

Twenty two (66.67%) of the sessions coded had a MITI global score for spirit above the suggested cut-off of 4, with the remaining 11 (33.33%) scoring below this cut-off. The sessions (n=14) that were delivered by the 3 individuals with prior psychological training scored higher for MITI global spirit score (mean=5.93, sd=0.92) than the sessions facilitated by the experienced carers (n=19) (mean=4.26, sd=1.09),  $t=-4.610$ ,  $df=32$ ,  $p \leq 0.001$ ,  $D=1.63$ .

Table 2, below, provides the data for the carer and patient outcomes (changes in depression, anxiety, BMI, ED symptoms and expressed emotion between baseline and 12 month follow-up), comparing those whose coach provided the MI intervention with low treatment integrity (below cut-off of 4 on MITI) to those whose coach provided an intervention with high treatment integrity (above cut-off of 4 on MITI).

*Table 2: Patient and Carer Outcome Variables for High Motivational Interviewing Treatment Integrity and Low Motivational Interviewing Treatment Integrity*

| Outcome Measure                                 | Mean (SD) Low Treatment integrity (n=11) | Mean (SD) High Treatment integrity (n=22) | Test statistic          | Effect size (D) |
|---|--|---|-------------------------|-----------------|
| <b>Carer variables</b>                          |  |   |                         |                 |
| Depression (DASS-21)                            | -0.18 (5.4)                              | -4.59 (7.87)                              | t=1.804, df=32, p=0.08  | 0.62            |
| Anxiety (DASS - 21)                             | -0.91 (5.09)                             | -2.64 (4.62)                              | t=0.979, df=32, p=0.3   | 0.36            |
| Family Questionnaire-Expressed Emotion          | -4.06 (7.47)                             | -10.91 (10.57)                            | t=1.844, df=32, p=0.08  | 0.71            |
| Family Questionnaire-Hostility and Criticism    | -1.1 (2.88)                              | -3.82 (5.76)                              | t=1.405, df=32, p=0.17  | 0.54            |
| Family Questionnaire-Emotional over involvement | -3.91 (4.48)                             | -7.09 (6.92)                              | t=1.330, df=32, p=0.19  | 0.51            |
| <b>Patient Variables</b>                        |  |   |                         |                 |
| Depression (DASS-21)                            | -2.36 (10.34)                            | -6.05 (11.06)                             | t=0.943, df=32, p=0.4   | 0.34            |
| Anxiety (DASS - 21)                             | -3.82 (6.78)                             | -7.45 (7.16)                              | t=1.398, df=32, p=0.2   | 0.52            |
| Eating disorder symptoms (EDE-Q)                | 0.01 (1.26)                              | -0.93 (1.52)                              | t=1.853, df=32, p=0.08  | 0.64            |
| Body Mass Index                                 | 3.68 (2.09)                              | 3.03 (2.28)                               | t=0.764, df=32, p=0.451 | 0.29            |

df= degrees of freedom, D=Cohen's D effect size estimation (Cohen, 1988; 1992) ( $\text{mean}_1 - \text{mean}_2 / \text{pooled standard deviation}$ ), with an effect size of 0.2 defined as small, 0.5 defined as medium and 0.8 defined as large (Cohen, 1992). Means represent the difference in depression and anxiety measured using the Depression, Anxiety and Stress Scale 21 item version (DASS-21), eating disorder symptoms measured using the Eating Disorder Examination Questionnaire (EDE-Q), body mass index ( $\text{weight}/\text{height}^2$ ) and emotional over-involvement, hostility and criticism measured using the Family Questionnaire between the baseline and 12 month follow-up period during which the MI coaching sessions were provided. Negative values indicate a reduction in the outcome measure, whereas positive values indicate an increase in the outcome measure.

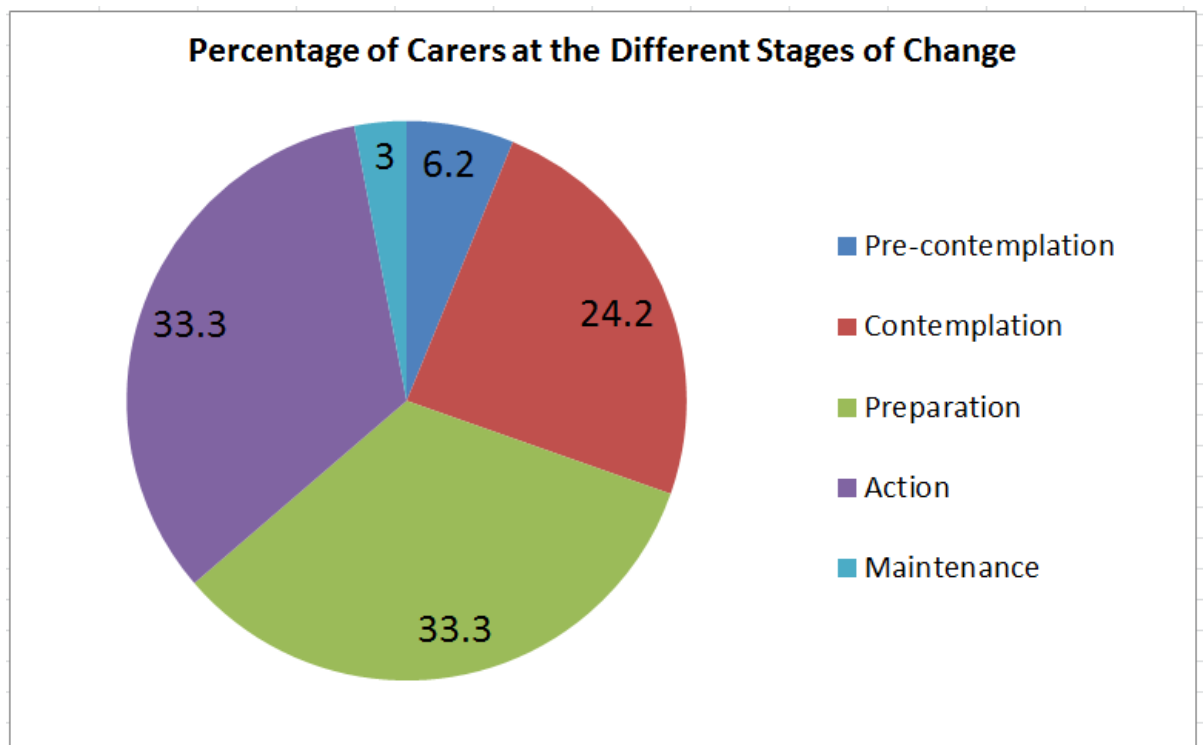
As illustrated in Table 2, above, there was a trend towards better outcome variables for carers who received the MI treatment with higher treatment integrity, with greater reductions in depression and anxiety with small to medium effect sizes and greater reductions in expressed emotion, emotional over-involvement and hostility and criticism with medium effect sizes. The same pattern was true for patients whose carers received the MI treatment with higher treatment integrity, as these patients reported greater reductions in depression and anxiety with small to medium effect

sizes, greater reductions in overall ED symptoms with a medium effect size and a greater improvement in body mass index with a small effect size. A limited number of these comparisons reached statistical significance and it is possible that the sample was limited in power.

### ***Carer Stage of Change and Treatment Fidelity***

Figure 1, below, shows how many carers were at each of the different stages of change described in the Transtheoretical Model (Prochaska & DiClemente, 1983).

*Figure 1: Percentage of Carers at the Different Stages of Change Described in the Transtheoretical Model*



Most carers were either in the preparation (n=11) or action (n=11) stages of change. The next most common stage was contemplation (n=8) and a small number were in pre-contemplation (n=2) and maintenance (n=1). An ANOVA was run to explore whether treatment fidelity measured by the MI spirit outcome variable was different

depending on which stage of change the carer was in. There was no main effect of stage of change on treatment fidelity:  $F(4,28)=0.252, p=0.9$ .

*Impact of Experience of using Motivational Interviewing and Length of Training in Motivational Interviewing on Treatment Fidelity and Carer and Patient Outcomes*

Nineteen out of 33 (57.58%) coaches scored above the mean of 8.03 (SD=3.49) for the number of families they had coached at the time the data was analysed. Twenty out of 33 (60.61%) coaches scored above the mean of 3.44 (SD=0.79) for the number of years they had been training in MI at the time the data was analysed.

Sessions delivered by coaches with a greater number of years of MI training who scored above the mean of 3.44 for years of MI training ( $n=20$ ) had a significantly higher global score for MI spirit on the MITI (mean=5.85, SD=1.34) than sessions delivered by coaches who scored below the mean ( $n=13$ ) (mean=4.40, SD=0.94)  $t=-3.64, df=31, p=0.001$  with a large effect size ( $D=1.19$ ). Sessions delivered by more experienced coaches who scored above the mean of 8.03 for the number of families coached ( $n=19$ ) had a significantly higher global score for MI spirit on the MITI (mean=5.47, SD=0.84) than sessions delivered by coaches who scored below the mean ( $n=14$ ) (mean=4.29, SD=1.54)  $t=2.84, df=31, p\leq 0.001$  with a large effect size ( $D=1.0$ ).

Table 3, below, provides outcome data for carers and their loved ones with an ED, comparing those coached by coaches with more MI experience (scoring above the mean for the number of families coached) and those coached by coaches with less MI experience.

*Table 3: Outcome Data for Carers and Patients based on the Experience the Coach had in Motivational Interviewing*

|  | Mean (SD) for sessions delivered by more experienced coaches n=19 | Mean (SD) for sessions delivered by less experienced coaches n=14 | Test statistic           | Effect size |
|--|---|---|--------------------------|-------------|
| <b>Carer Variables</b>                           |   |   |                          |             |
| Depression (DASS – 21)                           | -5.63 (4.97)  | 0.57 (8.79)   | t=-2.577, df=32, p=0.02  | 0.91        |
| Anxiety (DASS - 21)                              | -2.11 (4.63)  | -2.00 (5.14)  | t=-0.062, df=32, p=0.9   | 0.02        |
| Family Questionnaire- Expressed Emotion          | -13.06 (8.67)   | -1.66 (8.67)  | t=3.523, df=32, p=0.002  | 1.32        |
| Family Questionnaire- Hostility and Criticism    | -5.56 (4.19)  | 0.69 (4.64)   | t=-3.807, df=32, p=0.001 | 1.43        |
| Family Questionnaire- Emotional over involvement | -7.50 (6.79)  | -3.08 (5.04)  | t=-1.949, df=32, p=0.06  | 0.72        |
| <b>Patient variables</b>                         |   |   |                          |             |
| Depression (DASS-21)                             | -6.95 (9.51)  | -1.92 (11.55)   | t=-1.368, df=32, p=0.08  | 0.48        |
| Anxiety (DASS - 21)                              | -7.47 (5.97)  | -4.57 (8.43)  | t=-1.159, df=32, p=0.3   | 0.41        |
| Eating disorder symptoms (EDE-Q)                 | -1.22 (1.63)  | 0.17 (0.78)   | t=-2.934, df=32, p=0.006 | 1.04        |
| Body Mass Index                                  | 3.79 (2.44)   | 2.92 (1.98)   | t=-1.060, df=32, p=0.3   | 0.40        |

A more experienced coach scored equal to or above the mean of 8.03 for the number of families coached. A less experienced coach scored below the mean of 8.03 for the number of families coached. df= degrees of freedom, D=Cohen's D effect size estimation (Cohen, 1988; 1992) ( $\text{mean}_1 - \text{mean}_2 / \text{pooled standard deviation}$ ), with an effect size of 0.2 defined as small, 0.5 defined as medium and 0.8 defined as large (Cohen, 1992). Means represent the difference in depression and anxiety

measured using the Depression, Anxiety and Stress Scale 21 item version (DASS-21), eating disorder symptoms measured using the Eating Disorder Examination Questionnaire (EDE-Q), body mass index (weight/height<sup>2</sup>) and emotional over-involvement, hostility and criticism measured using the Family Questionnaire between the baseline and 12 month follow-up period during which the MI coaching sessions were provided. Negative values indicate a reduction in the outcome measure, whereas positive values indicate an increase in the outcome measure.

As shown in Table 3 above, for carers coached by a more experienced coach who scored above the mean of 8.03 for the number of families they had worked with within this intervention, there was a large sized, significant difference for expressed emotion and criticism and hostility measured using the Family Questionnaire, such that carers coached by more experienced coaches had greater reductions in these variables compared to those coached by less experienced coaches. There was a medium sized significant difference for depression, such that carers coached by more experienced coaches had a greater reduction in symptoms of depression, measured using the DASS-21 than those coached by less experienced coaches. However, once correcting for multiple testing using the Bonferroni correction ( $0.05/5=0.01$ ), this difference no longer remained significant. There was also a medium sized, albeit non-significant difference for emotional over involvement measured using the Family Questionnaire, with a trend towards carers coached by more experienced coaches having a greater reduction in depression than those coached by less experienced coaches. There was no difference between carers coached by more experienced coaches and those coached by less experienced coaches regarding anxiety.

For patients whose carer was coached by a more experienced coach, there was a large sized, significant difference for ED symptoms compared to those whose carer was coached by a less experienced coach. There were small sized, non-significant findings for the change in body mass index, depression and anxiety for the patient, with a trend towards those whose carer was coached by a more experienced coach having a greater improvement in body mass index, depression and anxiety compared to those whose carer was coached by a less experienced coach.

Table 4, below, provides outcome data for carers and their loved ones based on whether the carer was coached by a coach with more years of training in MI (scoring



above the mean for years of MI training received) or by a coach with fewer years of training in MI.

*Table 4: Outcome Data for Carers and Patients based on the Number of Years of Training the Coach had received in Motivational Interviewing*

|  | Mean (SD) for sessions delivered by coaches with more years of MI training n=20 | Mean (SD) for sessions delivered by coaches with fewer years of MI training n=13 | Test statistic         | Effect size |
|--|---|--|------------------------|-------------|
| <b>Carer Variables</b>                           |   |  |                        |             |
| Depression (DASS – 21)                           | -2.80 (6.21)  | -3.31 (9.23)   | t=0.189, df=32, p=0.9  | 0.07        |
| Anxiety (DASS - 21)                              | -1.50 (5.50)  | -2.92 (3.40)   | t=0.832, df=32, p=0.4  | 0.09        |
| Family Questionnaire- Expressed Emotion          | -9.09 (9.25)  | -6.09 (12.02)  | t=0.756, df=32, p=0.5  | 0.29        |
| Family Questionnaire- Hostility and Criticism    | -3.67 (5.32)  | -1.27 (5.31)   | t=-1.176, df=32, p=0.3 | 0.45        |
| Family Questionnaire- Emotional over involvement | -5.94 (4.77)  | -4.82 (8.61)   | t=-0.455, df=32, p=0.7 | 0.17        |
| <b>Patient variables</b>                         |   |  |                        |             |
| Depression (DASS-21)                             | -4.25 (11.75)   | -5.69 (8.78)   | t=0.378, df=32, p=0.7  | 0.13        |
| Anxiety (DASS - 21)                              | -8.69 (7.21)  | -4.65 (6.82)   | t=1.628, df=32, p=0.1  | 0.58        |
| Eating disorder symptoms (EDE-Q)                 | -0.89 (1.62)  | -0.15 (1.15)   | t=-1.380, df=32, p=0.2 | 0.51        |
| Body Mass Index                                  | 3.98 (1.61)   | 1.88 (2.49)  | t=2.750, df=32, p=0.01 | 1.05        |

**A coach with more years of Motivational Interviewing training scored equal to or above the mean of 3.44 for the number of years of MI training received. A coach with fewer years of Motivational Interviewing training scored below the mean of 3.44 for the number of years of MI training. df= degrees of freedom, D=Cohen’s D effect size estimation (Cohen, 1988; 1992) ( $\text{mean}_1 - \text{mean}_2 / \text{pooled standard deviation}$ ), with an effect size of 0.2 defined as small, 0.5 defined as medium and 0.8 defined**

as large (Cohen, 1992). Means represent the difference in depression and anxiety measured using the Depression, Anxiety and Stress Scale 21 item version (DASS-21), eating disorder symptoms measured using the Eating Disorder Examination Questionnaire (EDE-Q), body mass index ( $\text{weight}/\text{height}^2$ ) and emotional over-involvement, hostility and criticism measured using the Family Questionnaire between the baseline and 12 month follow-up period during which the MI coaching sessions were provided. Negative values indicate a reduction in the outcome measure, whereas positive values indicate an increase in the outcome measure.

As shown in Table 4, above, for carers whose coach scored above the mean of 3.44 for the number of years the coach had been in training for MI, there was a small sized non-significant difference for expressed emotion and criticism and hostility, measured by the Family Questionnaire, such that carers coached by coaches with a greater number of years of MI training had larger reductions in expressed emotion and criticism and hostility than carers coached by individuals with fewer years of MI training. There were no differences for emotional over involvement, measured using the Family Questionnaire, or depression and anxiety, measured by the DASS-21.

For patients whose carer was coached by a coach with a greater number of years of MI training, there was a large sized significant difference for change in body mass index, such that patients whose carer was coached by a coach with more years of MI training had a greater increase in body mass index than those whose carer was coached by a coach with fewer years of MI training. There were medium sized, albeit non-significant differences for anxiety, measured by the DASS-21 and ED symptoms measured using the EDE-Q, with a trend towards there being a greater improvement in symptoms of depression and ED symptoms for those patients whose carer was coached by a coach with more years of MI training than those whose carer was coached by a coach with fewer years of MI training. There was no difference between the groups for depression.

There was a weak, positive, non-significant correlation between the number of years of training in MI and the number of families coached ( $r=0.18$ ,  $p=0.4$ ), perhaps suggesting that factors other than feeling more confident in using MI because of more training may have been associated with some coaches having coached more families than others.

## **8.0 Discussion**

The aim of this service evaluation was to audit treatment integrity to an MI intervention delivered as part of routine practice to carers of inpatients with EDs accessing specialist ED treatment at the South London and Maudsley NHS Foundation Trust. The data show that it is possible to train experienced carer coaches who have previously cared for a loved one with an ED to deliver the intervention to an acceptable level of treatment fidelity, as well health professionals with a psychology or counselling background. Most carers (66.67%, n=22) received an intervention which scored above the cut-off for acceptable treatment integrity. The data indicate that whilst those with prior training in psychology or counselling tended to have greater treatment integrity scores, the experienced carers, who have received no prior specialist psychological training, can be trained to provide an intervention which, on average, was above the accepted cut-off for treatment integrity. Indeed, the mean of 4.26 (sd=1.09) for MI spirit is not significantly different than the mean reported for nurses delivering an MI intervention for people with diabetes (mean=4.6, sd=1.0) (Maissi et al., 2011),  $t=-1.338$ ,  $df=18$ ,  $p=0.2$ .

The first hypothesis which was that there would be a difference in outcome (depression and anxiety, measured using the DASS and expressed emotion, measured using the Family Questionnaire for carers whose intervention was associated with higher levels of treatment integrity, measured using the MITI, compared to lower treatment integrity, was supported by the data. Whilst not statistically significant, there were small to medium sized differences in the change in depression, anxiety and expressed emotion from assessment to 12 month follow-up, with a trend towards greater improvements for those whose intervention was higher in treatment integrity. Therefore, the MI intervention may be most effective where the therapist adheres most rigidly to its spirit.

The second prediction, which was that there would be a difference in outcome (depression and anxiety, measured using the DASS and ED symptoms, measured using the EDE-Q and body mass index for patients whose carer receives an intervention assessed to have higher levels of treatment integrity, measured using the MITI, compared to those sessions assessed to have lower treatment integrity, was also

supported by the data and although not statistically different, there were small to medium sized differences for the change in depression and anxiety, ED symptoms and body mass index, with a trend towards greater improvements for patients whose carer received an intervention higher in treatment integrity. Thus, it may be possible to indirectly influence these outcome variables in patients with EDs through supporting their carer and greater improvements may be observed when the MI intervention is delivered in a way that most closely matches its spirit.

The third hypothesis was also supported by the data, as coaches who had a greater number of years of MI training and who had coached a greater number of families had higher treatment fidelity than coaches who scored below the mean for the number of years of MI training received and the number of families coached. After correcting for multiple testing, there were a small number of differences in outcome for carers and patients depending on whether the coach was more experienced and had been training in MI for longer, such that carers coached by coaches who had worked with an above average number of families within the context of this intervention had greater reductions in expressed emotion and hostility and criticism, measured by the Family Questionnaire and patients whose carer was coached by these more experienced coaches had greater improvements in ED symptoms, measured by the EDE-Q and patients whose carer was coached by a coach who had a higher than average number of years of training in MI also had greater increases in BMI than those whose carer was coached by a coach with a lower than average number of years of MI training. Whilst this small number of significant differences may be due to Type 1 error, the medium to large effect sizes for the differences indicate that higher experience and more training are important in generating better outcomes for carers and patients.

Unlike Daepfen et al., (2010) the data did not suggest that treatment fidelity was associated with clients being in a particular stage of change.

### **8.1 Considerations and Recommendations for the Service**

The service evaluation provides data which indicate the MI intervention may have a beneficial effect on the depression, anxiety and expressed emotion of carers of people

with EDs and the MI sessions may also have an indirect, positive impact on the depression, anxiety, body mass index and ED symptoms of the patients themselves. Therefore, the data suggest that the service should continue to offer the MI intervention to carers and that investing in the training and supervision of the MI coaches is justified, as higher treatment integrity was associated with better symptomatic improvement in the carer as well as the patient. Indeed, it may be warranted to spend more time and effort in increasing the treatment integrity of this routine intervention by providing enhanced training and targeting those coaches whose sessions have lower treatment integrity and supporting them to improve their adherence to the spirit of MI. The data also have broader implications for the service as it is possible that by reducing expressed emotion, and ameliorating the carer's psychological distress, this enables the carer to provide better quality care for their loved one, thus reducing the potential for future costly hospitalisations and adding value to the service provision for carers.

## **8.2 Limitations**

This service evaluation may have lacked power, such that the small to medium sized differences between the outcomes associated with high and low treatment integrity only approached statistical significance for some comparisons. However, the sample size was limited by the availability of viable session recordings and the necessity for those whose sessions were successfully recorded to have also provided the assessment and 12 month follow-up data. The findings should be interpreted with caution due to this potential lack of power and in future the database could be analysed again when there is further availability of outcome data. The individuals scoring the sessions for treatment integrity were not blind to the aims of the service evaluation and this may have reduced the validity of the data. In future, it may be helpful to consider using external raters to reduce this potential confound. However, the author of this report was not involved with the collection of the outcome measures and this may have increased the validity of the data. Finally, it is important to consider that some of the variance in the improvements in the patient's mood, ED symptoms and body mass index may be due to the treatment they were accessing in the ED service rather than

an indirect effect of the coaching sessions received by their carer. Future work could also explore whether the coaches show higher treatment integrity when the carer they are working with is more motivated.

### **8.3 Summary**

In conclusion, it is possible to train individuals without a health professional background to provide a competent MI intervention. Delivering a high integrity MI intervention to carers of service users with EDs is a viable way of reducing psychological distress in carers and indirectly increasing the body mass index and reducing psychological distress and ED symptoms in patients. Continuing to invest in training and supervision of the MI coaches may enable the service to reduce costs by reducing repeat hospitalisations and increasing the value of the service provided to both patients and carers.

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**APPENDICES – Service Evaluation Project**

### Family Questionnaire

This questionnaire lists different ways in which families try to cope with everyday problems. For each item please indicate how often you have reacted to the patient in this way. There are no right or wrong responses. It is best to note the first response that comes to mind. Please respond to each question, and mark only one response per question.

|   | Never/<br>very<br>rarely | Rarely                | Often                 | Very<br>often         |
|---|--------------------------|-----------------------|-----------------------|-----------------------|
| 1 I tend to neglect myself because of him/her                           | <input type="radio"/>    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 2 I have to keep asking him/her to do things                            | <input type="radio"/>    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 3 I often think about what is to become of him/her                      | <input type="radio"/>    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 4 He/she irritates me   | <input type="radio"/>    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 5 I keep thinking about the reasons for his/her illness                 | <input type="radio"/>    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 6 I have to try not to criticize him/her                                | <input type="radio"/>    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 7 I can't sleep because of him/her                                      | <input type="radio"/>    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 8 It's hard for us to agree on things                                   | <input type="radio"/>    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 9 When something about him/her bothers me<comma> I keep it to myself    | <input type="radio"/>    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 10 He/she does not appreciate what I do for him/her                     | <input type="radio"/>    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 11 I regard my own needs as less important                              | <input type="radio"/>    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 12 He/she sometimes gets on my nerves                                   | <input type="radio"/>    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 13 I'm very worried about him/her                                       | <input type="radio"/>    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 14 He/she does some things out of spite                                 | <input type="radio"/>    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 15 I thought I would become ill myself                                  | <input type="radio"/>    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 16 When he/she constantly wants something from me<comma> it annoys me   | <input type="radio"/>    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 17 He/she is an important part of my life                               | <input type="radio"/>    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 18 I have to insist that he/she behave differently                      | <input type="radio"/>    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 19 I have given up important things in order to be able to help him/her | <input type="radio"/>    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 20 I'm often angry with him/her   | <input type="radio"/>    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

## Depression Anxiety and Stress Scale (21 item version)

# DASS<sub>21</sub>

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you *over the past week*. There are no right or wrong answers. Do not spend too much time on any statement.

*The rating scale is as follows:*

- 0 Did not apply to me at all
- 1 Applied to me to some degree, or some of the time
- 2 Applied to me to a considerable degree, or a good part of time
- 3 Applied to me very much, or most of the time

|    |  |   |   |   |   |
|----|--|---|---|---|---|
| 1  | I found it hard to wind down   | 0 | 1 | 2 | 3 |
| 2  | I was aware of dryness of my mouth   | 0 | 1 | 2 | 3 |
| 3  | I couldn't seem to experience any positive feeling at all  | 0 | 1 | 2 | 3 |
| 4  | I experienced breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion)           | 0 | 1 | 2 | 3 |
| 5  | I found it difficult to work up the initiative to do things  | 0 | 1 | 2 | 3 |
| 6  | I tended to over-react to situations   | 0 | 1 | 2 | 3 |
| 7  | I experienced trembling (eg, in the hands)   | 0 | 1 | 2 | 3 |
| 8  | I felt that I was using a lot of nervous energy  | 0 | 1 | 2 | 3 |
| 9  | I was worried about situations in which I might panic and make a fool of myself  | 0 | 1 | 2 | 3 |
| 10 | I felt that I had nothing to look forward to   | 0 | 1 | 2 | 3 |
| 11 | I found myself getting agitated  | 0 | 1 | 2 | 3 |
| 12 | I found it difficult to relax  | 0 | 1 | 2 | 3 |
| 13 | I felt down-hearted and blue   | 0 | 1 | 2 | 3 |
| 14 | I was intolerant of anything that kept me from getting on with what I was doing  | 0 | 1 | 2 | 3 |
| 15 | I felt I was close to panic  | 0 | 1 | 2 | 3 |
| 16 | I was unable to become enthusiastic about anything   | 0 | 1 | 2 | 3 |
| 17 | I felt I wasn't worth much as a person   | 0 | 1 | 2 | 3 |
| 18 | I felt that I was rather touchy  | 0 | 1 | 2 | 3 |
| 19 | I was aware of the action of my heart in the absence of physical exertion (eg, sense of heart rate increase, heart missing a beat) | 0 | 1 | 2 | 3 |
| 20 | I felt scared without any good reason  | 0 | 1 | 2 | 3 |
| 21 | I felt that life was meaningless   | 0 | 1 | 2 | 3 |

## Eating Disorders Examination Questionnaire

The following questions are concerned with the past four weeks only (28 days). Please read each question carefully and tick the appropriate box.

**Please answer all the questions.**

| On how many days out of the past 28 days...   | No days                       | 1-5 days                      | 6-12 days                     | 13-15 days                    | 16-22 days                    | 23-27 days                    | Every day                     |
|---|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| 37. Have you been deliberately trying to limit the amount of food you eat to influence your shape or weight?  | 0<br><input type="checkbox"/> | 1<br><input type="checkbox"/> | 2<br><input type="checkbox"/> | 3<br><input type="checkbox"/> | 4<br><input type="checkbox"/> | 5<br><input type="checkbox"/> | 6<br><input type="checkbox"/> |
| 38. Have you gone for long periods of time (8 hours or more) without eating anything in order to influence your shape or weight?  | 0<br><input type="checkbox"/> | 1<br><input type="checkbox"/> | 2<br><input type="checkbox"/> | 3<br><input type="checkbox"/> | 4<br><input type="checkbox"/> | 5<br><input type="checkbox"/> | 6<br><input type="checkbox"/> |
| 39. Have you <u>tried</u> to avoid eating foods which you like in order to influence your shape or weight?  | 0<br><input type="checkbox"/> | 1<br><input type="checkbox"/> | 2<br><input type="checkbox"/> | 3<br><input type="checkbox"/> | 4<br><input type="checkbox"/> | 5<br><input type="checkbox"/> | 6<br><input type="checkbox"/> |
| 40. Have you tried to follow definite rules regarding your eating in order to influence your shape or weight; for example, a calorie limit, a set amount of food, or rules about what or when you should eat? | 0<br><input type="checkbox"/> | 1<br><input type="checkbox"/> | 2<br><input type="checkbox"/> | 3<br><input type="checkbox"/> | 4<br><input type="checkbox"/> | 5<br><input type="checkbox"/> | 6<br><input type="checkbox"/> |
| 41. Have you wanted your stomach to be empty?   | 0<br><input type="checkbox"/> | 1<br><input type="checkbox"/> | 2<br><input type="checkbox"/> | 3<br><input type="checkbox"/> | 4<br><input type="checkbox"/> | 5<br><input type="checkbox"/> | 6<br><input type="checkbox"/> |
| 42. Has thinking about food or its calorie content made it much more difficult to concentrate on things you're interested in; for example, read, watch TV or follow a conversation?                           | 0<br><input type="checkbox"/> | 1<br><input type="checkbox"/> | 2<br><input type="checkbox"/> | 3<br><input type="checkbox"/> | 4<br><input type="checkbox"/> | 5<br><input type="checkbox"/> | 6<br><input type="checkbox"/> |
| 43. Have you been afraid of losing control over eating?   | 0<br><input type="checkbox"/> | 1<br><input type="checkbox"/> | 2<br><input type="checkbox"/> | 3<br><input type="checkbox"/> | 4<br><input type="checkbox"/> | 5<br><input type="checkbox"/> | 6<br><input type="checkbox"/> |
| 44. Have you had episodes of binge eating?  | 0<br><input type="checkbox"/> | 1<br><input type="checkbox"/> | 2<br><input type="checkbox"/> | 3<br><input type="checkbox"/> | 4<br><input type="checkbox"/> | 5<br><input type="checkbox"/> | 6<br><input type="checkbox"/> |
| 45. Have you eaten in secret? (Do not count binges)   | 0<br><input type="checkbox"/> | 1<br><input type="checkbox"/> | 2<br><input type="checkbox"/> | 3<br><input type="checkbox"/> | 4<br><input type="checkbox"/> | 5<br><input type="checkbox"/> | 6<br><input type="checkbox"/> |

|     | <b>On how many days out of the past 28 days...</b>   | <b>No days</b>            | <b>1-5 days</b>           | <b>6-12 days</b>          | <b>13-15 days</b>         | <b>16-22 days</b>         | <b>23-27 days</b>         | <b>Every day</b>          |
|-----|--|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| 46. | Have you definitely wanted your stomach to be flat?  | 0<br><input type="text"/> | 1<br><input type="text"/> | 2<br><input type="text"/> | 3<br><input type="text"/> | 4<br><input type="text"/> | 5<br><input type="text"/> | 6<br><input type="text"/> |
| 47. | Has thinking about shape or weight made it more difficult to concentrate on things you are interested in; e.g., read, watch TV or follow a conversation? | 0<br><input type="text"/> | 1<br><input type="text"/> | 2<br><input type="text"/> | 3<br><input type="text"/> | 4<br><input type="text"/> | 5<br><input type="text"/> | 6<br><input type="text"/> |
| 48. | Have you had a definite fear that you might gain weight or become fat?   | 0<br><input type="text"/> | 1<br><input type="text"/> | 2<br><input type="text"/> | 3<br><input type="text"/> | 4<br><input type="text"/> | 5<br><input type="text"/> | 6<br><input type="text"/> |
| 49. | Have you felt fat?   | 0<br><input type="text"/> | 1<br><input type="text"/> | 2<br><input type="text"/> | 3<br><input type="text"/> | 4<br><input type="text"/> | 5<br><input type="text"/> | 6<br><input type="text"/> |
| 50. | Have you had a strong desire to lose weight?   | 0<br><input type="text"/> | 1<br><input type="text"/> | 2<br><input type="text"/> | 3<br><input type="text"/> | 4<br><input type="text"/> | 5<br><input type="text"/> | 6<br><input type="text"/> |

|     | <b>Over the past 4 weeks (28 days)</b>  | <b>None of the times</b>  | <b>A few of the times</b> | <b>Less than ½ the time</b> | <b>Half the time</b>      | <b>More than ½ the time</b> | <b>Most of the time</b>   | <b>Every time</b>         |
|-----|---|---------------------------|---------------------------|-----------------------------|---------------------------|-----------------------------|---------------------------|---------------------------|
| 51. | On what proportion of times that you have eaten have you <u>felt guilty</u> because of the effect on your shape or weight? (Do not count binges)              | 0<br><input type="text"/> | 1<br><input type="text"/> | 2<br><input type="text"/>   | 3<br><input type="text"/> | 4<br><input type="text"/>   | 5<br><input type="text"/> | 6<br><input type="text"/> |
| 52. | Have there been any times when you have felt that you have eaten what other people would regard as an unusually large amount of food given the circumstances? |                           | 0<br><input type="text"/> |                             |                           | 1<br><input type="text"/>   |                           |                           |
| 53. | How many such episodes have you had over the past four weeks?   |                           | <input type="text"/>      |                             |                           |                             |                           |                           |
| 54. | During how many of these episodes of overeating did you have a sense of having lost control over your eating?   |                           | <input type="text"/>      |                             |                           |                             |                           |                           |

55. Have you had other episodes of eating in which you have had a sense of having lost control and eaten too much, but have not eaten an unusually large amount of food given the circumstances?

0

1



56. How many such episodes have you had over the past four weeks?
57. Have you made yourself sick (vomit) as a means of controlling your shape or weight?  0  1
58. How many times have you done this over the past four weeks?
59. Have you taken laxatives as a means of controlling your shape or weight?  0  1
60. How many times have you done this over the past four weeks?
61. Have you taken diuretics (water tablets) as a means of controlling your shape or weight?  0  1  
No Yes
62. How many times have you done this over the past four weeks?
63. Have you exercised hard as a means of controlling your shape or weight?  0  1  
No Yes
64. How many times have you done this over the past four weeks?

| <b>Over the past 4 weeks (28 days)</b>  | <i>Not at all</i> | <b>Slightly</b>               | <b>Moderately</b>             | <b>Markedly</b>               |                               |                               |                               |                          |
|---|-------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|--------------------------|
| 65. Has your weight influenced how you think about (judge) yourself as a person?  | 0                 | 1<br><input type="checkbox"/> | 2<br><input type="checkbox"/> | 3<br><input type="checkbox"/> | 4<br><input type="checkbox"/> | 5<br><input type="checkbox"/> | 6<br><input type="checkbox"/> | <input type="checkbox"/> |
| 66. Has your shape influenced how you think about (judge) yourself as a person?   | 0                 | 1<br><input type="checkbox"/> | 2<br><input type="checkbox"/> | 3<br><input type="checkbox"/> | 4<br><input type="checkbox"/> | 5<br><input type="checkbox"/> | 6<br><input type="checkbox"/> | <input type="checkbox"/> |
| 67. How much would it upset you if you had to weigh yourself once a week for the next four weeks?   | 0                 | 1<br><input type="checkbox"/> | 2<br><input type="checkbox"/> | 3<br><input type="checkbox"/> | 4<br><input type="checkbox"/> | 5<br><input type="checkbox"/> | 6<br><input type="checkbox"/> | <input type="checkbox"/> |
| 68. How dissatisfied have you felt about your weight?   | 0                 | 1<br><input type="checkbox"/> | 2<br><input type="checkbox"/> | 3<br><input type="checkbox"/> | 4<br><input type="checkbox"/> | 5<br><input type="checkbox"/> | 6<br><input type="checkbox"/> | <input type="checkbox"/> |
| 69. How dissatisfied have you felt about your shape?  | 0                 | 1<br><input type="checkbox"/> | 2<br><input type="checkbox"/> | 3<br><input type="checkbox"/> | 4<br><input type="checkbox"/> | 5<br><input type="checkbox"/> | 6<br><input type="checkbox"/> | <input type="checkbox"/> |
| 70. How concerned have you been about other people seeing you eat?  | 0                 | 1<br><input type="checkbox"/> | 2<br><input type="checkbox"/> | 3<br><input type="checkbox"/> | 4<br><input type="checkbox"/> | 5<br><input type="checkbox"/> | 6<br><input type="checkbox"/> | <input type="checkbox"/> |
| 71. How uncomfortable have you felt seeing your body; for example, in shop window reflections, while undressing or taking a bath or shower?         | 0                 | 1<br><input type="checkbox"/> | 2<br><input type="checkbox"/> | 3<br><input type="checkbox"/> | 4<br><input type="checkbox"/> | 5<br><input type="checkbox"/> | 6<br><input type="checkbox"/> | <input type="checkbox"/> |
| 72. How uncomfortable have you felt about others seeing your body; for example, in communal changing rooms, when swimming or wearing tight clothes? | 0                 | 1<br><input type="checkbox"/> | 2<br><input type="checkbox"/> | 3<br><input type="checkbox"/> | 4<br><input type="checkbox"/> | 5<br><input type="checkbox"/> | 6<br><input type="checkbox"/> | <input type="checkbox"/> |

## **The Motivational Interviewing Treatment Integrity (MITI)**

**Code: Version 2.0**

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Author Note: The Motivational Interviewing Treatment Integrity (MITI) Code is an instrument-in-development. We are making it available now for use in research and scholastic endeavors, and we expect that many improvements will be needed before this coding system is complete. If you find errors, inconsistencies or have suggestions for improvement or other feedback, please contact us. We look forward to improving the MITI, with your help.

Learn, compare, collect the facts!

Pavlov 1849-1936

How well or poorly is a practitioner using motivational interviewing? The MITI is a behavioral coding system that provides an answer to this question. The MITI also yields feedback that can be used to increase clinical skill in the practice of motivational interviewing. The MITI is intended to be used: 1) as a treatment integrity measure for clinical trials of motivational interviewing and 2) as a means of providing structured, formal feedback about ways to improve practice in non-research settings.

It should be noted that the MITI and its parent instrument the Motivational Interviewing Skills Code (MISC) are not competing instruments for the same task. They are different tools designed to accomplish different tasks. The MISC is typically more useful in conducting detailed process research investigating the critical elements and causal mechanisms within motivational interviewing. It cannot be replaced by the MITI for these purposes. Alternatively, the MITI may be more useful when a simpler

question is posed (how much is this treatment like motivational interviewing?) or when more targeted feedback is needed (how can our clinicians improve in their use of motivational interviewing?) for training. Specific differences between the MITI and the MISC are:

- 1) The MISC provides a comprehensive examination of interviewer and client behaviors, as well as the interaction between the two, while the MITI measures only interviewer behaviors.
- 2) The MISC may require up to three separate reviews or “passes” of the tape segment, while the MITI typically uses a single pass.
- 3) The MISC captures dimensions of the client’s readiness to change and commitment language, while the MITI does not. Such client behavior can be important in predicting outcomes.
- 4) The MISC is a mutually exclusive and exhaustive coding system, but the MITI is not. Many specific behaviors that are coded in the MISC are collapsed into a single category in the MITI, or left uncoded entirely.

#### A. COMPONENTS OF THE MITI

The MITI has two components: the global scores and the behavior counts.

A global score requires the coder to assign a single number from a seven-point scale to characterize the entire interaction. These scores are meant to capture the rater’s global impression or overall judgment about the dimension, sometimes called the “gestalt”. Two global dimensions are rated: empathy and MI spirit. This means that each MITI review will contain two global scores.

A behavior count requires the coder to tally instances of particular interviewer behaviors. These running tallies occur from the beginning of the segment being reviewed until the end. The coder is not required to judge the quality or overall adequacy of the event, as with global scores, but simply to count it.

Typically both the global scores and behavior counts are assessed within a single review of the tape, and typically a random 20-minute segment is used. Careful attention should be paid to insuring that the sampling of the tape segments is truly random, especially within clinical trials, so that proper inferences about the overall integrity of the MI intervention can be drawn.

The tape may be stopped as needed, however excessive stopping and restarting in actual coding (as opposed to training or group review) may disrupt the ability of the coder to form a gestalt impression needed for the global codes. Coders may therefore decide to use two passes through the tape until they are proficient in using the coding system. In that case, Pass One should be used for the global scores and Pass Two for the behavior counts.

#### B. DESIGNATING A TARGET BEHAVIOR

An important component of using motivational interviewing well involves the interviewer's attention to facilitating change of a particular behavior or problem. Skillful interviewers will attempt to reinforce and elicit client change talk about that specific change when they can. Coders should know, in advance of the coding task, what is the designated target behavior for the intervention, assuming there is one. This will allow coders to judge more accurately whether the therapist is directing interventions toward the target behavior, is floundering or hopelessly lost. The MITI is not designed to be used for interventions in which a target behavior cannot be identified.

#### C. GLOBAL SCORES

"What is the short meaning of a long speech?"

Schiller (1759-1805)

Global scores are intended to capture the rater's overall impression of how well or poorly the interviewer meets the intent of the scale. While this may be accomplished by simultaneously evaluating a variety of elements, the rater's gestalt or all-at-once judgment is paramount. The global scores should reflect the holistic evaluation of the

interviewer, one that cannot necessarily be separated into individual elements. Global scores are given on a 7 point Likert scale, with the coder assuming a beginning score of 4 and moving up or down from there.

### 1. Empathy

This scale is intended to capture the extent to which the therapist understands and/or makes an effort to grasp the client's perspective.

What does it look like? Examples of high and low empathy clinicians

#### Ideal Adherence

Empathy is evident when providers show an active interest in making sure they understand what the client is saying. It can also be apparent when the therapist accurately follows or perceives a complex story or statement by the client or probes gently to gain clarity. Reflective listening is an important part of this characteristic, but this global rating is intended to capture all efforts that the therapist makes to understand the client's perspective and convey that understanding to the client.

#### Poor Adherence

Empathy is lacking when clinicians show little interest in the client's perspective and experiences. There is little effort to gain a deeper understanding of complex events and emotions. Clinicians low in empathy may probe for factual information or to pursue an agenda, but they do not do so for the sole purpose of understanding the client's perspective.

Differentiating empathy from other characteristics

Empathy is not to be confused with warmth, acceptance, genuineness or client advocacy. These characteristics are independent of the empathy rating. It is possible for a clinician to:

Work very hard to understand the client's perspective but not be especially warm or friendly while doing so. (empathy vs. warmth)

Understand fully without agreeing with the client's perspective. (empathy vs acceptance)

Be fully present and authentic, but not make efforts to understand the client's perspective. (genuineness vs. empathy)

Be invested in helping the client or gaining services for them without a particular effort to understand the client's perspective. (client advocacy vs. empathy)

## 2. Motivational Interviewing Spirit

This rating is intended to capture the overall competence of the clinician in using motivational interviewing. It explicitly focuses on the three characteristics of evocation, collaboration and autonomy. These dimensions often overlap, or blend into one another, hence the global nature of this scale. The rater should consider all three characteristics when assigning a value for this scale and low scores in any of these dimensions should be reflected in a lower overall spirit score. Nevertheless, the global rating is intended to capture the "whole" or "gestalt" of the clinician's adherence to this spirit, without too much "picking apart" of the components of the scale.

What does it look like? Examples of high and low spirit clinicians

Ideal Adherence

Collaboration is apparent when clinicians negotiate with the client and avoid an

authoritarian stance. Clinicians high in collaboration show a respect for a variety of ideas about how change can occur and can accept differences between their ideal plan and what clients are willing to endorse. They avoid persuasion and instead focus on supporting and exploring the client's concerns and ideas. These clinicians minimize power-differentials and view their clients as partners.

Evocation is evident when clinicians emphasize drawing out the client's ideas rather than educating clients or giving opinions without being asked. Clinicians high in evocation are curious and patient. They give the client the benefit of the doubt about wanting to change and show a focused intent to draw out the client's own desire and reasons for changing. Clinicians high in evocation show a special interest in helping clients to say to themselves the reasons that changing the target behavior can or should happen.

Autonomy-supportive clinicians can accept that clients may choose not to change. High autonomy clinicians are invested in specific behavior changes, but do not push for an immediate commitment at the expense of "taking the long view" about the option of change in the future. They convey an understanding that the critical variables for change are within the client and cannot be imposed by others.

#### Poor Adherence

Low collaboration is evident when clinicians confront clients with their point of view. An authoritarian and rigid stance is apparent and little effort is made to include the client's ideas about how change might be accomplished. Low collaboration clinicians attempt to persuade clients about the need for change. These clinicians view their clients as deficient in some manner and attempt to provide what is missing, often using an expert stance to do so.

Low evocation is evident when the clinician neglects the critical task of eliciting the client's verbalizations about the need for change. Clinicians may convey an attitude of suspicion or cynicism about the client's desire to change. They may focus on giving



information, educating the client or giving logical reasons for changing, at the expense of arranging conversations so the client talks himself or herself into changing.

Low autonomy clinicians have difficulty accepting that clients might choose to avoid or delay change, or may decide to proceed with change in an unconventional manner. They convey a sense of urgency about the need for change.

#### Differentiating spirit from other characteristics

MI Spirit is not to be confused with sympathy, expertise, education, skills-building, uncovering unconscious motivations or spiritual guidance. Therefore, a clinician might:

Feel sad that the client has so many burdens but not convey a sense that he or she can solve them. (sympathy vs. motivational interviewing)

Be able to give excellent advice to the client about how to solve problems, but fail to ask the client what he or she has already thought of. (expertise vs. motivational interviewing)

Help clients replace irrational thoughts about the benefits of continuing in a maladaptive behavior rather than explore the perceived rewards. (skills-building vs. motivational interviewing)

Probe the developmental contributions to the client's need for a behavior rather than asking about how this behavior is consistent, or not, with the client's current values and goals. (uncovering unconscious motivations vs. motivational interviewing)

Help the client to contact or recognize spiritual forces to assist in changing rather than using reflective listening and open questions to determine what strengths and successes the client already has. (spiritual guidance vs. motivational interviewing)

#### D. BEHAVIOR COUNTS

“It has long been an axiom of mine that the little things are infinitely the most important.”

Sherlock Holmes (A. Conan Doyle, 1892)

A Case of Identity

Behavior counts are intended to capture specific behaviors without regard to how they fit into the overall impression of the interviewer’s use of MI. While the context of the exchange will have some influence on the rater, behavior counts will generally be determined as a result of categorization and decision rules (rather than attempting to grasp an overall impression). Relying on inference to determine a behavior count is to be avoided.

#### Parsing Interviewer Speech to Assign Behavior Codes

An utterance is defined as a complete thought. An utterance ends when one thought is completed. A new utterance begins when a new idea is introduced. One utterance can succeed another in the flow of the interviewer’s speech, as with a sentence that conveys successive ideas. A client response always terminates an interviewer utterance, and the next interviewer response following client speech is therefore always a new utterance.

Not all interviewer utterances will receive behavior codes. Unlike the MISC, the MITI does not represent an exhaustive list of all possible codes; therefore, some therapist utterances will likely remain uncoded. Although they are not exhaustive, MITI codes are mutually exclusive, such that the same utterance does not receive more than one code.

Any utterance may be assigned one of six primary behavior codes. Within three categories, further sub-classification is required. As mentioned before, each utterance receives one and only one code: the same utterance may not receive more than one code. However, consecutive utterances, even if they occur in the same sentence, may

each receive different codes. Thus, in the course of a relatively long reply, if a clinician reflects, then confronts, then asks a question, these could each qualify for a distinct behavior count, assuming they are separate utterances (ideas).

A volley is defined as uninterrupted sequence of utterances by the interviewer. Once a behavior code is assigned once within the volley, it is not assigned again. A volley may contain only one of each behavior code.

Consider the following interviewer statement:

Well, let me ask you this: since you've been forced to come here and since you're feeling like everyone's kind of pecking on you like a crow, there's a bunch of crows flying around pecking on you about this thing about your drinking, what would you like to do with the time you spend here? What would be helpful for you?

This statement is parsed in the following way:

Utterance One: Well, let me ask you this: since you've been forced to come here and since you're feeling like everyone's kind of pecking on you like a crow, there's a bunch of crows flying around pecking on you about this thing with your drinking,

Utterance Two: What would you like to do with the time you spend here? What would be helpful for you?

What about this interviewer statement?

What you say is absolutely true, that it is up to you. No one makes that choice for you. No one can make that choice for you. Even if your wife wanted to decide for you, or your employer wanted to decide for you, or I wanted to decide for you; nobody can. It really is completely your own choice; how you live your life, what you do about drugs, where you're headed; so that is yours. And what I hear you struggling with is, "what do I want? Is it time for me to change things? Is this drug test a wake-up call?"

We've parsed it like this:

Utterance One: What you say is absolutely true, that it is up to you. No one makes that choice for you. No one can make that choice for you. Even if your wife wanted to decide for you, or your employer wanted to decide for you, or I wanted to decide for you; nobody can. It really is completely your own choice; how you live your life, what you do about drugs, where you're headed; so that is yours.

Utterance Two: And what I hear you struggling with is, "what do I want? Is it time for me to change things? Is this drug test a wake-up call?"

## Behavior Codes

### 1. Giving Information

This category is used when the interviewer gives information, educates, provides feedback or discloses personal information. When the interviewer gives an opinion, without advising, this category would be used. No subcodes are assigned for giving information. Specific examples of Giving Information include:

#### 1a. Providing Feedback from assessment instruments

You indicated during the assessment that you typically drink about 18 standard drinks per week. This places you in the 96th percentile for American men your age. (Giving Information)

\* Note that this is not a reflection. Reviewing information contained on assessment instruments does not typically qualify as a reflection, although the reflection code MAY be given if the interviewer skillfully emphasizes or enriches the material the client has given.

#### 1b. Personal Feedback about the client that is not already available.

Your doctor tells me you've been struggling with your glycemic control (Giving Information)

I talked to your wife and she said she was really worried about your drinking (Giving Information)

#### 1c. Explaining ideas or concepts relevant to the intervention

This homework assignment on logging your cravings is important because we know that cravings often lead to relapses. A craving is like a warning bell, telling you to do something different. (Giving Information)

#### 1d. Educating about a topic

Individuals who eat five fruits and vegetables each day reduce their cancer risk five fold. For certain kinds of cancer, like colon cancer, it's even more of a reduction. (Giving Information)

If I do find that you've relapsed, I'll have to disclose that to your probation officer. (Giving Information) (Coder may consider MI Inconsistent instead)

Coders need not distinguish among types of Giving Information. Once the coder has decided that the behavior is either one or another item in this category, she assigns the Giving Information code without further distinction.

#### Differentiating Giving Information from MI Non-Adherent Behaviors

Giving information should not be confused with giving advice, warning, confronting or directing.

You indicated during the assessment that you typically drink about 18 standard drinks per week. This far exceeds social drinking. (MI Inconsistent)

Keep track of your cravings, using this log, and bring it in next week to review with me.  
(Direct)

Well, you are only eating two fruits per day according to this chart, even though you said you are eating five. It can be easy to deceive yourself. (Confront)

It worked for me, and it will work for you if you give it a try. We need to find the right AA meeting for you. You just didn't find a good one. (Advice)

## 2. Questions

### 2a. Closed Question

This behavior code is used when the interviewer asks the client a question that can be answered with a "yes" or "no" response. Did you use heroin this week? Did you eat five fruits and vegetables this week? Have you been having trouble with your memory? It is also coded when the question specifies a very restricted range or one that is intended to satisfy a questionnaire. How long have you been using heroin? How many fruits and vegetables did you eat each day this week?

Who is the President of the United States?

### 2b. Open Question

An open question is coded when the interviewer asks a question that allows a wide range of possible answers. The question may seek information, may invite the client's perspective or may encourage self-exploration. The open question allows the option of surprise for the questioner. "Tell me more" statements are coded as open questions unless the tone and context clearly indicate a Direct or Confront code. How did it go with your heroin cravings since we last met? Tell me about your fruit and vegetable intake this week. What is your take on that?

In general, stacked questions (before the client gives an answer), are coded as only one question. Sometimes a therapist will stack questions by asking an open question and then giving a series of "for example" follow-up questions before the client answers.

These are coded as one open question. [not, in this case, as one open and two closed questions].

In what ways has your drinking caused problems for you? Has it caused problems in your relationships or with your memory? What about trouble with the law or health problems? Have you felt bad about yourself? Things like that.

### 2c. Questions-trying-to-be-reflections

Occasionally the interviewer will offer a statement that otherwise meets the criteria for a reflection, but is given with an inflection at the end (thereby making it “sound like” a question). These statements are coded as Questions (either open or closed), NOT as reflections.

## 3. Reflection

This category is meant to capture reflective listening statements made by the therapist in response to client statements. A Reflection may introduce new meaning or material, but it essentially captures and returns to clients something about what they have just said. Reflections must be further categorized into Simple or Complex categories.

### 3a. Simple Reflection

Simple reflections typically convey understanding or facilitate client/therapist exchanges. These reflections add little or no meaning (or emphasis) to what clients have said. Simple reflections may mark very important or intense client emotions, but do not go far beyond the client’s original intent in the statement. Therapist summaries of several client statements may be coded as simple reflections if the therapist does not use the summary to add an additional point or direction.

### 3b. Complex Reflection

Complex reflections typically add substantial meaning or emphasis to what the client has said. These reflections serve the purpose of conveying a deeper or more complex picture of what the client has said. Sometimes the therapist may choose to emphasize a particular part of what the client has said to make a point or take the conversation in a different direction. Therapists may add subtle or very obvious content to the client's words, or they may combine statements from the client to form summaries that are complex in nature.

### Speeding Tickets

Client: This is her third speeding ticket in three months. Our insurance is going to go through the roof. I could just kill her. Can't she see we need that money for other things?

Interviewer: You're furious about this. (Reflection, Simple)

Interviewer: This is the last straw for you. (Reflection, Complex)

### Controlling Blood Sugar

Interviewer: What have you already been told about managing your blood sugar levels?

(Open Question)

Client: Are you kidding? I've had the classes, I've had the videos, I've had the home nurse visits. I have all kinds of advice about how to get better at this, but I just don't do it. I don't know why. Maybe I just have a death wish or something, you know?

Interviewer: You are pretty discouraged about this. (Reflection, Simple)

Interviewer: You haven't given it your best effort yet. (Reflection, Complex)

### Mother's Independence

Client: My mother is driving me crazy. She says she wants to remain independent, but she calls me four times a day with trivial questions. Then she gets mad when I give her advice. Interviewer: Things are very stressful with your mother. (Simple Reflection)



Interviewer: You're having a hard time figuring out what your mother really wants.  
(Reflection, Complex)

Interviewer: Are you having a hard time figuring out what your mother really wants?

(Closed Question) Interviewer: What do you think your mother really wants? (Open Question)

3c. DECISION RULE: When a coder cannot distinguish between a simple and complex reflection, the simple designation should be used. Default category: simple.

### 3d. Reflection and Question in Sequence

Sometimes the interviewer begins with a reflection, but adds a question to "check" the reliability of the reflection (either open or closed). Both elements should be coded.

So you don't ever want to use heroin again. Is that right? (Reflection, Closed Question)

Your boss said you can't work overtime anymore. What do you make of that?  
(Reflection, Open Question)

### 3e. Reflections-Turned-Into-Questions

Occasionally the interviewer will offer a statement that otherwise meets the criteria for a reflection, but is given with an inflection at the end (thereby making it "sound like" a question). These statements are coded as Questions (either open or closed) NOT as reflections. (see 2c.)

## 4. MI Adherent

This category is used to capture particular interviewer behaviors that are consistent with a

motivational interviewing approach. Coders may be tempted to code especially good examples of MI practice in one of these categories, even if they do not genuinely “fit”. Instead, the coder should consider such examples within the overall rating assigned for MI Spirit or Empathy, as appropriate, reserving the MI Consistent behavior counts for the designated behaviors only. The MI Adherent Category is comprised of:

4a. Asking permission before giving advice or information or asking what the client already knows or has already been told about a topic before giving advice or information. Permission is implied when the client asks directly for the information or advice and the therapist is answering. Indirect forms of permission can also occur, such as when the therapist invites the client to disregard the advice as appropriate.

I have some information about how to reduce your risk of colon cancer and I wonder if I might discuss it with you. (MI Adherent)

What have you already been told about drinking during pregnancy? (MI Adherent)

This may not be the right thing for you, but some of my clients have had good luck setting the alarm on their wristwatch to help them remember to check their blood sugars 2 hours after lunch. (MI Adherent)

note: when permission is asked prior to advising, the MI Non-Adherent Code is not used for the subsequent advice. The entire volley is coded as MI Adherent.

4b. Affirming the client by saying something positive or complimentary. Affirming may also take the form of commenting on the client’s strengths, abilities or efforts in any area (not simply related to the target behavior).

You are the kind of person that, once you make up your mind, you usually get the job done (MI Adherent)

It's important to you to be a good parent, just like your folks were for you. (MI Adherent)

4c. Emphasizing the client's control, freedom of choice, autonomy, ability to decide.

Yes, you're right. No one can force you stop drinking. (MI Adherent)

You're the one who knows yourself best here. What do you think ought to be on this treatment plan? (MI Adherent)

The number of fruits and vegetables you choose to eat is really up to you. (MI Adherent)

You've got a point there. (MI Adherent)

4d. Supporting the client with statements of compassion or sympathy.

With the parking problems and the rain coming down, it hasn't been easy to get here. (MI Adherent)

I know it's really hard to stop drinking. (MI Adherent)

Well, there is really a lot going on for you right now. (MI Adherent)

No differentiating subcodes are assigned to the MI Adherent behaviors. The rater merely identifies them as belonging to this category and assigns the MI Adherent code.

4e. DECISION RULE: The MI Adherent code takes precedence when the utterance clearly falls into the MiA category. When in doubt, an alternate code (for example, Open Question or Reflection) should be given.

## 5. MI Non-Adherent

This category is used to capture those interviewer behaviors that are inconsistent with a motivational interviewing approach. No differentiating subcodes are assigned to the MI Non-Adherent behaviors. The rater merely identifies them as belonging to this category and assigns the MI Non-Adherent code.

5a. Advising without permission by making suggestions, offering solutions or possible actions without first obtaining permission from the client. Language usually, but not always, includes words such as: should, why don't you, consider, try, suggest, advise, how about, you could, etc. Note that if the interviewer first obtains permission either directly or indirectly, before advising, the code would be different.

What about trying to get a ride from a friend? (MI Non-Adherent)

Checking your blood sugars five times a day is best in the beginning. (MI Non-Adherent)

It might not be as bad as you think. People are usually civil if you give them a chance. (MI Non-Adherent)

5b. Confronting the client by directly and unambiguously disagreeing, arguing, correcting, shaming, blaming, criticizing, labeling, moralizing, ridiculing or questioning the client's honesty. Such interactions will have the quality of uneven power sharing, accompanied by disapproval or negativity. Included here are instances where the interviewer uses a question or even a reflection, but the voice tone clearly indicates a confrontation.

Restating negative information already known or disclosed by the client can be either a confront or a reflection. Most confrontations can be correctly categorized by careful attention to voice tone and context.

You were taking antabuse but you drank anyway? (MI Non-Adherent)

You think that is any way to treat people you love? (MI Non-Adherent)

Yes, you are an alcoholic. You might not think so, but you are (MI Non-Adherent)

Wait a minute. It says right here that your A1C is 12. I'm sorry, but there is no way you could have been counting your carbohydrates like you said if it's that high. (MI Non-Adherent)

5c. Directing the client by giving orders, commands or imperatives. The language is imperative.

"Don't do that!" (MI Non-Adherent)

"Bring this homework back next week." (MI Non-Adherent)

"You need to go to 90 meetings in 90 days" (MI Non-Adherent)

Again, coders are not required to subcategorize MI Non-Adherent behaviors. Once a coder has decided that the behavior is either a Confront or a Direct (or has narrowed it down to any other two codes in this category), he assigns the MI Non-Adherent code and moves on.

5d. DECISION RULE: The MI NonAdherent code takes precedence when the utterance clearly falls into the MiNa category. When in doubt, an alternate code (for example, Giving Information) should be given.

#### Tantrums

Client: "What do you think I should do about these tantrums my child is having? You're the doctor."

Interviewer: "Solving this yourself hasn't worked, so you're finally willing to ask for help." (MI Non-Adherent)

Client: "What do you think I should do about these tantrums my child is having? You're the doctor."

Interviewer: "Your child is normal. These are not tantrums." (MI Non-Adherent)

#### E. CHOOSING THE LENGTH AND TYPE OF THE CODED SEGMENT

The development of the MITI was done using 20-minute segments of therapy tapes. It may be possible to use the MITI for longer segments of tape (for example, the entire therapy session). We only caution that our attempt to increase the length of the coding segment was associated with 1) problems with sustained coder attention, 2) difficulty forming global judgments with increased data and 3) logistical difficulties in obtaining uninterrupted work time in a busy setting.

Similarly, most of our initial data has been gathered using audiotapes rather than videotapes. The MITI can be used to code videotapes, but should not be altered to gather visual information.

#### F. SUMMARY SCORES FOR THE MITI

Because critical indices of MI functioning are imperfectly captured by frequency counts, we have found that many applications of therapy coding are better served with summary scores computed from codes, rather than the individual scores themselves. For example, the ratio of reflections to questions provides a concise measure of an important MI process. Below is a partial list of summary scores that serve as outcome measures for determining competence in MI, as well as formulas for calculating them.

$\% \text{ Complex Reflections (\% CR)} = R_c / \text{Total reflections}$

$\% \text{ Open Questions (\% OC)} = OQ / (OQ + CQ)$

$\text{Reflection : Question Ratio (R:Q)} = \text{Total reflections} / (CQ + OQ)$

$\% \text{ MI Adherent (\% MiA)} = M_iA / (M_iA + M_iNa)$

#### F. TRAINING STRATEGY FOR THE MITI

Give me a fruitful error any time, full of seeds, bursting with its own corrections.

Pareto 1848-1923

Training coders to competency, as measured by interrater reliability and matching to a gold standard, usually requires a stepped learning process. We have found that coders do best beginning with fairly simple tasks, proceeding to more complex ones only when competence on the simpler tasks is solid. We recommend that coders begin by learning Level I tasks to an acceptable reliability standard prior to attempting Level II tasks. Only when acceptable standards for simultaneous I and II tasks have been accomplished should coders begin on Level III tasks. The self-review of MI text and video learning tools can be used at any time (perhaps as a prelude to beginning Level I tasks).

The use of pre-scored gold standard transcripts will assist in evaluating coder competency

and areas for improvement. We have found that coders often have difficulty in one area or another, requiring a more intensive focus. Problem areas can be identified using standardized transcripts as a quiz for each level. More than one quiz per level is often needed. We have found that coders typically require 40 hours of training to reach interrater reliability using the MITI. In addition, regular (probably weekly) group coding sessions are optimal to insure drift does not occur. Clinical experience (i.e. being a clinician) has not predicted ease of training or eventual competence in our laboratory.

Level I competencies: parsing utterances, giving information and open/closed questions

Level II competencies: add reflections, MiA and MiNa

Level III competencies: add global ratings

Below are recommended proficiency and competency thresholds for clinicians, based on the MITI coding system. Please note that these thresholds are based on EXPERT OPINION, and currently lack normative or other validity data to support them. We are in the process of gathering normative data for the MITI now (6/15/04). Until such normative data is available, these thresholds should be used in conjunction with other data to arrive at an assessment of clinician competency and proficiency in using MI.

Behavior Count or Summary Score Thresholds Beginning

Proficiency

Competency

Global Therapist Ratings 5 6

Reflection to Question Ratio (R:Q) 1 2

Percent Open Questions (%OC) 50% 70%

Percent Complex Reflections (%CR) 40% 50%

Percent MI-Adherent (% MIA) 90% 100%



**Motivational Interviewing Treatment Integrity Code (MITI)**  
**Coding Sheet**

Tape # \_\_\_\_\_ Coder: \_\_\_\_\_ Time: \_\_\_\_\_

Global Ratings

Empathy/ Understanding 1 Low 2 3 4 5 6 7 High

Spirit 1 2 3 4 5 6 7 Low High

Behavior Counts

*Giving Information*

MI Adherent

*Asking permission, affirm, emphasize control, support.*

MI Non-adherent

Advise, confront, direct.

*Question Closed Question*

(subclassify) Open Question

*Simple reflections*

(subclassify) *Complex reflections*

TOTAL REFLECTIONS:

First sentence: \_\_\_\_\_

Last sentence: \_\_\_\_\_

List of MITI Codes

EMPATHY (Global rating of empathy)

SPIRIT (Global rating of MI Spirit)

GI (Giving Information)

MiA (MI Adherent)

MiNa (MI Non-adherent)

OQ (Open Question)

CQ (Closed Question)

Rs (Reflection simple)

Rc (Reflection complex)

Note: Coded transcripts of two MI interviews, taken from the Professional Training Series, are available to assist you in learning to use the MITI. For ease in learning, each interview is coded twice: once for global ratings and once for behavior counts, although in practice both tasks would usually be done simultaneously. These transcripts, along with the MITI manual itself, can be downloaded free of charge from <http://casaa.unm.edu>.