

Investigating the 'Jumping to Conclusions' Bias in People with Anorexia

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Thesis Abstract

Investigating the 'Jumping to Conclusions' Bias in People with Anorexia

A Thesis Submitted for the Degree of Doctor of Clinical Psychology
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This thesis explores the decision making styles demonstrated by people with anorexia. It is presented as three papers: 1) a literature review; 2) an empirical study and 3) a personal reflection on the processes involved in conducting the research and critical appraisal of the issues which emerged.

The literature review in Paper 1 systematically explored the existing research that examined decision making in disordered eating populations. Twenty seven papers were reviewed and their findings synthesised to develop a comprehensive overview of decision making across a spectrum of disordered eating populations. Parallels in decision making across diagnostic categories were identified, and the relationship between decision making and clinical, personality and demographic variables was also explored. Methodological quality of studies was reviewed; recommendations for future research were also identified. Broadly, the findings indicated that similar styles of decision making appear evident in anorexia and bulimia. No characteristically different decision making patterns were demonstrated by people with eating disorder-not otherwise specified or by people recovered from anorexia. The evidence regarding nature of decision making in obesity and binge eating disorder was less conclusive.

The empirical study conducted in Paper 2 endeavoured to enhance our understanding of the nature of decision making in disordered eating. The study examined a specific decision making bias i.e. the 'jumping to conclusions' bias in people with anorexia. The study also explored whether eating disorder related beliefs in anorexia could be considered to be of 'delusional' proportions. The results indicated that compared with a healthy control group, people with anorexia did not display a 'jumping to conclusions' bias. They did not display a tendency to make decisions on the basis of little evidence. The majority of individuals with anorexia did demonstrate limited insight into their eating disorder related beliefs, though only a minority subgroup held beliefs that could be considered 'delusional'. Methodological limitations and clinical implications of the findings are discussed.

The third paper provides a personal and critical reflective account of the processes involved in conducting both the literature review and the scientific study. It critically appraises aspects of the research process including strengths and limitations of both studies. Implications for clinical practice, replication and directions for future research are also identified. This paper also includes personal reflections on the approaches used and the challenges encountered within these.

Thesis Overview

This thesis explores the decision making and reasoning style among eating disordered populations. Overall, the thesis is presented as three papers consisting of: 1) a literature review; 2) an empirical research study and; 3) personal reflections and critical appraisal of the issues and processes involved in conducting this research. The thesis progresses from broad to specific in content, beginning with an overview of the literature relating to decision making in a multitude of eating disordered populations. An empirical research study follows this, where a particular reasoning bias is investigated in one specific eating disorder diagnostic category - anorexia nervosa. Finally, the thesis culminates with consideration of and reflection upon some pertinent content and process issues that emerged during the course of this work.

Paper 1: Literature Review

In conducting a review of the literature, a systematic review approach was employed. This aimed to provide a comprehensive overview of the nature of decision making in eating disordered populations. The rationale for conducting a systematic review was based on a number of factors. As outlined by Mulrow (1994), this approach facilitated efficient integration of large quantities of data with the aim of enabling critical exploration and evaluation of existing study findings. In addition, employing a systematic approach facilitated identification and refinement of hypotheses, recognition of pitfalls of previous research, and highlighted consistencies of relationships across a multitude of studies. Finally, by employing explicit methods of assessing the nature and quality of previous research, this approach was valuable in explaining inconsistencies or conflicts between study findings or conclusions.

This systematic review endeavoured to review the existing literature in relation to decision making in disordered eating populations. Defined by Guillaume et al. (2010), decision making can be conceptualised as the capacity to make decisions about a course of action, and Garrido & Subira (2013) propose that impairment in this executive function could be related to some pathological behaviours including disordered eating. More specifically, a decision making style characterised by a desire for immediate rewards despite the risk of long term negative consequences appears to emerge consistently, and does not objectively appear to be disorder-specific. For example, in anorexia, immediate rewards (e.g. perceived personal control via restriction/purging) are favoured, despite the high risk of long term damaging and pathological consequences (i.e. physical and psychological damage, death). Similarly in obesity, a high need for immediate gratification (i.e. indulgence in gluttonous food) is preferred despite the inevitable negative consequences (i.e. medical complications). This particular review aimed to analyse the available decision making research across the continuum of disordered eating populations.

The findings of 27 studies were reviewed to develop a comprehensive understanding of the specific decision making patterns or styles displayed by people with disordered eating. Characteristic decision making styles or patterns were considered individually in six different eating disordered subgroups; anorexia nervosa, bulimia nervosa, recovered anorexia, eating disorder-not otherwise specified, binge eating disorder and obesity. Both conflicting and consistent research findings were highlighted and discussed, and variations in methodological quality were also discussed in the context of these findings. The impact of potentially confounding variables was also considered, and as such the relationship between decision making and factors such as level of education, illness severity, mood and clinical and personality characteristics was reviewed and tentative conclusions drawn. Methodological limitations of studies reviewed and suggestions or directions for future research were also discussed and highlighted in the latter part of the systematic review.

Paper 2: Empirical Paper

The second paper of the thesis relates to a quantitative, empirical research study which endeavored to investigate whether currently ill people with anorexia displayed the 'jumping to conclusions' (JTC) bias, when compared with a healthy control group. This empirical study aimed to follow conceptually from the findings of the systematic review. While the review investigated decision making more broadly in a range of eating disordered populations, this research study aimed to focus specifically on one particular probabilistic reasoning and decision making bias, in individuals with anorexia nervosa only. The research aimed to extend the existing body of evidence in relation to the JTC bias by examining whether people with anorexia, in addition to those with psychosis, displayed this decision making bias.

Reasoning biases are conceptually linked with cognitive models and theories of many disorders (So et al., 2012). Within cognitive models, one's appraisals and interpretations of events, experiences and internal beliefs and emotions are considered critically important. From this perspective, reasoning biases can influence the appraisal of unusual experiences, unpleasant events and negative emotions through the mechanism of limited information gathering or generation of realistic alternatives, and consequently contribute to delusion formation and maintenance (Garety, Freeman, Jolley, Dunn, Bebbington, & Fowler, 2005; Garety, Bebbington, Fowler, Freeman, & Kuipers, 2007). In light of this, the link between the JTC bias and delusional beliefs is clear. While the bias has been extensively researched in people with psychosis or schizophrenia, a recent meta-analysis (Fine, Garner, Craigie, & Gold, 2007) concluded the JTC bias cannot be solely attributed to or caused by schizophrenia symptomatology. However, research investigating the JTC bias in other clinical populations has thus far, been limited and inconclusive. Given the presence of 'delusional' distorted body image beliefs in anorexia (e.g. believing oneself to be overweight despite an

emaciated condition), it is theoretically plausible that people with anorexia should, or could demonstrate a jumping to conclusions bias.

This paper compares the performance of an anorexia group with a healthy control group on the JTC reasoning task. Three versions of the task are employed; a neutral version (the 'classic' beads task), and two emotionally salient, self referent tasks. Guided by previous research evidence, these latter two versions were employed as the JTC bias has been shown to be stronger specifically in relation to emotionally salient information (Warman, Lysaker, Martin, Davis, & Haudenschild, 2007). Potentially confounding variables such as premorbid intelligence, state of the illness and depression or anxiety are considered, along with additional clinical and demographic information. Findings, methodological limitations and directions for future research are subsequently discussed.

Paper Three: Critical Appraisal and Personal Reflections

The third and final section of this thesis consists of a critical appraisal and personal reflection on the systematic review, the empirical study as well as consideration of some process issues noted during the course of this work. The importance of critical appraisal in research is well-recognized, and is endorsed by national and international bodies, including the World Health Organization (WHO), National Institute of Clinical Excellence (NICE) and the National Health Service (NHS). The need to critically assess research findings constitutes an essential element of evidence-based practice, and so this section systematically appraises and reflects on the research particularly in relation to its strengths and limitations, and its relevance to and utility to the subject area under investigation. Within this paper, the approaches and methodologies used, the challenges encountered and the implications for clinical practice and future research are considered.

References

- Fine, C., Garner, M., Craigie, J., & Gold, I. (2007). Hopping, skipping or jumping to conclusions. Clarifying the role of the JTC in delusions. *Cognitive Neuropsychiatry*, 12, 46-77.
- Garety, P.A., Bebbington, P., Fowler, D., Freeman, D., & Kuipers, E. (2007). Implications for neurobiological research of cognitive model of psychosis: a theoretical paper. *Psychological Medicine*, 37, 1377-1391.
- Garety, P. A., Freeman, D., Jolley, S., Dunn, G., Bebbington, P. E., & Fowler, D.G. (2005). Reasoning, Emotions, and Delusional Conviction in Psychosis. *Journal of Abnormal Psychology*, 114, 373-384.
- Garrido, I., & Subira, S. (2012). Decision-making and impulsivity in eating disorder patients. *Psychiatry Research*, <http://dx.doi.org/10.1016/j.psychres.2012.10.004>

- Guillaume, S., Sang, C.N.T., Jaussent, I., Raingeard, I., Bringer, J., Jollant, F., & Courtet, P. (2010). Is decision making really impaired in eating disorders? *Neuropsychology*, 24(6), 808-812.
- Mulrow, C. (1994). Rationale for systematic reviews. *BMJ*, 309, 597-599.
- So, S.H., Freeman, D., Dunn, G., Kapur, S., Kuipers, E., Bebbington, P., Fowler, D., & Garety, P. (2012). Jumping to conclusions, a lack of belief flexibility and delusional conviction in psychosis. *Journal of Abnormal Psychology*, 121(1), 129-139.
- Warman, D. M., Lysaker, P. H., Martin, J. M., Davis, L., & Haudenschild, S. L. (2007). Jumping to conclusions and the continuum of delusional beliefs. *Behavior Research and Therapy*, 45(6), 1255-1269.

Declaration

No portion of the work referred to in the thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.

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Paper One

The nature of decision-making in eating disordered populations: A systematic review

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Declaration of Conflicting Interests

The author declared no potential conflicts of interests with respect to the research, authorship and/or publication of this article.

Journal Article Preparation

This article will be prepared for submission and publication in line with author guidelines for *Clinical Psychology Review* (Appendix 1).

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ABSTRACT

This paper aimed to critically review the literature examining decision making in disordered eating populations. The review aimed 1) to identify characteristics of decision making in disordered eating populations and investigate whether it differs from healthy populations; 2) to identify any demographic or illness factors related to decision making styles; 3) to identify whether similar decision making processes exist across all disordered eating subtypes. Five databases (PsycINFO, Embase, Medline, PubMed, Web of Knowledge) were searched. Included papers satisfied the following inclusion criteria: 1) English; 2) empirical studies; 3) published in peer reviewed journals; 4) adult populations; 5) included disordered eating populations; 6) included decision making measures; 7) published in the last 10 years. Reference lists were scanned for relevant articles. Twenty-seven papers were included. A decision making bias appears evident in a majority of studies with anorexic and bulimic populations. The evidence is less conclusive in binge eating disorder and obese populations. No differences in decision making appear evident in people recovered from anorexia nervosa, or in people with eating disorder– not otherwise specified. However, little research has been conducted in both these populations. Additional findings within the area are discussed. Issues and areas requiring further scientific investigation are highlighted.

Keywords:

Systematic Review

Eating disorders

Decision making

Methodological quality

Highlights:

- This systematic review investigates decision making in disordered eating populations
- Characteristically different decision making styles appear evident in anorexia nervosa and bulimia nervosa
- Preliminary evidence suggests people with binge eating disorder and obesity also display different styles of decision making, however evidence is less clear and research is lacking
- Methodological quality of studies is rated
- Areas for further investigation and consideration are highlighted

INTRODUCTION

Defined as “a process that chooses a preferred option or a course of actions from among a set of alternatives on the basis of given criteria or strategies” (Wang, Wang, Patel, & Patel, 2004), decision making is one of the most common cognitive processes occurring every few seconds in the subconscious and conscious human mind (Wang & Ruhe, 2007).

While an extensive review of decision making research within psychology is beyond the realm of this review and will not be addressed, it is apparent that even within psychology alone, disparate theories emerge. Within cognitive psychology, work pioneered by Kahneman & Tversky (1979) on the role of heuristics and biases in decision making prevails. This proposes that heuristics (efficient mental rules) are employed to help people make decisions, judgments and solve problems, usually in the context of complex problems or scenarios (Tversky & Kahneman, 1974). Within social psychology, theories pertaining to ‘groupthink’ (Janis, 1972) remain prominent i.e. the psychological phenomenon within groups whereby the desire for conformity results in faulty or incorrect decisions. In these situations the desire for unanimity in decision outweighs consideration of other alternatives. In neuropsychology, the Somatic Marker Hypothesis (Damasio, 1994) is widely cited; this states that decision making is influenced by emotional representations and prior experiences. However, this review will focus on decision making within disordered eating population, in the context of clinical populations.

Decision Making in Clinical Populations

Decision making is considered to be present as an important factor in many psychiatric disorders (Damasio, 1994). For example, people with psychosis consistently display a robust decision making bias. They display a tendency to reach decisions on the basis of little evidence, and report higher levels of confidence in such decisions, an effect known as the ‘jumping to conclusions’ bias (Huq, Garety, & Hemsley, 1988). Similarly, highly anxious individuals with a hypersensitivity to threats and a pessimistic evaluation of future events engage in less risk taking behaviour (Giorgetta et al., 2012). In people diagnosed with Obsessive Compulsive Disorder (OCD), those with high hoarding symptoms display characteristically different decision making skills to those with low hoarding symptoms or healthy controls, suggesting these decision making characteristics could contribute to maintenance of the disorder i.e. they appear unable to decide whether items should be discarded (Lawrence et al., 2006). Increased depression is associated with less productive decisions; depressed people tend to use less effective decision making techniques resulting in decisions that were less likely to further their interests (Leykin, Sewell Roberts, & DeRubeis, 2011). Disadvantageous patterns of decision making have also been reported in

drug users (Grant, Contoreggi, & London, 2000) and have been used as an indicator for early onset alcoholism in adolescents (Mazas, Finn, & Steinmetz, 2000). In eating disorders, decision making is implicated in ensuring successful regulation of dietary behaviour. The role of decision making is highly relevant to clinical populations, particularly when one considers the impact of decision making on problem solving, social and self-regulation skills, resistance and coping strategies; areas in which those suffering from psychiatric disorders often struggle.

Decision Making in Disordered Eating Populations

According to the DSM-IV-TR¹ (APA, 2000), eating disorders are categorised as anorexia nervosa (AN) and bulimia nervosa (BN). However, Eating Disorder Not Otherwise Specified (EDNOS) is the most common category used by clinicians, a hybrid subgrouping of eating disorders that include partial symptoms of AN, BN, binge eating disorder (BED) and purging behaviour (Fairburn & Bohn, 2005).

People with disordered eating appear to share commonalities with other psychiatric disorders in that they make decisions that are potentially damaging to their physical and mental health. They engage in self-damaging behaviours including food restriction, purging and excessive exercise to provide immediate relief despite the high risk of negative consequences such as malnutrition, dizziness, muscle weakness and poor circulation (Boekka & Lokken, 2006). They pursue such behaviours despite knowing they are damaging to their physical, social and psychological well-being. Evidence also suggests decision making biases are present in psychiatric disorders where issues relating to self-control and impulsivity play a prominent role (Moeller, Barratt, Dougherty, Schmitz, & Swann, 2001). In this context, adaptive decision making is considered crucial to ensure successful regulation of eating and dietary behaviour (Heatherton & Wagner, 2011).

Anorexia Nervosa

Anorexia Nervosa (AN) is an eating disorder characterised by low weight, intense fear of weight gain, amenorrhea and body image disturbance (APA, 2000).

Neuropsychological research has begun to investigate the underlying processes, including those involved in decision making, that may contribute to the maintenance of AN. While it is beyond the scope of this review to examine and discuss this research in detail, the concepts of set-shifting (i.e. the ability to alter, change or 'shift' cognitive strategies in response to changes in the environment) and weak central coherence (i.e. a limited ability to process

¹ Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revised.

information globally and in context to acquire a higher-level meaning; (Frith, 1989)) are being extensively researched (Tchanturia, Morris, Surguladze, & Treasure, 2002; Roberts, Tchanturia & Treasure, 2010), and are thought to underlie cognitive rigidity in anorexia (Danner et al., 2012b). It is hypothesised this rigidity may have a negative impact on the ability to make appropriate decisions, as an inability to learn from prior experiences can make it difficult to alter one's behaviour according to changing contextual and situational parameters. The ability to make flexible and appropriate decisions in unfamiliar contexts constitutes a core element of decision making (Norman & Shallice, 2000), and the extent to which this is present in anorexia is unclear.

Wilson (2010) and Avena & Bocarsly (2012) suggest traits of addiction may contribute to the maintenance of behaviours such as successive increases in exercise and dietary restriction. Alternatively, Brogan, Hevey, & Pignatti (2010) suggest that the behaviour of people with anorexia may be related to an incapacity to regulate reward and punishment, and this manifests as difficulties in everyday planning and decision making. Bulik, Sullivan, & Kendler (2003) suggest the perseverative cognitive style and high resistance to change may help explain the decision making profile in people with AN. Impairments in executive functions have been shown to persevere following reestablishment of normal eating (Green, Elliman, Wakeling, & Rogers, 1996; Kingston, Sz mukler, Andrewes, Tress, & Desmond, 1996), suggesting malnourishment or starvation are not responsible for these decision making patterns.

Cavedini et al. (2004) argue that the psychopathological consequences of decision making in AN is discernible in the pathological eating behaviours associated with the disorder. People systematically eliminate and refuse food, and even when hungry they avoid calories to obtain an immediate reward e.g. a reduction in anxiety. By ignoring the longer term consequences of their decisions, individuals with AN appear to struggle to make healthy decisions to regulate eating behaviour. The importance of adaptive decision making is clear; some researchers suggest that this, along with other executive functions such as cognitive flexibility and mental rigidity, is involved in not only the maintenance, but also the aetiopathogenesis of AN (Abbate-Daga et al., 2011).

Bulimia Nervosa

Bulimia nervosa (BN) is an eating disorder and mental health condition characterised by a cycle of binge eating and compensatory behaviour (i.e. vomiting, laxative use), and weight related/shape related self-evaluation (APA, 2000). High impulsivity, emotional instability (Vitousek & Manke, 1994), self-harm and substance misuse are often present (O'Brien &

Vincent, 2003). The self-regulatory eating pattern in BN is distorted, as despite the long term destructive costs, the immediate reinforcement gained through bingeing/purging appears to provide immediate relief (e.g. from tension, anxiety), and this behaviour becomes progressively reinforced during repeated binge cycles.

A number of theories, predominantly from the field of neuropsychology in relation to executive functions have been proposed. Steiger, Gauvin, Jabalpurwala, Séguin, & Stotland (1999) propose people with BN have poor impulse control and this is implicated in binge episodes. Liao et al. (2009) reports impaired impulse control and an incapacity to anticipate long term consequences is typical of the disorder. Herrera-Giménez (2011) has suggested that decision making abilities in BN are mediated by both cognitive and affective process.

Binge Eating Disorder

Binge eating disorder (BED) is characterised by a compulsion to regularly overeat, without engaging in compensatory behaviours such as purging or restriction. Most research has highlighted the role of negative emotions (Stein et al., 2007), and the over evaluation of shape and weight (Grilo et al., 2008) in maintenance of the disorder; however little research has investigated the role of executive functions such as decision making.

Consistent with the transdiagnostic approach to eating disorders (Fairburn, Cooper, & Shafran, 2003), the behavioural topography of binge episodes in BN and BED is somewhat similar and inherently reflects differences in adaptive and advantageous decision making. In binge cycles, individuals engage in behaviours that result in immediate stress reduction or release (e.g. bingeing on high calorie, palatable food), but that inevitably have long term negative costs (e.g. physical or psychological complications). In BN and BED, people are often fully cognisant of the impact of binge attacks; they often 'know' a binge is coming and yet still consciously buy junk food, or they have an awareness their emotional dysregulation strategies (e.g. emotional suppression) may trigger a binge episode but are be unable to change them. Clearly, the decision making processes evident in such behavioural patterns play a large contributory role in maintaining eating disorders, particularly in periods prior to binge episodes (Svaldi, Brand, & Tuschen-Caffier, 2010).

Obesity

While obesity is often seen in the context of BED, it differs from BED in certain domains, notably regarding levels of psychopathology, weight and shape concerns and quality of life

(Smink, van Heken, & Hoek, 2012). Categorised in ICD-10² (WHO, 1993) as a general medical condition, obesity is generally linked with overeating and insufficient exercise. Within the research, several conceptualisations of obesity and its links with decision making exist. Davis, Levitan, Muglia, Bewell, & Kennedy (2004) strongly advocate that over-eating is fundamentally about making decisions between short-lived indulgences and long term disadvantageous outcomes.

Parallels between obesity and addiction behaviours have also been drawn. Bruinsma & Taren (1999) propose that food can be used to regulate against negative affective mood states, in a similar manner to self-medication. Sweet foods have been found to produce analgesic effects (Pelchat, 2002) and physiological effects of addiction such as withdrawal, sensitization and down-regulation, are apparent in excessive food consumption (Grigson, 2002). Decision making research in obesity has drawn on the behavioural similarities of drug abusers, and has used this as a foundation upon which to conduct further research in obesity.

Alternative perspectives have suggested that one's ability to self-regulate and make rational decisions may be facilitated by the ability to postpone immediate gratification (Metcalf & Mischel, 1999). Parallels between BED and obesity are also drawn whereby the propensity for poor decision making in eating and dietary self-regulatory behaviour is considered in the context of poor self-control and high impulsivity (Danner, Ouweland, van Haastert, Hornsveld & de Ridder, 2012a). Reduced self-control and impulsivity are characteristics associated with disordered eating, including obesity (Fischer, Smith, & Anderson, 2003).

Measures of Decision Making

Numerous experimental tasks and self-report measures have been used to investigate decision making, including the Cambridge Risk Task (Rogers et al., 1999), the Cups Task (Levin, Weller, Pederson, & Harshman, 2007) and the Risk Taking Propensity Scale (Dahlbaeck, 1990). A review of their purpose and validity is beyond the scope of this paper. Two prominent experimental decision making tasks however, are the Iowa Gambling Task (IGT) and the Game of Dice Task (GDT).

Iowa Gambling Task (IGT)

First developed by Bechara, Damasio, Damasio, & Anderson (1994) to assess decision making deficits in people with lesions to the ventromedial prefrontal cortex, the IGT is one of the most widely used measures to assess decision making under ambiguous conditions. It is used extensively in clinical populations to measure decision making under experimental

² International Statistical Classification of Diseases and Related Health Problems 10th Revision, World Health Organisation (ICD-10)

conditions (Steingroever, Wetzels, Hortsman, Neumann, & Wagenmaers, 2013). Participants can succeed on the task when they forfeit high immediate rewards and consistently choose safe options over riskier ones. Impaired performance on the IGT is generally interpreted as a consequence of insensitivity to future consequences, positive or negative (Bayard, Raffard, & Gely-Nargeot, 2011).

On the IGT, participants are given a fictitious amount of money. They are presented with four decks of cards and are asked to maximize their long term outcome, by choosing cards from the decks. Two decks (A and B) are associated with high immediate rewards, but with higher unpredictable losses, and consequently, these are termed 'disadvantageous decks'. Decks C and D are associated with lower immediate rewards but with distinctly lower unpredictable losses and result in positive long term outcomes. These decks are referred to as 'advantageous decks' (Steingroever et al., 2013).

The IGT has been extensively validated and remains robust when aspects of the task change, for example, when real financial rewards are at stake (Bowman & Turnbull, 2003), when different time delays are used (Bowman, Evans, & Turnbull, 2005), and when lifespan developmental changes have been considered (Overman, 2004).

Despite its widespread use and prevailing popularity as a primary measure of decision making in clinical populations, a recent review (Steingroever et al., 2013) has highlighted some pertinent criticisms. It has been suggested that the IGT might not serve as a valid measure of decision making deficits in clinical populations, as there is high variability in healthy participants' performances (Dunn, Dalgleish, & Lawrence, 2006) and this has implications with regard to drawing conclusions. Furthermore, the ecological validity of the IGT has been questioned. The poor scoring on the IGT of many healthy participants is not always matched by decision making deficits in real life. This places a question mark over the extent to which IGT performance accurately reflects everyday, real life decision making.

The Game of Dice Task (GDT)

Developed by Brand et al. (2005), the GDT assesses the influence of executive functions on decision making. Participants are asked to decide among various options that are explicitly related to specific gains or losses and that have obvious winning probabilities. The rules for gains and losses are explicit and stable during the entire task, and feedback can be used to guide and inform subsequent choices. Successful GDT decisions appear linked to performance in tasks measuring executive functions (Brand, Labudda, & Markowitsch, 2006).

Primary differences between the IGT and GDT tasks relate to how explicit the rules for gains and losses are. While the IGT measures decision making under ambiguous decisions, in the GDT the different probability of choices that win or lose money can be reasoned easily, and as such the GDT assess decision making under uncertain/risky conditions. As a relatively new measure of decision making, the GDT appears less embedded in experimental research tasks when compared with the IGT, and as such there has been limited feedback from researchers as to its experimental utility or value.

Aims of Review

The primary purpose of this paper is to systematically review the literature examining the nature of decision making in disordered eating populations. Specifically, this paper aims to summarise and critique the existing findings in the literature and highlight clinical implications and areas that warrant further research and investigation. The current review synthesises the reviewed information into a single source, to inform and guide assessment and treatment considerations for people who present with tendencies towards disordered eating behaviours and patterns. The specific questions addressed within this paper were:

1. What are the characteristics of decision making in disordered eating populations and does it differ from healthy populations?
2. What demographic or illness factors are related to decision making characteristics of people with disordered eating?
3. Are there similar decision making processes across all disordered eating subtypes?

METHOD

Literature Search Method

A comprehensive two-stage systematic review procedure was employed. To identify relevant literature, five electronic databases were searched namely PsycINFO, Medline, Embase, Web of Knowledge and PubMed. Each database was searched individually. Reference lists of identified articles were then systemically explored to ensure that any further articles missed by the databases were also identified and included in the review.

As a wide variety of terms have been used to describe decision making, the following truncated search terms were used: *decision mak**, *decision**, *reasoning**, *reason** and *decision making**. For each database search, all of the above search components were combined with terms defining eating disorders (*anorexi**; *bulimia nervosa**; *ed-nos**; *eating disorder not otherwise specified*; *binge eating disorder*) using the “OR” operator. The same components were then combined together using the “AND” operator. Relevance was determined by screening titles and abstracts. Reference lists of potentially relevant articles were also examined. Abstracts of all selected articles were read by the first author to determine whether studies fulfilled the inclusion criteria. In situations where this was unclear, the full text of each article was also read. Following this, the full texts of all seemingly relevant articles were read to ensure they met the inclusion criteria. Search was conducted in May 2013. Instances where ambiguity arose regarding suitability of articles for inclusion were resolved through discussion with the second author.

Study Inclusion Criteria

The following criteria were used as a basis for including papers to be reviewed: (1) language: only papers written in English were included; (2) empirical study: only papers that provided empirical data were included; (3) published and peer-reviewed: papers had to be published in peer-reviewed journals before being accepted for inclusion; (4) age: only studies that involved adults (over 18 years of age) were included to ensure results were not attributable to developmental and maturational factors; (5) population; the population under investigation had to be a disordered eating population and (6) measure of decision making: studies had to include a specific measure of decision making. No restrictions were placed on ethnicity or gender. Using the above criteria, thirty-two papers were reviewed, of which twenty seven were considered eligible and suitable for inclusion. The phases of the literature search and number of journal articles at each stage is represented diagrammatically in Appendix 2.

Data Extraction

Specific information was extracted from each study to ensure the inclusion criteria were met and to assist and inform the quality rating process. Information extracted included: sample demographics, the nature of the disordered eating, decision making assessment method, and study findings.

Quality Rating System

While many quality rating assessment tools exist for randomised controlled trials, cohort studies, case-control studies and qualitative studies, few checklists are available to appraise the methodological quality of cross-sectional studies. Gilbert (2009) developed a checklist for cross-sectional studies based on NICE³ checklists (NICE, 2007). Due to this lack of available quality rating tools for cross-sectional studies, this review employed the checklist outlined by Gilbert (2009) (Appendix 3) and then used the NICE rating system for methodological quality of studies (NICE, 2007) (Appendix 4). This NICE rating system rates the studies from good quality (when all or most criteria have been fulfilled) (++), to reasonable quality (when some of the criteria have been fulfilled) (+), to poor quality (when few of the criteria have been fulfilled) (-). To determine inter-rater reliability of study quality ratings, a sample of studies (20% of the total) were also rated by an independent rater. Initial inter-rater reliability was 83.3%; remaining discrepancy was resolved through discussion to reach agreement by both raters.

³ National Institute of Clinical Excellence (NICE)

RESULTS

Search Results

The search yielded seventy-four articles in total; twenty-four from Web of Knowledge, twenty-five from PubMed, and twenty-five from PsychINFO, Embase and Medline combined. Once duplicates were removed, thirty-two potentially relevant articles were included. Twenty-seven met inclusion criteria and were considered eligible for inclusion. One additional paper was sourced through hand searching the reference lists of relevant papers. Descriptive characteristics of the studies will be discussed before considering the studies' findings.

Descriptive Characteristics of Studies

Descriptive characteristics of the studies are summarised and presented in Table 1.

Table 1: Descriptive characteristics of studies reviewed

No of studies with:	
<i>Gender</i>	
Female sample only	23
Mixed gender sample	4
<i>Decision Making Measure</i>	
Iowa Gambling Task	23
Game of Dice Task	3
Cups and Ambiguity Task	1
<i>Clinical Populations Investigated</i>	
Anorexia Nervosa	12
Bulimia Nervosa	9
Anorexia Nervosa Recovered	4
EDNOS-BN	1
Obesity	7
Binge Eating Disorder	4
ED differentiated by subgroups	4
<i>Design</i>	
Experimental design	25
Cross sectional design	1
Intervention design	1
Control sample included	23
<i>Quality of studies</i>	
Good (++)	21
Fair (+)	5
Poor (-)	1

Study Findings

The decision making patterns and the direction and strength of any relationship or pattern were examined in relation to each specific disordered eating category. An overview of the review findings is presented in Table 2. The relationship between decision making and demographic, clinical and personality variables were also examined and an overview of these findings is presented in Table 3.

Table 2: Characteristics of Studies Systematically Reviewed

Study	Population/ Diagnosis	Sample Characteristics (all figures are mean)	Method	DM ¹ Measure	Study Findings	Quality
1.Galimberti et al., (2012)	AN ² & their relatives; patients met DSM-IV-TR criteria	All female. AN: n=29; age=24.10;BMI ³ =16.21 ANrel ⁴ : n=29;age=43.79 HC ⁵ :n=29; age=28.62 HCrel ⁶ :n=29; age=43.31	AN vs ANrel vs HC vs HCrel	Iowa Gambli ng Task (IGT)	1. AN & ANrel had poorer DM than HC 2.Moderate heritability for poor DM in AN	++
2.Garrido & Subira (2013)	AN-R ⁷ , BP ⁸ /BN ⁹ , HC. Met DSM criteria.	All female. ANR: n=27; age= 25.9 BP: n=44; age=28.2 HC: n=38; age=23.3	ANR vs BP vs HC	IGT	1. ANR & BP = poorer IGT than HC 2. ANR< IGT than BP 3. In BP impulsivity = negatively correlated with DM	++
3.Tchanturia et al., (2012)	AN patients; met DSM criteria	AN: males: n=19; age = 27.22;BMI= 17.49 AN: females n= 29; age= 27.52; BMI= 16.59. HC: males; n=20; age= 25.45; BMI= 23.54 HC: females: n= 41; age= 22.2; BMI=22.1	AN vs HC	IGT	1. AN = poorer IGT performance 2.No gender differences 3. Higher impulsivity in male pts 4. Impulsivity did not predict poorer DM	+
4.Danner, Sanders et al., (2012)	AN & AN-Rec ¹⁰ , confirmed by DSM-IV & EDE-12 ¹¹	All female AN: n=16; age= 25.63; BMI=14.65 ANRec: n= 15; age = 24.33; BMI=21.2; recovery=4.8yrs HC: n=15; age=25.80; BMI=21.46	AN vs ANRec vs HC	IGT	1. AN: not significantly different from HC, but more similar to ANRec. DM in AN & ANRec unrelated to set-shifting or central coherence problems.	++
5.Abbate-Daga et al., (2011)	AN, recruited from ED ¹² service; met DSM criteria.	All female. AN: n= 30; age= 24.13; BMI=15.62 HC: n= 30; age = 24.67; BMI= 21.04	AN vsHC	IGT	1. AN = poorer performance than HC. 2. DM partially independent of state of illness.	++
6.Fagundo et al., (2012)	AN; according to DSM-IV-TR & SCID ¹³	All female. AN: n= 35; age=28.1; BMI=17.2. Obese: n=52; age= 40.5; BMI=39.8 HC: n=137; age= 24.8; BMI= 21.5	AN vs obese vs HC.	IGT	1. DM = impaired in AN & obese patients. 2.AN & obese did not learn over time. 3.DM not correlated w/BMI	++
7.Guillaume et al., (2010)	AN & BN; met DSM-IV criteria, confirmed using MINI ¹⁴ .	All female. AN: n =49 (37 restrictive; 13 purging); age=23.3; BMI=15.4 BN: n=38; age= 23; BMI=21.3. HC: n=83; age= 28; BMI= 20.2	HC vs AN vs BN	IGT	1. No evidence of DM alterations in EDs. 2.No relationship between any ED dimensions & DM	++

8. Cavedini et al., (2006)	AN inpatients; met DSM-IV criteria, using MIMI & International Neuropsychiatric Interview-Plus.	AN-R: age= 23.8; BMI= 13.2). AN-BP ¹⁵ . n= 20; age = 21.5; BMI=15.1. HC: n=30; age = 22.6	AN vs HC	IGT	1. AN patients = poor DM performance 2. No correlation between IGT & illness severity/BMI. 3. AN patients did not improve at retest- DM may be a trait condition.	++
9. Cavedini et al., (2004)	AN-R & AN-BP; diagnosed according to DSM-IV.	AN-R: n=26; age = 21.7; BMI=13.5 AN-BP; n= 33; age = 23.4; BMI=15.6. HC: n=82.	AN-R vs AN-BP vs HC	IGT	1. Poorer DM in AN. 2. AN-R & AN-BP showed different DM patterns 3. Poor IGT unrelated to starvation/illness severity.	++
10. Lindner, Fichter & Quadflieg, (2012)	AN-Rec & HC	All female AN-Rec: n= 100; age = 34.49; BMI=20.86 HC: n=100; age = 34.53; BMI=21.80	AN-Rec vs HC	IGT	1. AN-Rec = better DM than HC. 2. Positive correlations between DM & obsessive compulsive traits.	++
11. Bosanac et al., (2007)	AN, BN, AN-Rec & HC group; diagnosed by DSM-IV & EDE-12	All female: AN: n= 16; age=28.94; BMI= 15.18 AN-Rec: n= 12; age = 28.92; BMI= 20.47. BN: n= 13; age = 28.31; BMI=23.52. HC: n=16; age= 23.81; BMI=22.26	AN vs AN-Rec vs BN vs HC	IGT	1. No significant differences on IGT task.	++
12. Tchanturia et al., (2007)	AN (outpatient & inpatient); diagnosed SCID for DSM-IV. AN-Rec recruited via database.	All female AN: n=29 (23 AN-R; 6 AN-BP); age= 28.5, BMI= 15.5.2. AN-Rec: n=14 (11 restrictive; 3 BP); age= 28.9; BMI= 20.3 HC: n=29; age = 26.3; BMI= 22.1.	AN vs AN-Rec vs HC	IGT	1. DM impaired in AN- did not learn to avoid disadvantageous decks 2. DM is not impaired in AN-Rec or HC 3. AN showed lower anticipatory SCR ¹⁶ to all responses, not only risky choices	++
13. Van den Eynde et al., (2012)	BN & EDNOS-BN ¹⁷ ; met DSM-IV criteria	All female BN: n=40; age=28.3; BMI=25.2 EDNOS-BN: n=30; age=27.5; BMI=23.8 HC: n=65; age = 24.0; BMI= 22.2	BN vs EDNOS-BN vs HC	Game of Dice Task (GDT)	1. Once baseline differences are accounted for, no differences in attention, inhibitory control & DM among BN & EDNOS-BN.	++
14. Herrera Gimenez (2011)	BN patients from community mental health centres; met DSM-IV criteria.	All female. BN: n=19; age = 23 HC: n=28; age = 22.	BN vs HC	Cups Task & Ambiguity Task	1. No differences between BN & HC in proportion of risky decisions. 2. BN patients quicker to respond than controls. 3. BN patients took more risks in the context of winning than losing; HC showed opposite pattern.	-

15. Brogan, Hevey & Pignatti (2010)	AN, BN, obese & HC. DSM-IV-TR diagnostic interviews.	All female. AN: n= 22; age: 18-46 years. BN: n=17; age: 19-38. Obese: n=18; age: 30-72. HC: n=20; age = 18-40.	AN vs BN vs obese vs HC	IGT	1. AN, BN and obese women significantly more impaired on IGT on overall task performance & learning across tasks. 2. Clinical groups did not differ significantly from each other –suggests shared DM profile.	+
16. Liao et al., (2009)	AN & BN recruited from outpatient ED unit; fulfilled DSM-IV-TR criteria.	All female. BN: n=26; age= 27.8; BMI=25.3. HC: n=51; age = 29.4; BMI= 23.1. Compared with previously published data from AN group (Tchanturia et al., 2007).	BN vs HC vs AN group	IGT	1. DM diminished in BN and AN patients. 2. Poor IGT performance unrelated with diminished SCR. 3. Distinct differences in SCR between AN & BN.	++
17. Brand, Franke-Sievert, Jacoby, Markowitsch, & Tuschensch-Caffier (2007).	BN recruited from ED clinic; met DSM-IV criteria	All female BN: n=14; age= 21.86; BMI=21.57. HC: n=14; age= 21.64; BMI=21.33.	BN vs HC	GDT	1. BN show DM alterations compared with controls. 2. Correlations between GDT & specific executive functions; higher cognitive flexibility & set-shifting chose more non-risky options	++
18. Boeka & Lokken (2006)	Patients with past/current BN as determined by DSM-IV.	All females BN: n=20; past/current diagnosis of DN; age= 19.1. HC: n=20; no/minimal eating disorder symptoms; age=18.9	BN vs HC	IGT	1. BN made high risk decisions & failed to learn despite negative outcomes (i.e. losses). 2. BN symptoms related to IGT & could uniquely predict IGT performance 3. Depressive symptoms not correlated with IGT.	++
19. Danner et al., (2013)	BN/EDNOS-BN or EDNOS-BED ¹⁸ ; met DSM-IV criteria	All female. BN/EDNOS-BN: n=30; age=25.37; BMI=23.44 BED ¹⁹ : n=31; age=38.48; BMI=37.46. HC: n=34; age=30.19; BMI:21.83	Binge eating pathology vs HC	Choice task (based on IGT)	1. In the context of negative affect, punishment was associated with poorer DM 2. Reward did not influence DM.	++
20. Boisseau, Thompson-Brenner, Pratt, Farchione, & Barlow (2013)	OCD, ED & HC; clinical patients met DSM criteria using MINI	All female. OCD:n=19; age=22.32; BMI=24.82 ED(BN/EDNOS): n=17; age=23.12; BMI=22.05 HC:n=21; age=24.24; BMI= 22.22	OCD vs ED vs HC	IGT	1. ED patients more impaired on DM than OCD & HC under risky conditions 2. perfectionism associated with less risky DM in OCD, but more risky DM in ED.	++

21. Danner, Ouwehand, van Haastert, Hornsveld, & de Ridder, (2012)	BED from psychiatric unit; fulfilled DSM-IV criteria.	All female. BED: n=19; age 38.05; BMI=38.74. Obese: n=18; age = 44.56; BMI=30.84. HC: n=30; age = 36.13; BMI=22.32.	BED vs obese vs normal weight	IGT	1. BED patients showed poorer DM 2. Obese pts showed similar DM impairments 3. Reward sensitivity is not an underlying factor in DM deficits. 4. DM more impaired with < binge severity.	++
22. Svaldi, Brand & Tuschen-Caffier (2010)	BED, recruited through advertisement. Fulfilled DSM-IV-TR criteria.	All female. BED: n=17; age = 42.4; BMI=32.8. Overweight controls: n=18; age = 38.3; BMI= 30.7.	BED vs Overweight controls	GDT	1. BED = poorer DM than HC. 2. BED used feedback processing disadvantageously. 3. No group differences in behavior inhibition. 4. BED group scored lower in reward responsiveness	++
23. Davis, Patte, Curtis, & Reid (2010)	Obese & BED; met DSM-IV-TR criteria.	All female: BED Group: n=65; m age = 34.3. Non-binge obese: n= 73; age= 35.2. HC:n= 71; age=31.8.	BED vs obese vs HC	IGT	1. BED & obese had similar DM deficits. 2. Group differences no longer significant once education controlled for.	+
24. Brogan, Hevey, O'Callaghan, Yoder, & O'Shea (2011)	Obese adults; recruited from Weight Management Clinic.	Obese Group: n=42 (12 male, 30 female); BMI=41.45; age = 52.24. HC:n= 50 (17 male, 33 female); BMI= 24.36; age = 47.34.	HC vs obese	IGT	1. Obese significantly impaired on IGT- lower scores & failed to learn. 2. DM independent of age, gender, education, BMI & eating pathology.	++
25. Pignatti et al., 2006	Obese patients; recruited from specialist hospital.	Severely obese: n=20 (6 male; 14 female); age=43.4; BMI=42.17. HC: n= 20 (10 male; 10 female); age= 46.64; BMI = 22.16.	Obese vs HC	IGT	1. Obese patients performed poorly on the IGT. 2. Obese patients did not learn to maximize advantageous choices.	+
26. Davis, Levitan, Muglia, Bewell, & Kennedy (2004)	Overweight & obese women	All female N= 41; age = 28.35.		IGT	1. Poor DM tends to characterize those who are overweight and obese 2. Emotional eating does not mediate relationship between DM & BMI	+
27. Witbracht, Laugero, Van Loan, Adams, & Keim (2012)	Obese Women	All female. Obese group: N=29; age=32.7; body weight: 88kg		IGT	1. Change in weight significantly related to IGT performance. 2. Performance on IGT not associated with energy intake or resting energy expenditure	+

¹Decision Making; ²Anorexia Nervosa; ³Body Mass Index; ⁴Anorexia Relatives; ⁵Healthy Control group; ⁶Healthy Control group Relatives; ⁷Anorexia Nervosa Restricting Subtype; ⁸Binge Purge Subtype; ⁹Bulimia Nervosa; ¹⁰Recovered Anorexia; ¹¹Eating Disorder Examination- 12th edition; ¹²Eating Disorder; ¹³Structured Clinical Interview for DSM Disorders; ¹⁴Mini International Neuropsychiatric Interview; ¹⁵Anorexia Nervosa Binge Purge Subtype; ¹⁶Skin Conductance Responses; ¹⁷Eating Disorder not Otherwise Specified- Bulimia Nervosa; ¹⁸Binge Eating Disorder not Otherwise Specified-Binge Eating Disorder; ¹⁹Binge Eating Disorder

Table 3: Relationship between decision making and demographic, clinical and personality variables

Author & Year	Clinical Group	Demographic Variables Measured	Clinical Variables Measured	Personality Variables Measures	Relationship with DM
1. Galimberti et al., (2012)	AN & ANRel	Age, Education; BMI; Age of onset; Illness duration	Eating pathology	-	<ul style="list-style-type: none"> • Illness severity, BMI & illness duration did not correlate with any neurocognitive performance.
2. Garrido & Subira, (2013)	AN-R & AN-BP	Age; Education (yrs); Age of onset (yrs); Illness duration; BMI	Depression	Impulsivity	<ul style="list-style-type: none"> • Age and education did not correlate significantly DM • When education included as co-variate, IGT differences between HC and ANBP non-significant. • Illness severity or depression was not related to DM impairment. • When education was controlled for, there was no DM difference between binge/purge group and controls.
3. Tchanturia et al., (2012)	AN	Age; Education (yrs); ED duration; BMI (current, lowest & highest)	-	Impulsivity	<ul style="list-style-type: none"> • AN patients had higher impulsivity scores; impulsivity did not predict DM.
4. Abbate-Daga et al., (2011)	AN	Age; Education (yrs); BMI; Age at onset; Illness duration	Eating pathology; depression	-	<ul style="list-style-type: none"> • Impaired DM unrelated to depression severity • DM impairment only partially independent of state of illness.
5. Fagundo et al., (2012)	AN	Age; Marital status; Level of Education; yrs of Education; BMI (current, maximum, minimum)	Eating pathology; general psychological & psychopathological symptoms	Impulsivity	<ul style="list-style-type: none"> • DM was not correlated with BMI
6. Guillaume et al., (2010)	AN; BN	Age; Age at onset; Illness duration; Yrs in Education; IQ score; BMI	Depression; eating pathology	-	<ul style="list-style-type: none"> • No significant correlation between eating disorder dimensions and DM. • No correlation between DM and BMI.
7. Cavedini et al., (2006)	AN	Age; Education; Age at onset; Illness duration; BMI; Hospitalisation duration.	Eating pathology	-	<ul style="list-style-type: none"> • No correlation between DM and severity of illness or BMI score
8. Cavedini et al., (2004)	AN	Age; Education; Age at onset; Illness duration;	Eating pathology; obsessive	-	<ul style="list-style-type: none"> • DM unrelated to illness severity, BMI, gender, or age differences

9. Danner, Sanders et al., (2012)	AN & ANRec	BMI Age; BMI; Fat%; Education	compulsive traits Eating pathology; depression; obsessive compulsive traits; anxiety	Sensitivity to reward and punishment; harm avoidance.	<ul style="list-style-type: none"> No relationship between DM and clinical or personality features. ANR & AN more sensitive to punishment Punishment sensitivity strongly related to depression and eating disorder symptoms.
10. Lindner et al., (2012)	ANRec	Age; IQ score; BMI (current & minimal); age of onset; illness duration; recovery duration;	Depression; anxiety; obsessive compulsive traits	Perfectionism ; impulsivity; inhibition	<ul style="list-style-type: none"> DM was positively correlated with obsessive compulsive traits Differences in DM no longer significant once current BMI considered Duration of recovery and duration of AN unrelated to DM Depression, anxiety, perfectionism & inhibition unrelated to DM
11. Bosanac et al., (2010)	AN; BN; ANRec	Age; Illness duration; BMI; IQ score; Medication	Eating pathology; depression; anxiety	-	<ul style="list-style-type: none"> No relationship reported
12. Tchanturia et al., (2007)	AN; ANRec	Age; Yrs in Education; IQ score; BMI (current & lowest); Illness duration	Eating pathology; depression	-	<ul style="list-style-type: none"> Significant association between depression severity and DM
13. Van den Eynde et al., (2012)	BN; EDNOS	Age; BMI; Illness duration; Age at onset; History of AN; Medication use; IQ score	Eating pathology; Anxiety, depression, stress	-	<ul style="list-style-type: none"> Once differences in age, IQ score, depression, anxiety and stress are taken into account, no differences in DM.
14. Herrera – Giménez (2011)	BN	Age	-	-	-
15. Brogan, Hevey & Pignatti (2010)	AN;BN; Obesity	Age; BMI; Yrs Education	-	-	-
16. Liao et al., (2009)	BN	Age; Education (Yrs); IQ score; Illness duration;	Psychological functioning;	Impulsivity; Perfectionism	<ul style="list-style-type: none"> No correlation between DM and impulsivity & depression.

		BMI (current & lowest);	Obsessive-compulsive traits; depression		<ul style="list-style-type: none"> • Obsessive compulsive symptoms significantly associated with poorer DM performance
17. Brand et al., (2007)	BN	Age; Yrs in Education; BMI; Illness duration; IQ score	Depression; general psychological/ psychopathological symptoms	Extensive assessment of personality dimensions	<ul style="list-style-type: none"> • DM unrelated to personality traits and psychological symptoms • DM unrelated to education, age, BMI and disease specific variables (i.e. illness duration)
18. Boeka & Lokken (2006)	BN	Age; Education; IQ score; BMI	Bulimic symptoms; eating pathology; depression	-	<ul style="list-style-type: none"> • DM unrelated to depressive symptoms • Bulimic symptoms uniquely predicted DM performance
19. Danner et al., (2013)	BN or BED	Age; BMI; Education	Eating pathology; depression	Impulsivity; Sensitivity for reward & punishment; urgency	<ul style="list-style-type: none"> • Negative affect led to more disadvantageous DM in BED/BN • BED more likely to act impulsively in response to negative affect. • Level of sadness did not influence DM after reward in either group.
20. Danner, Ouwehand et al., (2012)	BED; Obesity	Age; Education level; BMI; Binge eating severity	Depression	Sensitivity to reward & punishment; Self- control	<ul style="list-style-type: none"> • DM was more impaired with greater binge severity • No correlation between DM and reward sensitivity • Marginal correlation between lower DM performance and lower punishment sensitivity • Higher BMI associated with poorer DM • DM differences not attributable to educational differences.
21. Boisseau et al., (2013)	OCD; ED	Age; Ethnicity; BMI; IQ score; Education; Illness duration; medication	Eating pathology; depression	Perfectionism	<ul style="list-style-type: none"> • Perfectionistic related doubt & concern regarding mistakes were not associated overall with DM, however were differentially associated with risky decisions.
22. Svaldi, et al., (2010)	BED	Age; Martial status; Employment status; Monthly income; BMI; Yrs in Education	Depression; Eating Pathology	Sensitivity to reward and punishment	<ul style="list-style-type: none"> • No correlation between DM and eating pathology • No correlation between DM and BMI, depression, age, years in education or binge frequency • Riskier decisions were associated with higher scores on fun seeking scales

23. Davis et al., (2010)	BED; Obesity	Age; BMI; Education	-	-	<ul style="list-style-type: none"> DM differences in BED and obese participants not significant once education controlled for.
24. Brogan et al., (2011)	Obesity	Age; Education; BMI;	Emotional Eating; Eating pathology; Consideration of future consequences	-	<ul style="list-style-type: none"> DM unrelated to eating pathology DM unrelated to BMI
25. Pignatti et al., (2006)	Obesity	Age; Yrs in Education; IQ score; BMI	Eating pathology; general psychological/psychopathological symptoms; binge eating behaviour; body uneasiness	-	<ul style="list-style-type: none"> No relationship between demographic factors and DM performance
26. Witbracht et al., (2012)	Obesity	Age; Body weight & loss; Fat mass & loss; Lean mass & loss; cognitive functioning; BMI	Cognitive restraint	Disinhibition	<ul style="list-style-type: none"> No association between energy intake and DM performance No association between dietary restraint or disinhibited eating and DM performance
27. Davis et al., (2004)	Obesity	BMI	Depression; Emotional Eating	-	<ul style="list-style-type: none"> Emotional eating did not mediate the relationship between DM and BMI in any way

Decision Making in Anorexia Nervosa

Twelve studies examined decision making in people with AN. All studies (n=12) used the Iowa Gambling Task (IGT) as the primary measure of decision making. Of the studies that examined decision making in AN, the majority (n=9) provided evidence that individuals with AN performed significantly poorer than healthy controls on the IGT decision making task (Abbate-Daga, et al., 2011; Brogan et al. 2010; Cavedini et al; 2004; Cavedini et al. 2006; Fagundo et al., 2012; Galimberti et al., 2012; Garrido & Subira 2013; Tchanturia et al., 2007; Tchanturia et al., 2012). Overall, the nine studies reported that people with AN consistently showed a preference for choices that yielded high immediate gains despite high long term negative consequences. Additionally, they tended to demonstrate an inability to learn to avoid these choices, even over repeated trials. This empirical finding appears to reflect the decisions they make in everyday life with regard to their eating behaviours, where immediate gains (i.e. weight loss) are valued despite the long term negative costs (i.e. ill-health, death).

Three studies (Bosanac et al., 2007; Danner et al., 2012b; Guillaume et al., 2010) reported no significant difference in decision making abilities in AN compared with healthy controls. In fact, one study (Guillaume et al., 2010) found individuals with AN performed in a manner similar to the control group. In contrast, two studies (Bosananc et al., 2007; Danner et al., 2012b) report that while the difference between groups did not reach significance, the AN group tended to make more disadvantageous decisions than control participants.

In seven studies (Abbate-Daga et al., 2011; Brogan et al., 2010; Cavedini et al., 2004; Fagundo et al., 2012; Galimberti et al., 2012; Tchanturia et al., 2007; Tchanturia et al., 2012) the diagnosis of AN was confirmed through the administration of diagnostic interviews according to DSM criteria. In the remaining studies (n=5), while no diagnostic assessment was used to ensure eligibility, each study specified that participants were eligible for inclusion and stated they met DSM criteria for AN. Overall, the papers reviewed in this section were of high quality. Two studies (Brogan et al., 2010; Tchanturia et al., 2012) received a lower rating of fair (+) while others were rated as good (++), indicating the findings obtained are valid and replicable. This finding also suggests that current research in the area of decision making in AN is of high quality.

Overall, of the twelve studies, only three (Bosanac et al., 2007; Guillaume et al., 2010; Tchanturia et al., 2007) included formal measures to estimate premorbid intelligence and of these, all three utilised the NART⁴ (Nelson & Willison, 1991). This finding suggests that in decision making research in AN thus far, little consideration has been given to level of education or intelligence as possible confounding factors that may have an impact on, or be

⁴ National Adult Reading Test (NART)

implicated in the decision making process.

Among the nine studies that found evidence of characteristically different decision making styles the relationship between affect, education, BMI, illness severity, personality factors and decision making appears inconsistent. Five studies (Cavedini et al., 2004; Cavedini et al., 2006; Fagundo et al., 2012; Galimberti et al., 2012; Garrido & Subira, 2013) found that disadvantageous decision making was independent of illness severity or low BMI, and suggest this decision making style could not be attributed to the negative effects of malnourishment or starvation. One study (Abbate-Daga et al., 2007) reported the impairments in decision making may be only partially independent of the state of the illness. Regarding the relationship between IGT performance and affective symptomatology, the results appear inconclusive. One study (Tchanturia et al., 2007) found a significant association between IGT performance and depression, while two studies (Abbate-Daga et al., 2007; Garrido & Subira, 2013) found decision making styles were unrelated to depressive symptomatology.

In the three studies (Bosanac et al., 2007; Danner et al., 2012b; Guillaume et al., 2010) where no differences in decision making were reported, no correlations were reported between decision making and clinical or personality factors. One study (Danner et al., 2012b) reported higher levels of punishment sensitivity, and this was reported to be strongly associated with depressive and eating disorder symptomatology.

All but three studies (Brogan et al., 2010; Garrido & Subira, 2013; Tchanturia et al., 2012) included measures of eating pathology; seven studies assessed severity of depression (Abbate-Daga et al., 2011; Bosanac et al., 2010; Danner et al., 2012b; Fagundo et al., 2012; Garrido & Subira, 2013; Guillaume et al., 2012; Tchanturia et al., 2007), and three studies assessed anxiety symptomatology (Bosanac et al., 2010; Danner et al., 2012b; Fagundo et al., 2012). Four studies (Danner et al., 2012b; Fagundo et al., 2012; Garrido & Subira, 2013; Tchanturia et al., 2012) included measures of personality variables (i.e. impulsivity, harm avoidance, sensitivity to reward and punishment). Of these, one study (Tchanturia et al., 2007) found evidence of higher impulsivity among the AN group; however higher impulsivity did not predict decision making. One study (Garrido & Subira, 2013) found that among AN binge/purge individuals, when differences in education were controlled for, differences in decision making were no longer significant.

Overall, the evidence suggests women currently experiencing AN do display qualitatively different decision making patterns. They showed a preference for choices that resulted in high immediate gains despite high long term negative consequences. Furthermore, it appears

decision making is largely independent of the state of the illness, and appears to be mostly unrelated to depression. More generally, decision making research in AN, where characteristically different decision making has been most consistently demonstrated, has not systematically considered and controlled for potentially confounding variables such as premorbid intellectual functioning and affective disorders. Eating pathology and depression were most consistently considered; however measures of anxiety and personality variables were only intermittently included. In studies where affective, clinical and personality variables were considered, the extent to which these had an impact on decision making performance varied considerably with inconsistent and contradictory results reported.

Specific methodological limitations in the design and conduct of these research studies have become apparent while conducting this review. Some studies had relatively small sample sizes, which often did not enable differentiation of eating disorders subtypes. Diagnostic subgroups (i.e. AN restricting and AN binge/purge) were frequently amalgamated into one larger heterogeneous group. Previous research has demonstrated that AN binge/purge is qualitatively different from restricting subtypes of AN on a range of dimensions that could have an impact on neuropsychological and decision making functioning (Cassin & von Ranson, 2005; Fassino et al., 2002; Roberts et al., 2010; Steinhausen, 2002) and consequently this is a significant limitation. The majority of studies also failed to specify whether participants were recruited exclusively from inpatient or outpatient units. Samples where these populations were mixed would vary significantly according to stage of illness and BMI, both of which may be implicated in decision making performance. These findings could limit the significance and generalizability of decision making differences reported.

Decision Making in Bulimia Nervosa

Nine studies investigated decision making in BN. In comparison with the studies investigating decision making in AN groups, a wider variety of assessment measures were employed. Six studies (Boeka & Lokken, 2006; Boisseau et al., 2013; Bosanac et al., 2007; Brogan et al., 2010; Guillaume et al., 2010; Liao et al., 2009) assessed decision making using the Iowa Gambling Task. Of these studies, four (Boeka & Lokken, 2006; Boisseau et al., 2013; Brogan et al., 2010; Liao et al., 2009) provided evidence of decision making which differed from healthy controls, while one study (Bosanac et al., 2007) did not. In these studies, people with BN performed significantly poorer than healthy controls. They consistently made decisions that resulted in greater longer term losses, and also appeared unable to learn how to improve their performance by failing to learn to avoid disadvantageous card options.

Two studies (Brand et al., 2007; Van den Eynde, 2012) used the Game of Dice Task (GDT)

as the primary measure to assess decision making. Of these, one study (Van den Eynde, 2012) found no differences in decision making once baseline characteristics were accounted for. The other study (Brand et al., 2007) reported evidence of impaired decision making abilities, where people with BN made disadvantageous choices more frequently than healthy controls. This tendency to make decisions with high immediate gains despite high long term negative consequences appears to parallel their decisions made in real life, engaging in behaviour that results in immediate stress or release (e.g. bingeing or purging) despite the long term negative costs (e.g. physical or psychological complications).

The final study (Herrera-Giménez, 2007) used two tasks to assess decision making – the Cups Task and the Ambiguity Task. Under conditions of risk and ambiguity, the clinical group did not differ significantly in terms of number of risk decisions made. However under both conditions, the BN group responded more quickly than the control participants. No other study assessed response latency. However, this study had a poor quality rating (-) due to a lack of information relating to participant recruitment (methods and time frame) and sample characteristics, along with a failure to identify and account for primary confounding variables in the study design and analysis. As such it is questionable the extent to which these findings can be taken as accurate, representative or valid. Seven studies achieved good quality ratings (++) indicating they are of sound methodological quality, and hence their conclusions can be taken as veracious. One study received a fair (+) quality rating due to small sample size and omission of important potentially confounding variables (e.g. illness duration, IQ score, psychopathology, impulsivity and medication use). One positive finding was that in all studies (n=9), participants were only eligible for inclusion once DSM-IV diagnostic criteria were satisfied.

As was found in the AN studies, the findings are somewhat limited as no study differentiated between diagnostic subgroups (i.e. purging/non-purging). Additionally, in all studies the clinical samples were exclusively female. Research has demonstrated that men and women show performance differences on the Iowa Gambling Task (van den Bos, Homberg, & de Visser, 2013), and therefore the extent to which these findings are applicable to males is not clear. Furthermore, two studies (Boeka & Lokken, 2006; Van den Eynde et al., 2012) included in their control comparison groups people who either scored below 2.8 on the Eating Disorder Examination Questionnaire (EDEQ), or those who had minimal BN symptoms. In this regard, the purity of this control groups and hence study conclusions may be compromised. Issues regarding insufficient power are also relevant as several studies included small samples sizes, limiting generalizability of findings. Similarly Boisseau et al. (2013) included people diagnosed with EDNOS in the BN group, which comprises the generalizability of these

results.

Seven studies (Boeka & Lokken, 2006; Boisseau et al., 2013; Bosanac et al., 2007; Brand et al., 2007; Guillaume et al., 2010; Liao et al., 2009; Van den Eynde et al., 2012) included measures of depressive symptomatology; three studies (Bosanac et al., 2007; Brand et al., 2007; Van den Eynde et al., 2012) included measures of anxiety and five studies (Boeka & Lokken, 2006; Boisseau et al., 2013; Bosanac et al., 2007; Guillaume et al., 2010; Van den Eynde et al., 2012) included measures of eating disorder symptomatology. Two studies included specific measures of impulsivity (Brand et al., 2007; Liao et al., 2009), a construct known to be associated with BN (Cassin & von Ronson, 2005), while one study (Boisseau et al., 2013) assessed perfectionism. Two studies (Brogan et al., 2010; Herrera-Giménez, 2007) did not include any additional measures of premorbid intelligence, mood, severity of illness or medication, and consequently these factors were not considered. Seven studies (Boeka & Lokken, 2006; Boisseau et al., 2013; Bosanac et al., 2007; Brand et al., 2007; Guillaume et al., 2010; Liao et al., 2009; Van den Eynde et al., 2012) included measures to specifically estimate premorbid intellectual function. Of these five used the NART, one (Boeka & Lokken, 2006) used the WTAR⁵ (Wechsler, 2001), while another (Brand et al., 2007) used the MWT-B (Lehrl, 1977), the German version of the NART.

Four studies found no correlation between decision making and level of depression (Boeka & Lokken, 2006; Bosanac et al., 2010; Brand et al., 2007; Liao et al., 2009) while two studies found decision making was unrelated to personality characteristics (Brand et al., 2007; Liao et al., 2009). One study (Boisseau et al., 2013) reported perfectionism was differentially associated with decision making under risky, rather than ambiguous decisions. One study (Van den Eynde et al., 2012) found that differences in decision making in the BN group were no longer significant once differences in age, IQ score, depression, anxiety and stress were accounted for. Interestingly, one study (Boeka & Lokken, 2006) found that BN symptoms uniquely predicted decision making performance, while another study (Liao et al., 2009) found obsessive compulsive symptoms were significantly associated with a poorer decision making performance.

As in AN research, there is a lack of consistency and consideration given to important variables. This limits the extent to which study findings can be compared with one another. In BN research, the extent to which study findings differ based on these variables is quite significant; some studies report no relationship, while others report a relationship so strong as to uniquely predict decision making.

⁵ Wechsler Test of Adult Reading (WTAR)

As mood disorders are often considered a core feature of many eating disorders, it would be useful to determine whether this is a confounding factor in research of this nature. From this review, most studies support the tentative conclusion that decision making performance in BN is unrelated to depression. Little consideration has been given to anxiety and its relationship to decision making in BN and other disordered eating populations. Decision making appeared to be largely unrelated to personality variables; however too few studies examined this construct to allow conclusions to be drawn.

In conclusion, of the nine studies that investigated decision making in BN populations, six indicated that people with BN made characteristically different decisions, compared with controls. BN participants made more disadvantageous decisions by choosing options that resulted in greater longer terms losses and they appeared unable to learn to avoid such disadvantageous decisions.

Decision Making in Recovered Anorexia

Four studies (Bosanac et al., 2007; Danner et al., 2012b; Lindner et al., 2012; Tchanturia et al., 2007) examined decision making in women who had recovered from anorexia (ANRec). Overall, no study reported significant differences in decision making in this population compared with healthy controls. Indeed, one study (Lindner et al., 2012) reported the ANRec group actually performed significantly better than healthy controls. Taken together, these results suggest that the decision making style in ANRec could act as an indicator for recovery, when women favour longer term positive consequences (psychological health and weight restoration) over high immediate rewards (avoidance of food). In one study (Danner et al., 2012), a pattern of poorer decision making was evident among ANRec. They tended to have lower scores than the controls but this difference did not reach significance. However, these results contrast with those reported by Galimberti et al. (2012) who report evidence of a shared dysfunctional executive profile among AN women and their relatives, and suggest this finding indicates that poorer decision making may constitute a biological marker of AN (Galimberti et al., 2012). However, this conclusion does not seem to be supported by other findings.

In all studies (n=4), the IGT was employed as the primary measure of decision making. While this is in some ways advantageous (i.e. consistency throughout research studies and therefore facilitates comparison between studies/clinical groups), there are some inherent limitations. Employing a more varied range of decision making tasks could yield more comprehensive and informative data on the nature of the processes that underlie decision

making. Of note, the research studies involved in this section were methodologically robust as all studies attained a good quality rating (++).

With regard to inclusion criteria for the ANRec group, three studies (Bosanac et al., 2012; Danner et al., 2012b; Lindner et al., 2012) specified that the women had previously met DSM-IV criteria for AN. However, there were considerable disparities in the manner in which 'recovery' was defined. In three studies (Danner et al., 2012b; Lindner et al., 2012; Tchanturia et al., 2007), one criterion for recovery was the recommencement of regular menstruation for at least one year. However BMI and duration of recovery varied considerably. For example, Bosanac et al. (2007) defined recovery as the maintenance of a BMI of 18.5 for over twelve months; Tchanturia et al. (2007) defined it as a BMI of 20-25 for at least a year, in addition to regular menstruation; Danner et al. (2012b) included people with a BMI of 18 for at least one year along with a regular menstrual cycle. The definition employed by Lindner et al. (2012) appeared most comprehensive whereby recovery was defined physiologically (BMI of 18.5-26 and regular menstrual cycles), psychologically (no considerable eating disorder cognitions for one year) and behaviourally (no bingeing and compensatory behaviours for one year). Clearly, inconsistencies in the manner in which 'recovery' is defined are evident. The absence of an agreed definition could be potentially misleading thus slowing research progress and interfering with comparability across studies.

With the exception of Lindner et al. (2012), all studies were based on small sample sizes, precluding the opportunity to examine subgroups separately. It also places a question mark over the statistical power of the studies. Like much of the previous research, only women were included, indicating a failure to account for gender differences in decision making styles. One final limitation was the cross-sectional design employed by all four studies. This design fails to address whether any decision making differences were primary illness features or whether they could be attributed to the cognitive and neuroanatomical consequences of starvation.

All but one study (Danner et al., 2012b) included a measure of premorbid intelligence; all included measures of eating disorder psychopathology and all assessed depressive symptomatology. Three studies (Bosanac et al., 2007; Danner et al., 2012b; Lindner et al., 2012) assessed anxiety, and two further studies (Danner et al., 2012b; Lindner et al., 2012) assessed obsessive-compulsive traits.

Two studies (Bosanac et al., 2010; Danner et al., 2012b) found no relationship between decision making and clinical or personality factors. One study (Lindner et al., 2012) reported

decision making was positively correlated with obsessive compulsive traits, but that these differences were no longer significant once current BMI was controlled for. In the same study duration of recovery, AN duration, depression, anxiety and perfectionism were unrelated to decision making. In contrast, one study (Tchanturia et al., 2007) found a significant association between severity of depression and decision making.

In conclusion, the evidence suggests ANRec participants do not display characteristically different decision making when compared with healthy controls, although further research is needed to explore this due to the limited number of studies in this area. Furthermore, it appears decision making in ANRec is largely unrelated to clinical, affective or personality characteristics. This review also indicates that the inclusion of confounding variables into the methodological design is much more consistent in ANRec research. However, as only four studies were included in this review, it is clear that much more research with this population is needed, along with a continued awareness of the need to consider and control for meaningful variables.

Decision Making in Eating Disorder Not Otherwise Specified (ED-NOS)

Within this review, one study (Van den Eynde et al., 2012) investigated decision making in a population with EDNOS. No indication of decision making differences was evident, as assessed by the Game of Dice Task (GDT). A wide range of demographic and clinical variables were considered; however these did not significantly correlate with, or uniquely predict decision making performance. People with EDNOS-bulimia type performed equally as well as controls on decision making task, once differences in age, IQ score, depression anxiety and stress levels were controlled for.

This study had a number of strengths. In particular, the sample sizes were sufficiently large to ensure adequate power to detect significant differences. Heterogeneity within the EDNOS-BN group was also minimised by specific inclusion criteria and by the requirement for participants to have a formal diagnosis to be eligible for inclusion. This study achieved a good quality rating (++) indicating methodological robustness. However, like much of the previous research, the EDNOS sample consisted entirely of females. The dearth of available research involving this population appears consistent with Fairburn & Bohn's (2005) assertion that while EDNOS is one of the categories most frequently used by clinicians, it remains largely ignored by researchers.

Decision Making in Binge Eating Disorder (BED)

Four studies (Danner et al., 2012a; Danner et al., 2013; Davis et al., 2010; Svaldi et al., 2010)

within the current review examined decision making in BED. Two studies (Danner et al., 2012a; Davis et al., 2010) used the IGT, one study (Svaldi et al., 2010) used the GDT to assess decision making, while one study (Danner et al., 2013) used a measure based on the IGT, which is as yet, not validated. Three studies (Danner et al., 2012a; Danner et al., 2013; Svaldi et al., 2010) demonstrated evidence of decision making which differed from controls. BED participants used decision making strategies characterised by high immediate gains and long term costs. This reflects their decision making strategies in everyday life i.e. bingeing to ameliorate negative affective states despite the high risk of long term physical, health and psychological complications. However, one study (Davis et al., 2010) did not find significant decision making biases among individuals with BED. While they did make fewer advantageous choices than healthy controls, once level of education was taken into account, the differences between groups were no longer significant.

Two studies (Danner et al., 2013; Svaldi et al., 2010) included a formal measure of eating pathology, with contrasting results. One study (Svaldi et al., 2010) found no significant relationship between decision making performance and features of disordered eating, whereas Danner et al. (2012a) reported that poorer decision making was associated with greater binge frequency and higher BMI. Evidently, the nature of this relationship remains unclear.

Three studies (Danner et al., 2012a; Danner et al., 2013; Svaldi et al., 2010) included measures of depression. No study found that depression predicted decision making performance, indicating decision making differences could not be attributed to depression severity. A number of unique findings also emerged from each of these studies. One study (Danner et al., 2012a) reported no association between decision making and reward sensitivity; however a marginal association between lower decision making performance and lower punishment sensitivity was evident. A further study (Svaldi et al., 2010) found that higher scores on fun-seeking scales were associated with riskier decisions, while Davis et al. (2010) found that differences in decision making no longer reached significance once education was controlled for. Danner et al. (2013) found, in the context of negative affect, that punishment was associated with more disadvantageous decision making.

As in much of the research discussed thus far, all studies (n=4) used clinical and control groups that consisted entirely of women. Three studies attained good quality ratings (++), while one (Davis et al., 2010) study achieved a fair quality rating (+). In addition, the use of heterogeneous clinical samples limits the quality of research with this clinical population.

Decision making in BED has not been extensively researched and therefore only tentative conclusions can be drawn. Based on the studies in this review, there is some evidence that women with BED have decision making patterns that differ from healthy controls. Decision making differences in BED appear to be independent of levels of depression; however the relationship between decision making and illness severity appears poorly understood due to the discrepancies in findings. Similarly, few conclusions can be drawn on the role of personality variables as differing results are reported.

Decision Making in Obesity

Seven studies (Brogan et al., 2010; Brogan et al., 2011; Danner et al., 2012a; Davis et al., 2004; Davis et al., 2010; Pignatti et al., 2006; Witbracht et al., 2012) investigated decision making in obese adults. All seven studies used the IGT to assess decision making. Six studies (Brogan et al., 2010; Brogan et al., 2011; Danner et al., 2012a; Davis et al., 2004; Davis et al., 2010; Pignatti et al., 2006) used a cross-sectional design. Among these six studies, five reported evidence of differences in decision making ability compared to controls. One study (Davis et al., 2010) found initial differences became insignificant once differences in education were accounted for; however this contrasts with two studies (Brogan et al., 2011; Danner et al., 2012a) who report a significant variation in decision making, even when education level is controlled for.

One study (Witbracht et al., 2012) employed a weight-loss treatment intervention design. In this study, greater weight loss was associated with higher IGT performance, suggesting there is a distinct relationship between body fat loss and performance on the IGT task. This is consistent with findings by Danner et al. (2012a) whereby higher BMI was associated with particular decision making profiles compared to controls. The results of both these studies suggest that decision making styles may be attributable to weight gain. Recognition of the need for mixed gender samples is acknowledged in studies by Brogan et al. (2011) and Pignatti et al. (2006), both of which include mixed gender control and clinical samples. The remaining four studies included women only.

Little information regarding the relationship between decision making and relevant variables (depression, anxiety, BMI, IQ score) was reported. Three studies (Brogan et al., 2011; Davis et al., 2004; Pignatti et al., 2006) included measures of eating pathology and three studies (Danner et al., 2012a; Davis et al., 2004; Pignatti et al., 2006) included measures of depression. Two studies (Brogan et al., 2011; Pignatti et al., 2006) found no relationship between decision making performance and demographic or clinical variables. Davis et al. (2010) also found decision making performance was no longer significant once education was

controlled for. The same study reported that emotionality did not mediate the relationship between decision making and BMI, in that poor decision making did not contribute to higher BMI as a consequence of overeating due to negative mood. Finally, Witbracht et al. (2012) found no association between dietary restraint or disinhibited eating and decision making performance.

A number of critical observations can be made. Firstly, differences in criteria for inclusion in studies were evident. Some studies required a BMI 34+ (Pignatti et al., 2006) for inclusion in the 'obese' sample, others used BMI 30+ (Brogan et al., 2011), others a BMI 25+ (Danner et al., 2012a; Davis et al., 2004), and another accepted a range of 28-37 (Witbracht et al., 2012). A standard definition of 'obesity' is required to facilitate the generalizability of findings. Secondly, only two studies achieved a good quality rating (++) (Brogan et al., 2011; Danner et al., 2012a), while the remainder achieved 'fair' quality ratings (+). Primary issues relating to poor methodological quality included small sample sizes, inconsistent definitions and failure to account for confounding variables. This suggests the quality of obesity research is not optimal. Thirdly, many participants were recruited from psychiatric or weight management clinics, and thus may not be representative of obese people within the general population. Finally, in obesity research as in much of the research discussed previously, only one measure of decision making was employed. Regardless of whether the IGT or GDT was employed, a single task is limited in its ability to comprehensively assess characteristics of decision making.

In conclusion, the evidence tentatively suggests that people with obesity display differences in decision making. Decision making was not however significantly correlated with demographic, clinical or personality factors in the majority of studies. Four of the seven studies reviewed in this section were of fair (+) quality only, indicating that these studies lacked sufficient methodological rigour. The conclusions of these studies may vary if replicated. Their findings therefore should be interpreted with caution.

DISCUSSION

The aim of this paper was to critically review and synthesis the available literature in relation to decision making among disordered eating populations. The review aimed to answer three questions: 1). What are the characteristics of decision making in disordered eating populations and does it differ from healthy populations?; 2). What demographic or illness factors are related to decision making characteristics of people with disordered eating?; 3). Are there similar decision making processes across all disordered eating subtypes?. Additional issues to consider in relation to decision making in disordered eating populations are addressed.

Characteristics of Decision Making in Disordered Eating Populations

Overall, the evidence relating to decision making in disordered eating populations appears inconsistent and often contradictory. Within the two most common eating disorder diagnostic categories, AN and BN, the research evidence appears slightly more conclusive. A small majority of studies in these two disorders appear to suggest that people with AN and BN do display characteristic decision making which is specific to the disorder. Their decision making profile appears to be characterised by a preference to make decisions that result in high immediate rewards and gains but that have negative longer term consequences. They appear to value and consistently choose options that are immediately gratifying, without appropriate consideration of the implications for the longer term. Furthermore, compared with controls, people diagnosed with AN and BN seem unable to learn to avoid disadvantageous decisions. These findings appear to have face validity, as they reflect the decisions made each day in relation to their eating and dietary behaviours; they invariably choose highly rewarding, immediately gratifying options (i.e. restriction, bingeing/purging) despite the associated negative long term consequences (physical, medical, psychological complications, risk of death). Within BN populations, there is emerging evidence for the role of affective, as well as cognitive processes in decision making.

Similar to the findings on AN and BN, people with both obesity and BED appear to display some characteristic decision making patterns. While the evidence is less clear and less extensive, the available studies do appear to suggest people with BED and obesity perform differently to controls, and also appear to make more disadvantageous choices. It is unclear whether obese people can learn to avoid disadvantageous choices.

People diagnosed with ANRec or EDNOS did not display any indication of a decision making impediment. Their performance was comparable to healthy controls. However, little research investigating decision making in these populations is available. The dearth of research

investigations makes it difficult to draw representative and generalizable conclusions, and as such, these findings should be considered with caution.

Demographic and Illness factors associated with Decision Making

Based on the evidence presented in this review, results regarding the relationship between decision making and demographic, clinical and personality factors are inconsistent. Incorporating these confounding variables into the methodological design of some studies has not occurred. Consequently, the available research evidence is limited, both in quantity and in quality. Studies have not consistently examined similar variables, and as such there is little continuity when examining this relationship across clinical populations.

In AN research, characteristically different decision making appears largely independent of the state of the illness and depression. However, premorbid intelligence, anxiety and personality variables have not been thoroughly examined and this is a limitation when drawing conclusions regarding the nature of this relationship. Similarly, in BN decision making performance also appears unrelated to depression, and personality variables such as impulsivity do not seem to be correlated with decision making. In bulimia and anorexia research, the impact of anxiety on decision making has not been consistently considered. Waller (2008) has proposed that the category 'eating disorders' should be re-conceptualised as 'anxiety disorders' within the new DSM-V. It is proposed that anxious/vulnerability core beliefs and eating safety behaviours maintain and elaborate anxiety, and consequently the eating disorder. In light of the prominence of anxiety within eating disorder research, consideration of it as a potentially confounding variable in eating disorder experimental research is warranted.

Furthermore, despite the high co-morbidity of obsessive compulsive symptoms among disordered eating populations, few studies have controlled for this. Research has demonstrated that people with both OCD and anxiety independently display characteristically different decision making on the IGT (DaRocha, Alvarenga, Malloy-Diniz, & Correa, 2011; Miu, Heilman, & Houser, 2008). As anxiety is a common comorbidity in people with eating disorders (Murphy, Straebl, Cooper, & Fairburn, 2010), and OCD is significantly associated with a range of eating disorders (Bellodi et al., 2001), the extent to which each clinical disorder uniquely contributes to decision making patterns is difficult to establish.

For people with ANRec and EDNOS, a clear limitation is the lack of research conducted. However, based on the studies within this review, neither people with ANRec nor EDNOS demonstrate any relationship between patterns of decision making and clinical, affective and personality characteristics.

In BED, decision making differences also appear independent of levels of depression. However incongruent results are reported regarding the relationship between illness severity or personality characteristics and decision making. Studies report contrasting results. Therefore few conclusions can be drawn. A significant limitation also pertains to the lack of research conducted with this clinical population. More research is necessary to further elucidate the nature of this relationship among individuals diagnosed with BED.

While decision making among people who are obese also appears unrelated to demographic, clinical or personality variables, the quality of studies reviewed in this section was poorer and it is possible the results of these studies may vary if replicated. As such, additional research is warranted to further our understanding of the contribution of these variables to decision making performance in people with obesity.

Decision Making Processes across Disordered Eating subtypes

Generally, among the AN and BN populations who displayed disadvantageous decision making, similar decision making patterns were apparent. Some comparable patterns were evident, where decision making was characterised by a preference for immediate gains despite long term adverse consequences. That similar decision making patterns were found in two primary eating disorder diagnostic categories tentatively lends support to the transdiagnostic model of eating disorders (Fairburn, Cooper, & Shafran, 2003) . This may suggest the presence of similar core psychopathological processes. Characteristically different eating disorder styles were not found in the remaining diagnostic category (EDNOS). However research is clearly lacking with this clinical population.

However, even among disorders with similar behavioural typographies, there were sometimes subtle differences in decision making patterns. While both people with BED and BN showed some elements of disadvantageous decision making when research findings were compared, the evidence suggests people with BED choose safer options marginally more often than people with BN (Svaldi et al., 2010). Furthermore, there appear to be differences in the manner in which people who restrict their eating make decisions compared with those who binge or purge. For example, diminished skin conductance responses (SCR) have been reported in people with AN who have difficulties in decision making (Liao et al., 2009; Tchanturia et al., 2007), however this has not been found in people with BN (Liao et al., 2009), even though similar decision making profiles have been found in both AN and BN populations. This may suggest that personality factors are important for decision making.

There is also variation in the extent to which weight and BMI have an impact upon decision making abilities. Among AN populations, some research has suggested IGT performance is independent of BMI. Among obese adults however higher BMI has been associated with more disadvantageous decision making. Some recent research (Witbracht et al., 2012) has demonstrated that decision making improves with weight loss among obese adults (Danner et al., 2012a). This suggests that the role of BMI in decision making may be different in different eating disorders.

Across all disordered eating populations, the relationship between decision making performance and variables such as education, eating disorder symptomatology, personality characteristics and mood is quite inconsistent. No stable pattern or correlation has been found, and as such this indicates one aspect of decision making that is not fully understood.

Additional issues to Consider

Finally, some additional issues emerged from the review that are pertinent and merit consideration. In the context of obesity and BED, the role of education and its impact on decision making should be considered. Previous research has demonstrated a link between education level and decision making performance on the IGT (Davis et al., 2008). Within eating disorder research thus far, the link between education or IQ score and decision making is poorly established. However, as obesity and being overweight are associated with lower socioeconomic status (Aballay, Osella, Celi, & Diaz, 2009), this variable should be monitored and routinely incorporated into research designs..

BED research has indicated that some people, in addition to making disadvantageous decisions (Svaldi et al., 2010), also make inappropriate use of feedback. It is suggested this is in line with the clinical presentation of people with BED. While cognitively they may be able to consider options in a risky situation (i.e. imminent weight gain due to binges) they may make inappropriate use of this feedback and be swayed by immediate rewards (i.e. palatable food).

Some additional explanations have been proposed that might account for the variation in findings of research on AN and BN. As is evident from the review, clinical samples are rarely sub-divided according to eating disorder subcategories. Peat, Mitchell, Hoek, & Wonderlich (2009) have demonstrated that there is often frequent crossover from restricting to binge/purge subtypes, depending on the phase of the illness, and also from AN and BN. As discussed by Milos, Spindler, Schnyder, & Fairburn (2005), migration between eating disorder diagnoses is common such that people with BN may have a history of AN and vice versa. This may explain some variability in study outcomes. Garrido & Subira (2013) have suggested

there may be different factors underlying AN and BN, and this diagnostic crossover could be partially responsible for the inconsistent research findings.

Finally, the extent to which particular decision making patterns in AN could be considered state- or trait-dependent is not clear. Within AN research, many findings have suggested that such decision making styles are significant, independent of illness severity. However, the absence of such a decision making pattern among ANRec participants lends support to the view that such decision making may be a state condition. Longitudinal designs are needed to further our understanding of this, and to address whether decision making differences are primary features or can be attributed to the secondary effects of starvation.

In conducting this review, it was noted that research investigating decision making in disordered eating population is infused with deficit-laden language. Terms such as 'deficiencies', 'deficits', and 'impairments' contribute to a view of people with eating disorders as predominantly lacking in skills and competencies, with the underlying assumption that such styles warrant addressing and correction. What is missing from this framework is an understanding or acknowledgment that they are comprised also of strengths, and that their particular decision making styles may be adaptive for them, at that particular point in their lives.

Future Research

There are several domains on which future research on decision making in disordered eating populations should focus. Generally, studies need to include larger, more homogenous samples of clinical participants. Larger sample sizes are necessary to ensure that studies undertaken have adequate power to detect performance differences and to ensure generalizability of reported findings. Efforts should be made to address the heterogeneity apparent in many clinical samples, and it is recommended that within broader eating disorder diagnostic categories, groups are differentiated according to subtypes of eating pathology. Furthermore, to enhance representativeness of obtained data, recommended that more research is conducted with males with disordered eating. Accounting for gender differences in tasks of decision making is also important if the field is to advance. The majority of decision making research has been conducted using the IGT or the GDT. Future research would benefit from using a wider variety of validated assessment tools. Studies would also benefit from using multiple measures of decision making within studies to establish a more comprehensive decision making profile among participants.

While research studies have begun to include additional measures of executive functioning, this is not routinely included as part of many study designs. Increasingly, there is a need to assess and determine the relationship between decision making and other executive functions such as working memory, attention, and cognitive flexibility. Consideration of participants conscious knowledge of decision making tasks used is also warranted.

Consistent inclusion of measures of potential confounding variables (i.e. education, illness duration and severity) is necessary to enhance our understanding of their role and the impact they have in making self-serving and advantageous decisions. Specifically, in decision making research involving BN and BED populations, it is recommended that measures of impulsivity be routinely administered, as impulsivity and impulse control difficulties are implicated in these disorders (Shroff & Thompson, 2006). The inclusion of such measures would facilitate further examination of the relationship between BN/BED, impulsivity and decision making. Furthermore, future research studies need to ensure that control groups used in eating disorder research are as 'pure' as possible. Studies should avoid the inclusion of people who have minimal or sub-threshold eating disorder pathology. In line with research evidence, it is suggested that control groups consist of people who, on the EDEQ, ideally score between 0-1, and who do not score above 2 (Carter, Stewart, & Fairburn, 2001).

Many of the studies included within this review used a cross sectional design. One limitation of this design is that studies are incapable of explaining whether any observed differences are state or trait dependent. Future research should begin to adopt longitudinal designs to explore this. Finally, many of the studies that considered premorbid intelligence used the NART. However this is now recognised as being outdated and future research should consider using the ToPF⁶ (Wechsler, 2011).

Methodological Limitations of this Review

Only studies that included an experimental task of decision making were considered eligible for inclusion in the review. Consequently, studies that examined decision making using neuropsychological measures or additional assessment tools were not included. This is an acknowledged limitation, and restricts the extent to which broader conclusions can be made about the processes involved in decision making in people with disordered eating. Additionally, while the search terms employed endeavoured to be as representative as possible in yielding relevant papers, there is a possibility that a number of relevant journal articles were missed during the search process. Furthermore, prior research has highlighted the potential for a positive publication bias in systematic reviews (Bax & Moons, 2011; Guyatt

⁶ Test of Premorbid Functioning (ToPF)

et al., 2008). It is possible studies that did not find evidence of characteristically different decision making in disordered eating populations were not published as frequently as those with significant results. In this context, it is possible that studies with significant results are over-represented in this review. These limitations should be considered when interpreting the results of this review.

CONCLUSIONS

Despite the variation among studies, there appears to be a link with disordered eating behaviour and specific types of decision making skills. This decision making bias appears most evident in AN and BN populations. While there may be some suggestion that this profile is also evident among people with BED and obesity, the evidence is less conclusive. No differences in decision making are reported in ANRec or EDNOS populations. However, surprisingly little research has been conducted in both these clinical groups. Whether such decision making styles are a state or trait issue is unknown. The interrelationship between confounding factors such as level of education, illness severity, mood and clinical and personality characteristics is neither clearly explored nor clearly understood.

REFERENCES

- Aballay, L.R., Osella, A.R., Celi, A., & Diaz, M.D. (2009). Overweight and obesity: prevalence and their association with some social characteristics in a random sample based population based study in Cordoba city, Argentina. *Obesity Research and Clinical Practice*, 3, 75-83.
- Abbate-Daga, G., Buzzichelli, S., Amianot, F., Rocca, G., Marzola, E., McClintock, S.M., & Fassino, S. (2011). Cognitive flexibility in verbal and non-verbal domains and decision making in anorexia nervosa patients: a pilot study. *BMC Psychiatry*, (11), 162.
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders (4th ed., text rev.)*. Washington, DC: Author
- Avena, N.M., & Bocarsly, M.E. (2012). Dysregulation of brain reward systems in eating disorders: Neurochemical information from animal models of binge eating, bulimia nervosa, and anorexia nervosa, *Neuropharmacology*, 62 (1), 87-96.
- Bax, L., & Moons, K.G. (2011). Beyond publication bias. *Journal of Clinical Epidemiology*, 64(5), 459-462.
- Bayard, S., Raffard, S., & Gely-Nergeot, M. (2011). Do facets of self-reported impulsivity predict decision-making under ambiguity and risk? Evidence from a community sample. *Psychiatry Research*, 190, 322-326.
- Bechara, A., Damasio, A.R., Damasio, H., & Anderson, S.W. (1994). Insensitivity to future consequences following damage to human prefrontal cortex. *Cognition*, 50, 7-15.
- Bellodi, L., Cavallini, M.C., Bertelli, S., Chiapparino, D., Riboldi, C., & Smeraldi, E. (2001). Morbidity risk for obsessive-compulsive spectrum disorder in first degree relative of patients with eating disorder. *American Journal of Psychiatry*, 158, 563-569.
- Boekka, A.G., & Lokken, K.L. (2006). The Iowa Gambling task as a measure of decision making in women with bulimia nervosa. *Journal of the International Neuropsychological Society*, 12, 741-745.
- Boisseau, C.L., Thompson-Brenner, H., Pratt, E.M., Farchione, T.J. & Barlow, D.H. (2013). The relationship between decision-making and perfectionism in obsessive-compulsive disorder and eating disorders. *Journal of Behaviour Therapy and Experimental Psychiatry*, 44(3), 316-321.
- Bosanac, P., Kurlender, S., Stojanovska, L., Hallam, K., Norman, T., McGrath, C., Burrows, G., Wesnes, K., Manktelow, T., & Olver, J. (2007). Neuropsychological study of underweight and "weight-recovered" anorexia nervosa compared with bulimia nervosa and normal controls. *International Journal of Eating Disorders*, 40, 613-621.
- Bowman, C.H. & Turnbull, O.H. (2003). Real versus facsimile reinforcers on the Iowa Gambling Task. *Brain and Cognition*. 53, (2) 207-210
- Bowman, C.H. Evans, C.E.Y. & Turnbull, O.H. (2005). Artificial time constraints on the Iowa Gambling Task: The effects on behavioural performance and subjective experience. *Brain and Cognition*. 57, (1) 21-25.
- Brand, M., Labudda, K., & Markowitsch, H.J. (2006). Neuropsychological correlates of

decision making in ambiguous and risky situations. *Neural Networks*, 19, 1266-1276.

- Brand, M., Franke-Sievert, C., Jacoby, G.E., Markowitsch, H.J., & Tuschen-Caffier, B. (2007). Neuropsychological correlates of decision making in patients with bulimia nervosa. *Neuropsychology*, 21(6), 742-50.
- Brand, M., Fujiwara, E., Borsutzky, S., Kalbe, E., Kessler, J., & Markowitsch, H.J. (2005). Decision-making deficits of Korsakoff patients in a new gambling task with explicit rules-associated with executive functions. *Neuropsychology*, 19, 267-277.
- Brogan, A., Hevey, D., & Pignatti, R. (2010). Anorexia, bulimia, and obesity: shared decision making deficits on the Iowa Gambling Task (IGT). *Journal of the International Neuropsychological Society*, 16(4), 711-715.
- Brogan, A., Hevey, D., O'Callaghan, G., Yoder, R., & O'Shea, D. (2011). Impaired decision making among morbidly obese adults. *Journal of Psychosomatic Research*, 70(2), 189-196.
- Bruinsma, K., & Taren, D.L. (1999). Chocolate: food or drug? *Journal of the American Dietetic Association*, 99(10), 1249-56.
- Bulik, C.M., Sullivan, P.F., & Kendler, K.S. (2003). Genetic and environmental contributions to obesity and binge eating. *International Journal of Eating Disorders*, (33), 293-298
- Carter, J.C., Stewart, D.A., & Fairburn, C.G. (2001). Eating disorder examination questionnaire: Norms for young adolescent girls. *Behaviour Research and Therapy*, 39, 625-32.
- Cassin, S.E., & von Ronson, K.M. (2005). Personality and eating disorders: a decade in review. *Clinical Psychology Review*, 25(7), 895-916
- Cavedini, P., Bassi, T., Ubbiali, A., Casolari, A., Giordani, S., Zorzi, C., & Bellodi, L., (2004). Neuropsychological investigation of decision making in anorexia nervosa. *Psychiatry Research*, 127, 259-266.
- Cavedini, P., Zorzi, C., Bassi, T., Gorini, A., Baraldi, C., Ubbiali, A., & Bellodi, L. (2006). *Psychiatry Research*, 145, 179-187.
- Dahlbaeck, O. (1990). Personality and risk taking. *Personality and Individual Differences*, 11, 1235-1242.
- Damasio, A.R. (1994). *Descartes' error: Emotion, reason, and the human brain*. New York: Grosset/Putnam.
- Danner, U.N., Ouwehand, C., van Haastert, N.L., Hornsveld, H., & de Ridder, D.T.D. (2012a). Decision-making impairments in women with binge eating disorder in comparison with obese and normal weight women. *European Eating Disorders Review*, 20(10), e56-e62.
- Danner, U.N., Sanders, N., Smeets, P.M.A., van Meer, F., Adan, R.A.H., Hoek, H.W., & van Elburg, A.A. (2012b). Neuropsychological Weaknesses in Anorexia Nervosa: Set-Shifting, Central Coherence, and Decision Making in Currently Ill and Recovered Women. *International Journal of Eating Disorders*, 45, 685-694.
- Danner, U.N., Evers, C., Sternheim, L., van Meer, F., van Elburg, A.A., Geerets, T.A.M.,

- Breteler, L.M.T., & de Ridder, D.T.D. (2013). Influence of negative affect on choice behaviour in individuals with binge eating pathology. *Psychiatry Research*, *207*, 100-106.
- DaRocha, F.F., Alvarenga, N.B., Malloy-Diniz, L., & Correa, H. (2011). Decision-making impairment in obsessive-compulsive disorder as measured by the Iowa Gambling Task. *Arq Neuropsiquiatr*, *69*(4), 642-647.
- Davis, C., Fox, J., Patte, K., Curtis, C., Strimas, R., Reid, C., & McCool, C. (2008). Education level moderates learning on two versions of the Iowa Gambling Task. *Journal of the International Neuropsychological Society*, *14*, 1063-1068.
- Davis, C., Levitan, R.D., Muglia, P., Bewell, C., & Kennedy, J.L. (2004). Decision-making deficits and overeating: A risk model for obesity. *Obesity Research*, *12*(6), 929-935.
- Davis, C., Patte, K., Curtis, C., & Reid, C. (2010). Immediate pleasures and future consequences. A neuropsychological study of binge eating and obesity. *Appetite*, *54*, 208-213.
- Dunn, B. D., Dalgleish, T., & Lawrence, A. D. (2006). The somatic marker hypothesis: a critical evaluation. *Neuroscience and Biobehavioural Reviews*, *30*, 239–271.
- Fagundo, A.B., de la Torre, R., Jiménez-Murcia, S., Aguera, Z., Granero, R., Tárrego, S., Botella, C., Banos, R., Fernández-Real, J.M., Rodríguez, R., Forcano, L., Fruhbeck, G., Gómez-Ambrosi, J., Tinahones, F.J., Fernández-García, J.C., Casanueva, & F.F., Fernández-Aranda, F. (2012). Executive Functions Profile in Extreme Eating/Weight Conditions: From Anorexia Nervosa to Obesity. *PLoS ONE, Medicine*, *7*(8), e43382.
- Fairburn, C. & Bohn, K. (2005). Eating disorder NOS (EDNOS): an example of the troublesome “not otherwise specified” (NOS) category in DSM-IV. *Behaviour Research and Therapy*, *43*(6), 691-701.
- Fairburn, C.G., Cooper, Z., & Shafran, R. (2003). Cognitive behaviour therapy for eating disorders: a “transdiagnostic” theory and treatment. *Behaviour Research and Therapy*, *41*(5), 509-528.
- Fassino, S., Piero, A., Daga, G.A., Leombruni, P., Mortara, P., & Rovera, C.G. (2002). Attentional biases and frontal functioning in anorexia nervosa. *International Journal of Eating Disorders*, *31*, 274-283.
- Fischer, S., Smith, G.T., & Anderson, K.G. (2003). Clarifying the role of impulsivity in bulimia nervosa. *International Journal of Eating Disorders*, *33*(4), 406-41.
- Frith, U. (1989). Autism and "Theory of Mind". In C. Gillberg (Ed.), *Diagnosis and Treatment of Autism*. (pp. 33-52). New York: Plenum Press.
- Galimberti, E., Fadda, E., Cavallini, M.C., Martoni, R.M., Erzegovesi, S., & Bellodi, L. (2012). Executive functioning in anorexia nervosa patients and their unaffected relatives. *Psychiatry Research*, <http://dx.doi.org/10.1016/j.psychres.2012.10.001>.
- Garrido, I., & Subira, S. (2013). Decision-making and impulsivity in eating disorder patients. *Psychiatry Research*, *207*, 107–112.
- Gilbert, N. (2009). *Disclosure of eating disorders and subsequent help seeking*. Unpublished Doctoral Dissertation, Volume I. Birmingham: University of Birmingham.

- Giorgetta, C., Grecucci, A., Zuanon, S., Perini, L., Balestrieri, M., Bonini, N., Sanfey, A.G., & Brambilla, P. (2012). Reduced Risk-Taking Behavior as a Trait Feature of Anxiety. *Emotion, 12*(6), 1373-1383.
- Grant, S., Contoreggi, C., & London, E.D. (2000). Drug abusers show impaired performance in a laboratory test of decision making. *Neuropsychologia, 38*, 1180-1187.
- Green, M. W., Elliman, N. A., Wakeling, A., & Rogers, P. J. (1996). Cognitive functioning, weight change and therapy in anorexia nervosa. *Journal of Psychiatric Research, 30*, 401-410.
- Grigson, P. S. (2002). Like drugs for chocolate: Separate rewards modulated by common mechanisms? *Physiology & Behavior, 76*(3), 389-395.
- Grilo, C.M., Hrabosky, J. I., White, M.A., Allison, K.C., Stunkard, A.J., & Masheb, R.M. (2008). Over-evaluation of shape and weight in binge eating disorder and overweight controls: Refinement of a diagnostic construct. *Journal of Abnormal Psychology, 117*(2), 414-419.
- Guillaume, S., Sang, C.N.T., Jaussent, I., Raingard, I., Bringer, J., Jollant, F., & Courtet, P. (2010). Is decision making really impaired in eating disorders? *Neuropsychology, 24*(6), 808-812.
- Guyatt, G.H., Oxman, A.D., Vist, G., Kunz, R., Falck-Ytter, Y., Alonso-Coello, P., & Schünemann, H.J. (2008). Rating quality of evidence and strength of recommendations GRADE: an emerging consensus on rating quality of evidence and strength of recommendations. *BMJ, 336*, 924-926.
- Heatherington, T.F., & Wagner, D.D. (2011). Cognitive neuroscience of self-regulation failure. *Trends in Cognitive Science, 15*(3), 132-139.
- Herrera Gimenez, M. (2011). Bulimia nervosa: Emotions and making decisions. *Revista de Psiquiatría y Salud Mental (Barc), 4*(2), 88-95.
- Huq, S. F., Garety, P. A., & Hemsley, D. R. (1988). Probabilistic judgements in deluded and non-deluded subjects. *Quarterly Journal of Experimental Psychology, 40A*, 801-812.
- Janis, I. L. (1972). *Victims of Groupthink: a Psychological Study of Foreign-Policy Decisions and Fiascos*. Boston: Houghton Mifflin.
- Kahneman, D., & Tversky, A. (1979). Prospect Theory: An Analysis of Decision under Risk. *Econometrica, 47*(2), 263-292.
- Kingston, K., Szukler, G., Andrewes, D., Tress, B., & Desmond, P. (1996). Neuropsychological and structural brain changes in anorexia nervosa before and after refeeding. *Psychological Medicine, 26*, 15-28.
- Lawrence, N.S., Wooderson, S., Mataix-Cols, D., David, R., Speckens, A., & Phillips, M.L. (2006). *Neuropsychology, 20* (4), 406-419.
- Lehrl, S. (1977). *Mehrfachauswahl-Wortschatz-Intelligenztest (MWT-B)*. Perimed, Erlangen.
- Levin, I.P., Weller, J.A., Pederson, A., & Harshman, L. (2007). Age-related differences in adaptive decision making: Sensitivity to expected value in risky choice. *Judgment and Decision Making, 2*(2), 225-233.

- Leykin, Y., Sewell Roberts, C., & DeRubeis, R.J. (2011). Decision-Making and Depressive Symptomatology. *Cognitive Therapy and Research*, 35(4), 333-341.
- Liao, P., Uher, R., Lawrence, N., Treasure, T., Schmidt, U., Campbell, I., Collier, D., & Tchanturia, K. (2009). An examination of decision making in bulimia nervosa. *Journal of Clinical and Experimental Neuropsychology*, 31 (4), 455-461.
- Lindner, S.E., Fichter, M.M., & Quadflieg, N. (2012). Decision-making and planning in full recovery of anorexia nervosa. *International Journal of Eating Disorders*, 45(7), 866-875.
- Mazas, C.A., Finn, P.R., & Steinmetz, J.E. (2000). Decision-making biases, antisocial personality, and early onset alcoholism. *Alcoholism, Experimental & Clinical Research*, 24(7), 1036-40.
- Metcalf, J., & Mischel, W. (1999). A hot/cool-system analysis of delay of gratification: Dynamics of willpower. *Psychological Review*, 106, 3-19.
- Milos, G., Spindler, A., Schnyder, U., & Fairburn, C.G. (2005). Instability of eating disorder diagnoses: prospective study. *The British Journal of Psychiatry*, 185, 573-578.
- Miu, A. C., Heilman, R. M., & Houser, D. (2008). Anxiety impairs decision-making: Psychophysiological evidence from an Iowa Gambling Task. *Biological Psychology*, 77, 353–358.
- Moeller, F.G., Barratt, E.S., Dougherty, D.M., Schmitz, J.M., & Swann, A.C. (2001). Psychiatric aspects of impulsivity. *American Journal of Psychiatry*, 158, 1783-1793.
- Moher, D., Liberati, A., Tetzlaff, J., & Altman, D.G. (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *PLoS Med* 6(7): e1000097
- Murphy, R., Straebl, S., Cooper, Z., & Fairburn, C.G. (2010). Cognitive Behavioural Therapy for Eating Disorder. *Psychiatric Clinics of North America*, 33(3), 611-627.
- National Institute of Health and Clinical Excellence. (2007). *The guidelines manual*. Retrieved from <http://www.nice.org.uk/guidelinesmanual>
- Nelson, H.E. & Willison, J.R. (1991). *The Revised National Adult Reading Test–Test manual*. Windsor, UK: NFER-Nelson.
- Norman, D. A., & Shallice, T. (2000). Attention to Action: Willed and Automatic Control of Behavior. In M. S. Gazzaniga (Ed.), *Cognitive Neuroscience: A Reader* (pp. 376-390):Wiley Backwell.
- O'Brien, K.M.O., & Vincent, N.K. (2003). Psychiatric comorbidity in anorexia and bulimia nervosa: Nature, prevalence, and causal relationships. *Clinical Psychology Review*, 23, 57-74.
- Overman, W. H. (2004). Sex differences in early childhood, adolescence, and adulthood on cognitive tasks that rely on orbital prefrontal cortex. *Brain and Cognition*, 55, 134 - 147.
- Peat, C., Mitchell, J.E., Hoek, H.W., & Wonderlich, S.A. (2009). Validity and utility of subtyping anorexia nervosa. *International Journal of Eating Disorders*. 42,590–594.

- Pelchat, M. L. (2002). Of human bondage: Food craving, obsession, compulsion, and addiction. *Physiology & Behavior*, *76*(3), 347-352.
- Pignatti, R., Bertella, L., Albani, G., Mauro, A., Molinari, E., & Semenza, C. (2006). Decision-making in obesity: A study using the Gambling Task. *Eating and Weight Disorders*, *11*, 126–132.
- Roberts, M., Tchanturia, K., & Treasure, J. (2010). Exploring the Neurocognitive Signature of Poor Set-shifting in Anorexia and Bulimia Nervosa. *Journal of Psychiatric Research*, *44*(14), 964-70.
- Rogers, R. D., Owen, A. M., Middleton, H. C., Williams, E. J., Pickard, J. D., Sahakian, B. J., & Robbins, T.W. (1999). Choosing between small, likely rewards and large, unlikely rewards activates inferior and orbital prefrontal cortex. *Journal of Neuroscience*, *19*, 9029-9038.
- Shroff, H. & Thompson, J.K. (2006). The tripartite influence model of body image and eating disturbance: A replication with adolescent girls. *International Journal of Research*, *3*, 17-23.
- Smink, F.R.E., van Hoeken, D., & Hoek, H.W., (2012). Epidemiology of Eating Disorders: Incidence, Prevalence and Mortality Rates. *Current Psychiatry Reports*, *14*(4), 406-414.
- Steiger, H., Gauvin, L., Jabalpurwala, S., Séguin, J.R., & Stotland, S. (1999). Hypersensitivity to social interactions in bulimic syndromes: Relationship to binge eating. *Journal of Consulting and Clinical Psychology*, *67*(5), 765-775.
- Stein, R.I., Kenardy, J., Wiseman, C.V., Douchis, J.Z., Arnow, B.A., & Wilfley, D.E. (2007). What's driving the binge in binge eating disorder. A prospective examination of precursors and consequences. *International Journal of Eating Disorders*, *40*(3), 195-203.
- Steinhausen, H. (2002). The outcome of anorexia nervosa in the 20th century. *American Journal of Psychiatry*, *159*, 1284-1293.
- Steingroever, H., Wetzels, R., Hortsman, A., Neumann, J., & Wagenmaers, E. (2013). Performance of Healthy Participants on the Iowa Gambling Task. *Psychological Assessment*, *25*(1), 180-93
- Svaldi, J., Brand, M., & Tuschen-Caffier, B. (2010). Decision making impairments in women with binge eating disorder. *Appetite*, *54*, 84-92.
- Tchanturia, K., Liao, P., Forcano, L., Fernandez-Aranda, F., Uher, R., Treasure, J., Schmidt, U., Penelo, E., Granero, R., Jimenez-Murica, S., Sánchez, I. & Campbell, I.C. (2012). Poor Decision Making in Male Patients with Anorexia Nervosa. *European Eating Disorders Review*, *20*, 169-73.
- Tchanturia, K., Liao, P., Uher, R., Lawrence, N., Treasure, J., & Campbell, I. (2007). An investigation of decision making in anorexia nervosa using the Iowa Gambling Task and skin conductance measurements. *Journal of the International Neuropsychological Society*, *13*, 635-641.
- Tchanturia, K., Morris, R., Surguladze, S. & Treasure, J. (2002). An examination of perceptual and cognitive set shifting tasks in acute anorexia nervosa and following

recovery. *Eating and Weight Disorders* 7, 312–316.

- Tversky, A., & Kahneman, D. (1974). Judgment under Uncertainty: Heuristics and Biases. *Science*, 185(4157), 1124-1131.
- Van den Bos, R., Homberg, J., & de Visser, L. (2013). A critical review of sex differences in decision-making tasks: Focus on Iowa Gambling Task. *Behavioural Brain Research*, 238, 95-108.
- Van den Eynde, A., Samarawickrema, N., Kenyon, M., DeJong, H., Lavender, A., Startup, H., & Schmidt, U. (2012). A study of neurocognition in bulimia nervosa and eating disorder not otherwise specified-bulimia type. *Journal of Clinical and Experimental Neuropsychology*, 42 (1), 67-77.
- Vitousek, K., & Manke, F. (1994). Personality variables and disorders in anorexia nervosa and bulimia nervosa. *Journal of Abnormal Psychology*, 103(1), 137-147.
- Waller, G. (2008). A trans-transdiagnostic model of the eating disorders: A new way to open the egg? *European Eating Disorders Review*, 16 (3), 165-172.
- Wang, Y. & Ruhe, G. (2007). The Cognitive Process of Decision Making. *International Journal of Cognitive Informatics and Natural Intelligence*, 1(2), 73-85.
- Wang, Y., Wang, Y., Patel, S., & Patel, D. (2004). A layered reference model of the brain (LRMB). *IEEE Transactions on Systems, Man, and Cybernetics (C)*, 36(2), 124-133
- Wechsler, D. (2001). *Wechsler Test of Adult Reading*. San Antonio: The Psychological Corporation.
- Wechsler, D. (2011). *Test of Premorbid Functioning- UK*. San Antonio: The Psychological Corporation.
- Wilson, G.T. (2010). Eating disorders, obesity and addiction. *European Eating Disorders Review*, 18(5), 341-351.
- Witbracht, M.G., Laugero, K.D., Van Loan, M.D., Adams, S.H., & Keim, N.L. (2012). Performance on the Iowa Gambling Task is related to magnitude of weight loss and salivary cortisol in a diet-induced weight loss intervention in overweight women. *Physiology & Behaviour*, 106(2), 291-7.
- World Health Organization (1993). *The ICD-10 classification of mental and behavioral disorders*. Diagnostic criteria for research. Geneva: World Health Organization.

Paper Two:**Investigating the ‘Jumping to Conclusions’ Bias in people with Anorexia**

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Declaration of Conflicting Interests

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ABSTRACT

'Jumping to conclusions' (JTC) is an established reasoning bias in people with psychosis and delusion proneness. Research investigating the JTC bias in other clinical populations remains in its infancy. This study investigated whether individuals with anorexia (AN) would display the JTC bias compared with healthy controls, and if so, whether the bias would be greater in response to emotionally salient information. The study also investigated whether delusional (measured by the BABS scale), would be correlated with the JTC bias. Three versions of the 'Beads tasks' were employed; the standard version and two emotionally salient survey tasks. Clinical and demographic questionnaires were administered. Results indicated a majority (55.6%) of people with AN (n = 26) displayed poor insight into their eating disorder beliefs, but did not JTC compared with healthy controls (n = 33) on any tasks. Level of delusional in the AN group was not correlated with JTC bias. Groups differed significantly on anxiety, depression and Body Mass Index (BMI), but not on age or premorbid functioning. Findings suggest that although a majority of people with AN demonstrate poor insight into their eating disorder beliefs, they do not 'jump to conclusions'. However study replication is essential.

Keywords

Jumping to conclusions

Decision making

Anorexia Nervosa

Eating Disorder

Highlights

- People with AN do not appear to 'jump to conclusions' when making decisions; they do not appear to make hasty decisions on the basis of little evidence.
- The majority of AN participants demonstrated limited insight into their eating disorder related beliefs. In only a minority of participants were these beliefs of 'delusional' intensity.
- A continuum of delusional in AN may exist, ranging from overvalued to delusional ideation.
- Study replication is necessary.

INTRODUCTION

Anorexia nervosa (AN) is a serious, often chronic, psychiatric disorder. With one of the highest rates of mortality of all psychiatric disorders (Crow et al., 2009), AN predominantly affects women. According to the Diagnostic and Statistical manual of Mental Disorders, a refusal to maintain a Body Mass Index (BMI) within the normal range through rigid dietary restriction and excessive exercise, along with a distorted body image and beliefs regarding weight and shape generally characterize the disorder (American Psychiatric Association, 2000). The behavioural manifestations of AN (i.e. restriction, exercise) are clearly outlined, and this has been considered in the context of decision making research. Some characteristic behavioural and decision making patterns appear evident in AN whereby people appear to favour decisions which result in immediate rewards despite long term, negative consequences (Cavedini et al., 2004; McKenna, Haddock, & Fox, In Preparation; Tchanturia et al., 2007). For example, people with AN choose the immediate reward of dietary restriction, purging and/or excessive exercise, despite the risk of long term medical and psychological consequences (i.e. osteoporosis, amenorrhoea/infertility, anxiety, and depression). Research indicating presence of particular decision making styles is not incontrovertible however, as several studies have reported no differences in decision making among AN populations (Bosanac et al., 2007; Danner et al., 2012; Guillaume et al., 2010) compared with healthy controls.

In addition to the behavioural features of the disorder, the presence and importance of distorted cognitions and beliefs evident in AN is now well recognized. Veale (2002) suggest over-valued beliefs (i.e. “an unreasonable and sustained belief that is maintained with less than delusional intensity”; American Psychiatric Association, 2000) dominate the clinical presentation of AN (Fairburn & Cooper, 1993). From this perspective, AN individuals hold beliefs with intense pertinacity but they are not usually considered delusional i.e. they demonstrate an awareness that their beliefs may not be objectively true. A slightly different stance is proposed by Steinglass, Eisen, Attia, Mayer, & Walsh, (2007) who report a significant minority of people with AN hold weight and shape-related cognitions that could be categorized as delusional. The ‘delusional’ aspect relates primarily to the rigidity and fixity of beliefs and experiences, despite the absence of supporting evidence. Steinglass et al. (2007) highlight that these eating disorder-related irrational beliefs may help account for the clinical observation that an appreciation of being ill does not necessarily translate into an ability to engage in treatment programmes. This denial of illness and rigidity of food and body image cognitions could be conceptualized as similar to delusional beliefs (Steinglass et al., 2007; Wittorf et al., 2012).

Reese, McNally & Wilhelm (2011) propose that the most reliable information processing bias associated with delusions is a probabilistic reasoning bias called the ‘jumping to conclusions’

(JTC) bias (Huq, Garety & Hemsley, 1998). Within psychosis literature, this bias is well-replicated (Fine, Gardner, Craigie, & Gold, 2007) and describes a pattern of reasoning in people with delusions which is characterised by making hasty decisions on the basis of little evidence. Within cognitive models of delusions, it is proposed that the JTC bias may contribute to the maintenance or development of delusions through the mechanism of reduced information gathering (Broome et al., 2007; Colbert & Peters, 2002; Freeman, Pugh & Garety, 2008). Gathering limited information increases the likelihood of reaching incorrect conclusions (Lincoln, Salzman, Ziegler, & Westermann, 2011). Van Dael et al. (2006) also report evidence of the JTC bias among first-degree relatives of individuals with schizophrenia and propose that this reasoning style could indicate a vulnerability for developing delusional beliefs.

The JTC bias is almost universally assessed using the 'beads task'. As described by Moore & Sellem (2006) in the standard version of the beads task, a sequence of beads from either Jar A or Jar B is shown to participants. Participants are informed that one jar contains more of one colour than the other (e.g. a ratio of 85:15 red to blue in Jar A, and a 15:85 ratio of red to blue in Jar B). Single beads are sequentially drawn from one jar and participants are asked to state from which of the two jars beads are being drawn. Participants are asked to make this decision as soon as they are confident in their choice. Recent versions of the task have used a 60:40 ratio of beads as this is considered a 'harder' measure of the JTC bias.

The JTC bias has been well-researched since its initial identification. Research suggests the JTC bias is evident in people with delusions or delusion proneness when material is more emotional (Warman & Martin, 2006); or self-referent (Warman, Lysaker, Martin, Davis, & Haudenschild, 2007); it increases under emotional arousal (Ellett, Freeman & Garety, 2008; Keefe & Warman, 2011); and is delusion-specific rather than schizophrenia-specific (Lincoln, Ziegler, Mehl, & Rief, 2010). Currently however, the extent to which persons with delusions are prone to draw premature conclusions in all areas of life, or whether delusion-related issues are specifically affected, is unclear (Lincoln et al., 2011).

As emotional arousal and salience of stimuli appear to increase the JTC bias, Bensi & Giusberti (2007) query whether it may be a form of information processing evident in people with higher trait anxiety. Lincoln et al. (2011) propose that if this were true then the JTC bias may be evident in other anxiety disorders such as agoraphobia, panic and social anxiety, particularly when exposed to anxiety-provoking situations. Bolstering this perspective, research has demonstrated that increased positive affect can influence reasoning biases by promoting information seeking

(Lee, Shi, Cheung, Lim, & Sia, 2011), thereby reducing the JTC bias. However research investigating the JTC bias in anxiety disorders remains inconclusive.

In this context, where the JTC bias is not considered schizophrenia specific and is evident in people with delusions or delusion-proneness, it would appear plausible that the JTC bias may be evident in other clinical populations, such as AN. However, to date, comparatively little research has been conducted investigating the JTC bias in clinical populations other than psychosis. Consequently, there is a lack of knowledge and understanding within the existing evidence base on the extent to which the JTC bias is evident, if at all, within an AN population. Only two other studies have used the Beads Task with AN populations. Sternheim, Startup, & Schmidt (2011) employed a neutral and an emotional task (i.e. with happy or angry faces) to assess intolerance of uncertainty in relation to data gathering, while Wittorf et al. (2012) employed a modified version of the standard beads task (i.e. replaced beads with fish). Sternheim, Startup, & Schmidt (2011) reported AN individuals and healthy controls requested similar numbers of beads, while Wittorf et al. (2012) found evidence of the JTC bias at a descriptive level, but the overall results were inconclusive. However, neither study included material that was highly emotional or self-referent specifically to AN populations (i.e. weight, shape or dietary related concepts).

Guided by existing research evidence that has highlighted the link between the JTC bias and delusions and delusion-proneness, this study aims to extend the existing body of literature with four primary aims. First, the study aims to extend previous research by exploring whether people with AN display a JTC bias; second, the study aims to explore whether people with AN demonstrate a significantly greater JTC bias in relation to emotionally salient tasks; third, the study aims to explore whether AN individuals' beliefs reach delusional proportions; finally, the study aims to determine whether severity of beliefs (i.e. delusional) in AN increases the JTC bias.

In light of these aims, the following hypotheses are derived. It is hypothesized there will be a significant difference in the level of confidence in decisions, and amount of information required (draws to decision⁷) to make decisions among the AN group compared with a healthy control group. It is also hypothesized that there will be a significant difference in strength of the JTC bias across emotionally salient tasks among the AN group. Finally it is hypothesized that among the AN group, individuals with higher focal delusional⁸ (as measured by the BABS) will request less information and be more confident in their decisions on three reasoning tasks.

⁷ The number of draws, or pieces of information requested by participants before making decisions.

⁸ Delusional in the primary disorder-related beliefs; e.g. "I am fat".

METHOD

Ethical Considerations

A favourable ethical opinion was given by the National Research Ethics Service Committee North West-Cheshire (Appendix 6). Research and Development approval was obtained from three participating NHS Trusts and two private healthcare organisations (Appendix 7). Written and oral informed consent was obtained from each individual prior to participation.

Participants

An a priori power analysis indicated 64 participants were required in each of the two groups for the study to have 80% power to detect a medium sized effect of 0.5 or more, at the .05 criterion of statistical significance.

Clinical Group

Current case note diagnoses were made by psychiatrists with specialist eating disorder experience, according to DSM-IV diagnostic criteria. Participant inclusion criteria were: i) aged 18 and above; ii) AN diagnosis; iii) BMI of 17.5 or less and iv) indicated willingness to partake. Individuals were ineligible to participate if they experienced delusions and hallucinations not associated with their eating disorder. Potentially suitable participants were identified by staff and given participant information sheets (Appendix 8). Individuals who indicated willingness to participate were contacted by the researcher to clarify questions, obtain written and oral consent and arrange a suitable time and location for participation (Appendix 9). Recruitment took place in two inpatient units, three community based outpatient services and one DayCare service.

Control Group

A control group was recruited via a research poster advertisement (Appendix 10) placed in a range of settings (e.g. Universities, community centres). Inclusion criteria were: i) aged 16 and above; ii) total Eating Disorder Examination Questionnaire (EDEQ) score of 1 or less. The lower age limit was used to bolster recruitment. Mond et al. (2008) identified an EDEQ score of 2.80 as an indicator of clinical significance and thus this low cut-off threshold of 1 was employed to ensure the control sample did not display sub-threshold features of eating disorders. All participants were recruited over the same time period, from September 2012 to April 2013.

Measures and Materials

Clinician – rated measures

Test of Premorbid Functioning (ToPF; Wechsler, 2011)

The ToPF is used to estimate premorbid intelligence with adults. It is suitable for participants aged 16 to 89 years and is composed of 70 words that have atypical grapheme to phoneme

translations. The ToPF has high internal consistency in a UK sample; Cronbach's alpha (α) is 0.95, split-half reliability is also 0.95. The ToPF also has concurrent validity as evidenced by significant correlations with the WAIS-IV^{UK} (Wechsler, 2008b) and WMS-IV^{UK} (Wechsler, 2009).

Brown Assessment of Beliefs Scale (BABS: Eisen et al., 1998)

This is a 7-item semi-structured scale that assesses delusionality in a range of psychiatric disorders. Both a categorical and a continuous score are generated from items 1-6. Each item is scored from 0 to 4. The total continuous score is derived by summing items 1-6, with higher delusionality indicated by higher scores (0-24). The categorical score is then generated from the continuous score; scores ranging from 0-3 are categorised as 'excellent insight, fully rational', scores from 4 to 7 are categorised as 'good insight', scores from 8 to 12 are categorised as 'fair insight', a score from 13-17 or greater than 18 in conjunction with a score of less than 4 on item 1 (conviction) is categorised as 'poor insight', and a continuous score greater than 18 plus a score of 4 on item 1 is categorised as 'lacks insight, delusional'. Item 7 (ideas of reference) is not included in the total score. Excellent test-retest reliability, convergent validity, and discriminant validity has been demonstrated by the BABS in an OCD population, BDD (Body Dysmorphic Disorder) population and with mood disorders with psychotic features (Eisen et al., 1998).

Self – report Measures

Demographics

Participants self-reported age, gender, ethnicity, level of education, occupational status, marital status, medication, primary and secondary diagnoses, BMI and length of stay on ward (where applicable) (Appendix 11). This information was then cross-referenced with clinician case notes to ensure accuracy.

Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith; 1983).

The HADS is a 14-item self-report measure. Originally developed to assess anxiety and depression in medical outpatients, it is now widely used in clinical practice and psychiatric research. This measure was included to assess and control for anxiety and depression. There are two subscales (anxiety and depression), each with 7 items. On both subscales, caseness is identified as follows: mild (scores 8-10); moderate (scores 11-15) or severe (16+) (Zigmond & Snaith, 1983). Reliability for anxiety and depression is acceptable (Cronbach's α of 0.82 and 0.77 respectively).

Eating Disorders Examination Questionnaire ((EDE-Q 6.0): Fairburn & Beglin, 1994)

This 28-item self-report version of the Eating Disorder Examination (EDE) interview assesses eating disorder behaviours and attitudes over the previous 28 days, and was used to determine participant eligibility for inclusion. The EDE-Q has four subscales (dietary restraint; eating concern; shape concern; weight concern) and a global score. A global EDE-Q score is obtained by calculating the mean of the four subscales, which ranges from 0-6, with higher scores indicating greater severity of eating disorder psychopathology. Internal consistency is high for each of the four subscales (0.78 to 0.93); test-retest reliability is also high for all four subscales ($r = 0.81$ to $r = 0.94$) (Luce & Crowther, 1999). Normative data for the EDE-Q is also available (Fairburn & Beglin, 1994).

Probabilistic Reasoning Tasks

To assess for biases in probabilistic reasoning, participants completed three tests of reasoning ability outlined below. The classic 60:40 'beads task' (Garety et al., 2005) comprised the first version. The original beads task (Garety, 1991; Huq et al., 1988) adopted the 85:15 beads ratio. While this is simpler and may be used for people with poor concentration, Garety et al. (2005) propose that with this version there may be little variation across well-functioning groups in performance. In contrast, the harder 60:40 beads ratio is considered to be more effective in discriminating differences between groups with attenuated biases, such as 'at risk' groups (Garety et al., 2005), and therefore this 'harder' measure of the JTC bias was employed. The latter two tasks followed the procedures outlined by Dudley, John, Young, & Over, (1997b) and Warman et al. (2007), where self-referent and emotionally salient material was presented in the 'survey tasks'. As evidence suggests the JTC bias may be influenced by memory capabilities and the demands of the task (Broome et al., 2007), a memory aid was used whereby drawn beads and words were left visible on screen to participants during trials. This was included to reduce the effects of any memory deficits. For each task, the numbers of beads or words requested, confidence in decision (%) and response times were recorded.

Neutral Reasoning Task: Beads Task

This research adopted a modification of the standard beads task paradigm, where beads were displayed in computerised format rather than manual format, obtained from Garety et al. (2005). In this task, two different jars of beads were presented on screen. Participants were asked to decide from which jar different coloured beads were drawn. One jar contained 60 blue beads and 40 red beads. The second jar was similar but with the reverse distribution (i.e. 40 blue beads and 60 red beads). Participants were then shown a series of beads that were drawn one at a time, from one of the jars. Participants were then asked to make a decision as to which jar the beads were drawn from. Number of beads requested before a decision was made ('draws to

decision') was recorded. Predetermined bead sequences were replicated from Garety et al. (2005). A maximum of 20 beads were presented. If participants had not made a choice after 20 beads, they were prompted to do so by the computer. Following this, participants were also asked to rate their confidence in their decision on a scale of 0 to 100 (Appendix 12).

Body Image Survey Task

This task assessed the salience of body image by asking participants to decide from which of two surveys about a person 'just like them' words were being chosen. This task replicated the procedures of the beads task with lists of 'fat' and 'thin' words replacing the red and blue beads (Appendix 13). This task was based on that used experimentally by Sperry (2010). The 'fat' and 'thin' words were chosen from standardised words lists developed by Cassin & von Ronson (2005), developed to improve the internal validity of cognitive research in eating disorders.

Food Survey Task

In this task, the salience of food was determined. Two categories of topics were established, 'food' and a 'neutral' topic of tools (Appendix 14). Similar to the previous tasks, the participant was asked to determine from which survey words were taken. As with the previous task, this food survey task was based on that used by Sperry (2010). Words were adapted into UK English in order to minimise spelling or recognition difficulties.

Materials

Stimuli appeared on a Samsung Q320 laptop with a 13.4 inch screen. E-prime (Schneider, Eschman, & Zuccolotto, 2002) presented the computer tasks. Button-press responses were recorded and stored on the laptop also.

Procedure

After providing informed consent, participants were offered the opportunity to ask any further questions about the study. Following this, all participants completed the demographic questionnaire, HADS, EDEQ and the ToPF. Only participants in the AN group completed the BABS. Participants then completed the three computer based beads tasks. Participation took approximately 45 minutes.

Data Analysis

Data were analysed using the Statistical Package for Social Sciences Version 21 (IBM Corp, 2012)

RESULTS

Preliminary Analyses

Initial preliminary analyses indicated that anxiety, depression, age, IQ, BMI and draws to decision (DTD) violated the normality assumption (assessed by the Kolmogorov-Smirnov test, $p > 0.05$). There were no significant outliers in the data as assessed by boxplot investigation. As these variables had highly skewed distributions, they were log transformed in an effort to reduce skewness and to meet the assumptions of inferential statistical analysis. Kolmogorov-Smirnov's test for normality and Levene's test for homogeneity of variance were employed. Independent samples t-tests were used to check for significant differences between groups on anxiety, BMI and premorbid intelligence as these variables met the assumptions of parametric analysis. Non-parametric Mann Whitney U tests were used to assess for significant differences between groups on depression and age, as following log transformation these variables remained not normally distributed and did not display homogeneity of variance.

Sample Description

Thirty-three people with AN provided written consent indicating interest in participation and consent for further contact. Of these, three people were unable to be contacted and three people did not fulfil participant inclusion criteria; one participant was experiencing psychotic symptoms unrelated to their eating disorder, and two participants did not meet the AN BMI criterion. One person completed the questionnaire section only, leaving a total of 26 participants (24 women; 2 men) who completed all aspects of the task (Inpatients, $n=14$; DayCare patients, $n= 7$; Outpatients, $n=5$). Fifty control participants took part, of which data from 17 were excluded due to high scores on the EDEQ leaving a final sample of 33 participants (31 women; 2 men). AN participants were severely underweight with an average BMI of less than 16. Furthermore, individuals had their diagnosis for a period of at least 9 years. At the time of participation they had been receiving treatment for an average of almost 2 years. Table 4 describes the sample demographic characteristics.

Table 4: Sample demographic characteristics

Group	Control Group (n=33)	Anorexia Group (n=27)
<i>Gender</i>		
Male	2 (6.1%)	2 (7.1%)
Female	31 (93.9%)	26 (92.9%)
<i>Age</i>		
Mean (SD)	26.97 (9.05)	32 (13.52)
<i>Ethnicity</i>		
White European	33 (100%)	29 (100%)
<i>Marital Status</i>		
Single	30 (90.9%)	21 (75%)
Married	2 (6.1%)	5 (17.9)
Divorced	1 (3%)	2 (7.1%)
<i>Employment Status</i>		
Retired	1 (3%)	-
Employed	23 (69.7%)	8 (28.6%)
Unemployed	0	12 (42.9%)
Student	9 (27.3%)	8 (28.6%)
<i>Time Diagnosed (Yrs)</i>		
Mean (SD)	-	9.1 (11.32)
<i>Time receiving tx (mths)</i>		
Mean (SD)	-	22.82 (52.44)
<i>Years full time education</i>		
Mean (SD)	17.68 (3.44)	15.93 (2.94)

Baseline Sample Characteristics

Independent samples t-tests revealed the AN group had significantly lower BMI than the control group, $t(58) = 10.891$, $p = 0.001$. The AN group had significantly higher anxiety scores than the control group, $t(59) = -7.438$, $p = 0.001$. No significant differences in premorbid intelligence were found between groups, $t(58) = 1.429$, $p = 0.158$. Mann Whitney U tests were used to test for significant differences between groups on depression and age. Significantly higher levels of depression were found in the AN sample; $U = 101.5$, $z = -5.266$, $p = 0.000$, $r = -0.67$. No significant differences in age between groups was found; $U = 392.5$, $z = -0.789$, $p = 0.43$, $r = -0.10$. Descriptive information relating to the clinical variables is presented in Table 5 below.

Table 5: Sample Clinical Characteristics

	Control Group		Anorexia Group	
	Mean (SD)	Range	Mean (SD)	Range
BMI	22.48 (3.13)	19.10 - 33.30	15.57 (1.14)	13.20 – 17.30
Anxiety	4.79 (2.52)	1-10	12.39 (5.20)	0 – 21
Depression	1.39 (1.43)	0-5	8.46 (5.43)	0 – 19
Premorbid IQ score	111.74 (9.88)	92.30-128.10	107.73 (11.88)	78.10– 129.70
EDEQ	0.39 (0.33)	0.00-1.00	3.333 (1.46)	0.39-5.57

Degree of Delusionalty (BABS)

Within the AN group, 3.7% were classified as having ‘good insight’, 40.7% were classified as having ‘fair insight’, 29.6% were classified as having ‘poor insight’ and 25.9% were classified as ‘lacking insight’. Using the criteria outlined by Reese et al. (2010) individuals’ scores were classified according to ‘high insight’ (BABS scores ≤ 12 ; $n=12$) and ‘low insight’ (BABS scores ≥ 13 ; $n=15$). From this, 55.5% of the AN group demonstrated poor insight into their dominant eating disorder related belief.

To test the hypothesis that higher level of delusionalty (as measured by the BABS) in the AN group is associated with a greater ‘jumping to conclusions’ bias, two separate one-tailed Pearson’s correlations were conducted. A one-tailed correlation was conducted between delusionalty and draws to decision (DTD) across the three tasks. No significant relationship was found between delusionalty and Task 1 DTD ($r = -0.195$, $p = 0.17$); delusionalty and Task 2 DTD, ($r = -0.098$, $p = 0.317$); or delusionalty and Task 3 ($r = -0.136$, $p = 0.253$). A second one-tailed correlation was conducted between delusionalty and confidence in decision across the three tasks. No significant relationship was found between delusionalty and Task 1 confidence ($r = -0.049$, $p = 0.406$); delusionalty and Task 2 confidence ($r = 0.122$, $p = 0.276$); or delusionalty and Task 3 confidence ($r = -0.164$, $p = 0.212$).

Accuracy of Decisions

Chi-square tests were performed to determine if the clinical and control group differed significantly regarding accuracy of decisions. This analysis was considered most suitable to compare frequencies of categorical data across two groups. No significant difference in accuracy of decisions made was found between groups on task 1 ($X^2(1, N = 60) = 0.582$, $p = 0.445$); or task 2 ($X^2(1, N = 60) = 0.055$, $p = 0.814$); or task 3 ($X^2(1, N = 60) = 0.599$, $p = 0.439$).

Response Times

Preliminary analyses of Kolmogorov-Smirnov's test for normality and Levene's test for homogeneity of variance indicated response time data was not normally distributed and did not display homogeneity of variance. Consequently non-parametric Kruskal Wallis analyses were performed. These revealed no significant differences between groups on response times on task 1 ($X^2(1, N=60) = 1.29, p=0.256$); or task 2 ($X^2(1, N=60) = 0.219, p=0.64$); or task 3 ($X^2(1, N=60) = 0.219, p=0.640$).

Probabilistic Reasoning

Draws to Decision (DTD)

Consistent with much research (Freeman, Pugh, & Garety, 2008; Lincoln et al., 2010), a continuous DTD measure and a dichotomous JTC categorisation were used as outcome measures. The JTC bias has been defined as reaching a decision with two or fewer pieces of information (Garety et al., 2005). Based on this criterion, data showing the number of people from each group who displayed evidence of the JTC bias across the three tasks is presented in Table 6.

Table 6: JTC Categorisations

	Control Group	Anorexia Group
<i>DTD Task1</i>	0	1
<i>DTD Task 2</i>	2	3
<i>DTD Task3</i>	1	2

Three instances of the JTC bias were found in the control group, compared with six instances in the clinical group. It was initially intended to conduct three separate univariate analyses of covariance (ANCOVA) with Bonferroni corrections ($p < .01$), to investigate differences between groups on DTD across the three tasks, while controlling for BMI, anxiety and depression. However, on initial inspection of the data, it became apparent the frequency of the JTC bias among groups was so low this analysis was rendered unnecessary, and was not conducted.

Decision Confidence

Three analyses of covariance (ANCOVA) were conducted with Bonferroni corrections to investigate differences between groups on confidence in decision across the three tasks. Again variables age, BMI, premorbid IQ score, anxiety and depression were controlled for. There were no statistically significant differences between groups on confidence in decision on task 1 ($F(1, 57) = 0.086, p = 0.771$), task 2 ($F(1, 57) = 0.007, p=0.934$) or task 3 ($F(1, 57) = 0.051, p=0.822$).

DISCUSSION

Anorexia and the 'Jumping to Conclusions' Bias

The results from this study did not confirm the three hypotheses. There were no significant differences between groups in DTD or level of confidence in decisions. The second hypothesis was not supported in that there was no difference in the strength of the JTC bias across the emotionally salient tasks among the AN group. Nor was the final hypothesis supported; individuals with higher levels of delusional thinking did not request more information and were not more confident in their decisions on the three reasoning tasks.

The results from this study contrast with those reported in previous studies (Cavedini et al., 2004; McKenna, Haddock, & Fox, In Preparation; Tchanturia et al., 2007) where characteristically different decision making styles have been demonstrated by people with AN. These studies examined decision making in the context of gains and losses, on the Iowa Gambling Task (IGT). On the IGT task of decision making, individuals with AN consistently displayed a preference for choices that yielded high immediate gains despite high long term negative consequences. Furthermore they tended to demonstrate an inability to learn to avoid disadvantageous choices, even on repeated trials. From these studies, the decision making styles displayed by people with AN empirically appeared to mirror their decisions made habitually in daily life, where immediate gains (i.e. weight loss) are selected regardless of the long term negative consequences (i.e. physical and psychological harm). Similar patterns of decision making on the IGT have also been reported in a number of clinical populations, including psychosis (Sevy et al., 2007; Shurman, Horan, & Nuechterlein, 2005).

Consequently, it is possible therefore that while people with AN do display a specific decision making style in the context of gains and losses, they do not make hasty decisions based on little evidence; that is, they do not appear to 'jump to conclusions'. On the basis of this study, individuals with AN under conditions of uncertainty, do not appear to use less information to arrive at a decision. When the results are considered in the context of the two previous studies which used the 'beads task' with AN populations, consistencies emerge. Wittorf et al. (2012) reported people with AN demonstrated no tendency to 'jump to conclusions'. Similarly, in the context of intolerance of uncertainty in data gathering, Sternheim et al. (2011) found no differences in number of beads requested across tasks in an AN population compared with a control group. People who display an intolerance of uncertainty may perceive uncertainty and a lack of control as aversive, and endeavour to avoid such states (Buhr & Dugas, 2002). Uncertainty is conceptually linked with probabilistic reasoning since probabilistic reasoning relates to information processing and decision making under uncertain conditions (Bensi & Giusberti, 2007). As much research describes the 'typical anorexia personality' as rigid,

perfectionistic and inflexible with a strong need for control (Serpell, Waller, Fearon, & Meyer, 2009), it is plausible that instead of making decisions with less information, individuals with AN would actually seek additional information to reduce any inherent uncertainty in decision making, thereby eliminating the JTC bias. Taken together, the results of this study, combined with those reported by Sternheim, Startup & Schmidt, (2011) and Wittorf et al. (2012), can be taken to tentatively suggest that the JTC bias is not a cognitive process demonstrated by AN populations.

Furthermore, prior research has indicated increased positive affect can influence reasoning biases by promoting information seeking (Lee et al., 2011), thereby reducing the JTC bias. Positive affect is believed to influence cognition and behaviour (Lee et al., 2011) by promoting risk-averse behaviour (Estrada, Isen & Young, 1997; Isen, 2001). Specifically, positive affect is thought to broaden attention and allow access to information stored in memory (Fredrickson, 2001). Research has demonstrated that people with more positive affect use a greater number of cues to inform decision making (Bramsfeld & Gasper, 2008; Djamasbi, 2007), and are less likely to gamble when there are risks of potential losses (Arkes, Herren, & Isen, 1988). In this study, the average depression scores among the AN group fell within the 'mild' range; it is possible the absence of severe negative affect may have prompted them to seek greater information prior to decision making, thereby reducing the JTC bias. In psychosis, prior research has suggested the JTC bias may be partly related to emotional factors as it is significantly more pronounced under stress conditions (Rubio et al., 2011).

Anorexia and Delusionality

More than half of the AN sample demonstrated limited insight into their dominant eating disorder related belief, and over a quarter were classified as 'lacking insight', a proportion similar to that reported by Steinglass et al. (2007). Evidently, people with AN have intense irrational eating-related beliefs, that when held with powerful conviction, can have a negative impact on their ability to objectively evaluate their beliefs.

However, it is possible that the lack of insight or 'delusionality' in AN may manifest as a qualitatively different process compared with delusionality in psychosis. For example, in AN a lack of insight often relates solely and specifically to eating disorder maintaining beliefs. Clinically, individuals can present as insightful with an appreciation or acknowledgement of being ill, while simultaneously demonstrating rigidity and fixity of eating-related beliefs (Steinglass et al., 2007). In contrast, delusional beliefs in psychosis are often broader and more global in nature, and can incorporate societal and cultural ideas of reference, which do not necessarily relate to the specific aspects of one's illness. It is possible that a majority of people

with AN, despite holding their AN beliefs with extreme tenacity and conviction, are able to demonstrate some insight that their beliefs may not be objectively true. Therefore, such AN beliefs may actually reflect overvalued beliefs (Veale, 2002), rather than delusions. This perspective is congruent with existing research investigating delusionality in AN, which proposes that a delusional variant of AN may exist among a minority of AN individuals (Konstantakopoulos et al., 2012; Steinglass et al., 2007). The results from this study support such an assertion, and may indicate presence of a continuum of delusionality, characterised by a lack of insight/delusionality at one end, and more general, overvalued ideation at the other.

In this context, eating disorder maintaining beliefs could be conceptualised as powerful ego-dystonic cognitive distortions that, while distressing, intrusive and often preoccupying, are not considered wholly delusional (Veale, 2002). Consequently, while delusionality and delusion-proneness is strongly associated with the JTC bias (Colbert & Peters, 2002) it is possible that AN individuals do not generally present as delusional and as such may be less likely to demonstrate a JTC bias.

Methodological Limitations

Some methodological limitations of this study have been identified. Firstly, the study lacked statistical power, and as such it is possible the small sample size limited the extent to which significant results could be detected. However, as the results did not approximate significance it is more likely that substantial differences between groups did not exist. A second limitation resulting from the small sample size was the inability to separate the AN group into ED subtypes i.e. restricting vs. binge/purge behaviours. As binge/purge AN can differ from restricting AN on personality and behavioural characteristics such as impulsivity (Konstantakopoulos et al., 2012), the failure to account for both diagnostic subtypes and behavioural characteristics have been identified as limitations. Thirdly, it is possible some features of the tasks used limited the study. The stimuli used may not have been sufficiently salient or emotionally self-referent for the AN group and were therefore unable to elicit the 'jumping to conclusions' bias. In addition, setting the maximum number of beads to 20 prevented exploration of perseveration in the clinical sample; a research paradigm where unlimited beads/words are available would facilitate investigation whether people with AN would request significantly more information than healthy controls, before making decisions. In addition, it is possible the paradigm of 60:40 was too stringent to detect differences between the clinical and control groups, and therefore future research should consider adopting the 85:15 paradigm with an AN population. Finally, while the study examined one specific aspect of executive functioning (i.e. decision making), this was considered in isolation rather than within the broader context of neuropsychological processes associated with executive functioning.

Study Strengths

Notwithstanding some methodological limitations, this study had a number of strengths. Firstly, diagnostic overlap within the clinical sample was minimised by employing stringent inclusion and exclusion criteria. Individuals were only eligible to participate once diagnostic criteria for AN were established; this endeavoured to preserve the 'purity' of the AN group. Secondly, the study accounted for several clinical and demographic parameters as potential confounders in the group comparison including age, anxiety, depression, illness severity and premorbid intelligence. Thirdly, two versions of the emotionally salient tasks were included in order to incorporate shape/weight and food related concepts, two concepts highly relevant to a clinical AN sample. Finally, while the study lacked sufficient statistical power, the sample size in this study was comparable with much experimental research studies involving individuals with AN (Mountford, Waller, Watson, & Scragg, 2004; Radomsky, de Silva, Todd, Treasure & Murphy, 2002; Zucker et al., 2013).

Future Research

Research investigating the JTC bias in clinical populations other than psychosis is still in its infancy. Replication of this study is needed to ensure results are valid and reliable and are generalizable to AN populations. Additionally, as these findings are preliminary in nature, future research is needed to qualify them. Furthermore, future research investigating the JTC bias in AN is needed to help determine conclusively whether the JTC bias is a cognitive process important or relevant in AN presentations. A larger sample size with sufficient statistical power is essential to ensure representativeness of study findings. In addition, sufficiently large sample sizes that facilitate comparison across groups according to diagnostic subtypes should be encouraged. This study did not find any differences between groups in response times, which could be taken as an indication that the groups did not differ on impulsivity. However, future research should consider the inclusion of specific measures of impulsivity, as research demonstrates this is an important personality trait, particularly among binge-purge eating disorder subtypes (Konstantakopoulos et al., 2012). This would facilitate investigation of the relationship, if any, between impulsivity and the JTC bias. Future studies should consider employing more ecologically valid tasks to elicit the JTC bias, and continue to explore the specificity of the JTC bias to disorders with high levels of delusionality. Finally, future research investigating the JTC bias in AN should consider drawing on existing neuropsychological perspectives, and use this approach to examine the JTC bias in the context of broader executive functioning (i.e. working memory, mental flexibility and task switching).

Clinical Implications

While the results of this study are preliminary, they suggest that people with AN do not display reasoning biases similar to those evident in psychotic disorders. This may indicate there may be qualitatively different executive functioning in these clinical populations. The continued exploration of decision making correlates in AN may help enhance our understanding of the meaning between decision making performance and the clinical presentation of AN. The results of the study suggest that a 'jumping to conclusions' style of decision making is not evident in people with AN. This implies this reasoning bias does not play an active role in the formation of their primary eating disorder related beliefs; they don't appear to accept false hypotheses hastily on the basis of limited evidence (Garety, 1991).

Furthermore, the results also appear to support the conceptualisation of underlying eating disorder related beliefs as overvalued ideas (Fairburn & Cooper, 1989) rather than delusions; where beliefs are 'unreasonable and sustained' but are 'maintained with less than delusional intensity' (American Psychiatric Association, 2000). A small majority of participants had demonstrable valued eating disorder beliefs with limited insight, highlighting the need for clinicians to consider this component of AN psychopathology, particularly in the context of treatment resistance and illness chronicity (Vandereycken, 2006; Halmi, 2009).

Clinically, these findings have a number of implications. As a lack of insight is associated with a range of poorer outcomes (i.e. increased hospitalisations, poor psychosocial functioning, non-adherence to treatment plans (Smith et al., 2004; Lincoln, Lullmann, & Rief, 2007)), the findings suggest that increasing insight may be an important target for therapeutic intervention. Clinical interventions that focus on provision of psychoeducation, generation of alternative evidence and correction of misinterpretation may be useful to gradually develop awareness into high conviction eating disorder related beliefs. Furthermore, it is suggested that assessment of insight into eating disorder related beliefs and changes in insight should be routinely incorporated into clinical practice, as increases in insight across psychiatric disorders are positively associated with recovery orientation (Mohammed et al., 2009). In addition, people with low levels of insight are often unwilling to engage in treatment in the first instance. Research has demonstrated that therapy with patients with poor insight who identify with their thoughts and are convinced of their correctness is often more difficult and less successful. In light of this, it is possible that therapeutic interventions that incorporate motivational interviewing techniques could constitute an important initial aspect of therapy to reduce resistance, increase engagement and explore disadvantages and advantages of change and/or their current behaviours. Finally, the results from this study suggest that people with AN do not jump to conclusions and do not appear to have difficulties processing external information. It is possible

that instead they have difficulties in processing internal, physiological or body focused cues (i.e. body representation, distorted experience of body size and body image). Consequently, therapeutic interventions targeting body image and self-perception may be particularly important for this client group.

REFERENCES

- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC.
- Arkes, H., Herren, L., & Isen, A. M. (1988). The role of potential loss in the influence of affect on risk-taking behavior. *Organizational Behavior and Human Decision Processes*, *41*, 181–193.
- Bensi, L., & Giusberti, F. (2007). Trait anxiety and reasoning under uncertainty. *Personality and Individual Differences*, *43*, 827-838.
- Bosanac, P., Kurlender, S., Stojanovska, L., Hallam, K., Norman, T., McGrath, C., Burrows, G., Wesnes, K., Manktelow, T., & Olver, J. (2007). Neuropsychological study of underweight and "weight-recovered" anorexia nervosa compared with bulimia nervosa and normal controls. *International Journal of Eating Disorders*, *40*(7), 613-621.
- Bramsfeld, K., & Gasper, K. (2008). Happily putting the pieces together: A test of two explanations for the effects of mood on group-level information processing. *British Journal of Social Psychology*, *47*(2), 285–309.
- Broome, M.R., Johns, L.C., Valli, J.B., Woolley, J.B., Tabraham, P., & Brett, C. (2007). Delusion formation and reasoning biases in those at clinical high risk for psychosis. *British Journal of Psychiatry*, *(191)*, 38-42.
- Buhr, K., & Dugas, M. (2002). The Intolerance of Uncertainty Scale: Psychometric properties of the English version. *Behaviour Research and Therapy*, *40*, 931-945.
- Cassin, S.E. & von Ranson, K. (2005). Word lists for testing cognitive biases in eating disorders. *European Eating Disorders Review*, *13*(3), 216-220.
- Cavedini, P., Bassi, T., Ubbiali, A., Casolari, A., Giordani, S., Zorzi, C., & Bellodi, L. (2004). Neuropsychological investigation of decision-making in anorexia nervosa. *Psychiatric Research*, *127*, 259–266.
- Colbert, S.M., & Peters, E. (2002). Need for closure and jumping-to-conclusions in delusion prone individuals. *Journal of Nervous and Mental Disease*, *190*, 27-31.
- Crow, S.J., Peterson, C.B., Swanson, S.A., Raymond, N.A., Specker, S., Eckert, E.D., & Mitchell, J.E. (2009). Increased mortality in bulimia nervosa and other eating disorders. *American Journal of Psychiatry*, *166*, 1342-1346.
- Danner, U.N., Sanders, N., Smeets, P.A., van Meer, F., Adan, R.A., Hoek, H.W., & van Elburg, A.A. (2012). Neuropsychological weaknesses in anorexia nervosa: Set-shifting, central coherence, and decision making in currently ill and recovered women. *International Journal of Eating Disorders*, *45*(5), 685-694.
- Djamasbi, S. (2007). Does Positive Affect Influence the Effective Usage of a Decision Support System?. *Decision Support Systems*, *43*(4), 1707-1717.
- Dudley, R.E.J., John, C.H., Young, A.W., & Over, D.E. (1997b). The effect of self-referent material on the reasoning in people with delusions. *British Journal of Clinical Psychology*, *(36)*, 575-584.

- Eisen, J. L., Phillips, K. A., Baer, L., Beer, D. A., Atala, K. D., & Rasmussen, S. A. (1998). The Brown Assessment of Beliefs Scale: Reliability and validity. *American Journal of Psychiatry, (155)*, 102–108.
- Ellett, L., Freeman, D., & Garety, P.A. (2008). The psychological effect of an urban environment on individuals with persecutory delusions: the Camberwell walk study. *Schizophrenia Research, 99*, 77-84.
- Estrada, C. A., Isen, A. M., & Young, M. J. (1997). Positive affect facilitates integration of information and decreases anchoring in reasoning among physicians. *Organizational Behavior and Human Decision Processes, 72*, 117–135.
- Fairburn, C.G. & Beglin, S.J. (1994). The assessment of eating disorders: Interview or self-report questionnaire? *International Journal of Eating Disorders, (16)*, 363-370.
- Fairburn, C.G., & Cooper, Z. (1989). Eating disorders. In K.Hawton, P. Salkovskis, J. Kirk & D.M. Clark (Eds.). *Cognitive therapy for psychiatric problems: A practical guide.* (pp. 277-314). Oxford, UK: Oxford University Press.
- Fairburn, C.G., & Cooper, Z. (1993). The Eating Disorder Examination (twelfth edition). In C.G. Fairburn & G.T. Wilson (eds.). *Binge Eating: Nature, Assessment & Treatment.* (pp. 317-360). New York: Guildford Press, 1993.
- Fine, C., Garner, M., Craigie, J., & Gold, I. (2007). Hopping, skipping or jumping to conclusions. Clarifying the role of the JTC in delusions. *Cognitive Neuropsychiatry, 12*, 46-77.
- Fredrickson, B.L. (2001). The Role of Positive Emotions in Positive Psychology: The Broaden-and-Build Theory of Positive Emotions. *American Psychologist, 56(3)*, 218-226.
- Freeman, D., Pugh, K., & Garety, P.A. (2008). Jumping to conclusions and paranoid ideation in the general population. *Schizophrenia Research, 102*, 254-260.
- Garety, P. A. (1991). Reasoning and delusions. *British Journal of Psychiatry, 159(Suppl. 14)*, 14-18.
- Garety, P. A., Freeman, D., Jolley, S., Dunn, G., Bebbington, P. E., & Fowler, D.G. (2005). Reasoning, Emotions, and Delusional Conviction in Psychosis. *Journal of Abnormal Psychology, 114*, 373-384.
- Guillaume, S., Sang, C.N., Jausse, I., Raingeard, I., Bringer, J., Jollant, F., & Courtet, P. (2010). Is decision making really impaired in eating disorders? *Neuropsychology, 24 (6)*, 808-812.
- Halmi, K.A. (2009). Perplexities and provocations of eating disorders. *Journal of Child Psychology and Psychiatry, 50(1-2)*, 163-169.
- Huq, S.F., Garety, P.A., & Hemsley, D.R. (1998). Probabilistic judgments in deluded and non-deluded subjects. *Quarterly Journal of Experimental Psychology, 40A*, 801-812.
- IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY
- Isen, A. M. (2001). An Influence of Positive Affect on Decision Making in Complex Situations: Theoretical Issues with Practical Implications. *Journal of Consumer Psychology 11(2)*, 75-85.

- Keefe, K.M., & Warman, D.M. (2011). Reasoning, delusion proneness and stress: an experimental investigation. *Clinical Psychology & Psychotherapy*, 18(2), 138-147.
- Konstantakopoulos, G., Varsou, E., Dikeos, D., Ioannidi, N., Gonidakis, F., Papdimitriou, G., & Oulis, P. (2012). Delusionality of body image beliefs in eating disorders. *Psychiatry Research*, 200, 482-488.
- Lee, M.K.O, Shi, N., Cheung, C.M.K., Lim, K.H., & Sia, C.L. (2011). Consumer's Decision to Shop Online: The Moderating Role of Positive Informational Social Influence. *Information & Management*, 48, 185–191.
- Lincoln, T.M., Lullmann, E., & Rief, W. (2007). Correlates and long-term consequences of poor insight in patients with schizophrenia. A systematic review. *Schizophrenia Bulletin*, 33, 1342-2324.
- Lincoln, T.M., Salzman, S., Ziegler, M., & Westermann, S. (2011). When does jumping to conclusions reach its peak? The interaction of vulnerability and situation-characteristics in social reasoning. *Journal of Behaviour Therapy and Experimental Psychiatry*, 42, 185-191.
- Lincoln, T.M., Ziegler, M., Mehl, S., & Rief, W. (2010). The jumping to conclusions bias in delusions: specificity and changeability. *Journal of Abnormal Psychology*, 119(1), 40-49.
- Luce, K. H. & Crowther, J. H. (1999). The reliability of the eating disorder examination—Self-report questionnaire version (EDE-Q). *International Journal of Eating Disorders*, (25), 349-351.
- McKenna, G., Haddock, G., & Fox, J. (In Preparation). The nature of decision making in disordered eating populations: A systematic review. *Clinical Psychology Review*.
- Mohamed, S., Rosenheck, R., McEvoy, J., Swartz, M., Stroup, S., & Lieberman, J.A. (2009). Cross-sectional and longitudinal relationships between insight and attitudes toward medication and clinical outcomes in chronic schizophrenia. *Schizophrenia Bulletin*, 25, 336-346.
- Mond, J.M., Myers, T.C., Crosby, R.D., Hay, P.J., Rodgers, B., Morgan, J.F., Lacey, J.H., & Mitchell, J.E. (2008). Screening for eating disorders in primary care: EDEQ versus SCOFF. *Behaviour Research and Therapy*, 46(5), 612-622.
- Moore, S.C. & Sellen, J.L. (2006). Jumping to conclusions: A network model predicts schizophrenic patients' performance on a probabilities reasoning task. *Cognitive, Affective & Behavioural Neuroscience*, 6(4), 261-269.
- Mountford, V., Waller, G., Watson, D., & Scragg, P. (2004). An experimental analysis of the role of schema compensation in anorexia nervosa. *Eating Behaviours*, 5, 223-230.
- Radomsky, A.S., de Silva, P., Todd, G., Treasure, J., Murphy, T. (2002). Thought-shape fusion in anorexia nervosa: an experimental investigation. *Behaviour Research and Therapy*, 40(10), 1169-1177.
- Reese, H., McNally, R., & Wilhelm, S. (2011). Probabilistic reasoning in patients with body dysmorphic disorder. *Journal of Behavior Therapy and Experimental Psychiatry*, 42, 270-276.

- Rubio, J.L., Ruiz-Veguilla, M., Hernández, L., Barrigón, M.L., Salcedo, M.D., Moreno, J.M., Gómez, E., Moritz, S., & Ferrín, M. (2011). Jumping to conclusions in psychosis: A faulty appraisal. *Schizophrenia Research*, *133*, 199-204.
- Schneider, A. Eschman, & A. Zuccolott. (2002). *E-Prime user's guide*. Psychology Software Tools Inc, Pittsburgh, PA.
- Serpell, L., Waller, G., Fearon, P. & Meyer, C. (2009). The roles of persistence and perseveration in psychopathology. *Behaviour Therapy*, *40*, 260-271.
- Sevy, S., Burdick, K.E., Visweswaraih, H., Abdelmessih, S., Lukin, M., Yechiam, E., & Bechara, A. (2007). Iowa Gambling Task in schizophrenia: A review and new data in patients with schizophrenia and co-occurring cannabis use disorders. *Schizophrenia Research*, *92*, 74-84.
- Shurman, B., Horan, W.P., & Neuchterlein, K.H. (2005). Schizophrenia patients demonstrate a distinctive pattern of decision-making impairment on the Iowa Gambling Task. *Schizophrenia Research*, *72*, 215-224.
- Smith, T.E., Hull, J.W., Huppert, J.D., Silverstein, S.M., Anthony, D.T., & McClough, J.F. (2004). Insight and recovery from psychosis in chronic schizophrenia and schizoaffective disorder patients. *Journal of Psychiatric Research*, *38*, 169-176.
- Sperry, H. (2010). *Jumping to Conclusions Bias and Attitudes Toward Body Image and Food*. (Unpublished thesis). Butler University. United States.
- Steinglass, J.E., Eisne, J.L., Attia, E., Mayer, L., & Walsh, B.T. (2007). Is anorexia nervosa a delusional disorder? An assessment of eating beliefs in anorexia nervosa. *Journal of Psychiatric Practice*, *13*(2), 65-71.
- Sternheim, L., Startup, H., & Schmidt, U. (2011). An experimental exploration of behavioural and cognitive-emotional aspects of intolerance of uncertainty in eating disorder patients. *Journal of Anxiety Disorders*, *25*, 806-812.
- Tchanturia, K., Liao, P., Uher, R., Lawrence, N., Treasure, J., & Campbell, I.C. (2007). An investigation of decision making in anorexia nervosa using the Iowa Gambling Task and skin conductance measurements. *Journal of the International Neuropsychological Society*, *13*, 635-641.
- Van Dael, F., Versmissen, D., Janssen, I., Myin-Germeys, I., van Os, J., & Krabbendam, L., (2006). Data gathering: biased in psychosis? *Schizophrenia Bulletin* *32*, 341–351.
- Vandereycken, W. (2006). Denial of illness in anorexia nervosa-conceptual review: part 1 diagnostic significance and assessment. *European Eating Disorders Review*, *14*(5), 341-351.
- Veale, D. (2002). Over-valued ideas: A conceptual analysis. *Behaviour Research and Therapy*, *40*, 383-400.
- Warman, D. M., Lysaker, P. H., Martin, J. M., Davis, L., & Haudenschild, S. L. (2007). Jumping to conclusions and the continuum of delusional beliefs. *Behavior Research and Therapy*, *45*(6), 1255-1269.

- Warman, D.M., & Martin, J.M. (2006). Jumping to conclusions and delusion proneness. The impact of emotionally salient stimuli. *The Journal of Nervous and Mental Disease*, 194, 760-765.
- Wechsler D. (2008b). *Wechsler Adult Intelligence Scale – Fourth Edition technical and interpretive manual*. San Antonio, TX: Pearson.
- Wechsler, D. (2009). *Wechsler Memory Scale — (WMS–IV) technical and interpretive manual, Fourth Edition*. San Antonio, TX: Pearson.
- Wechsler, D. (2011). *Test of Premorbid Functioning- UK*. San Antonio: The Psychological Corporation.
- Wittorf, A., Giel, K.E., Hautziger, M., Rapp, A., Schonernberg, M., Wolkenstein, L., Zipfel, S., Mehl, S., Fallgatte, A.J., & Klingberg, S. (2012). Specificity of jumping to conclusions and attributional biases: a comparison between patients with schizophrenia, depression and anorexia nervosa. *Cognitive Neuropsychiatry*, 17(3), 262-86.
- Zigmond, A.S., & Snaith, R.P. (1983). The hospital anxiety and depression scale. *Acta Psychiatrica Scandinavica*, 67(6), 361-70.
- Zucker, N.L., Merwin, R.M., Bulike, C.M., & Moskovich, A., Wildes, J.E., & Groh, J. (2013). Subjective experience of sensation in anorexia nervosa. *Behaviour Research and Therapy*, 51, 256-265.

Paper Three:
Critical Appraisal and Personal Reflections

Word Count (including footnotes): 5729

Introduction

The aim of this paper is to provide a critical and personal reflective account of conducting two distinct, albeit related, research studies. This paper is subdivided into two sections, with critical appraisal and personal reflections interwoven throughout. The first section of the paper relates solely to the process and intricacies of conducting a systematic review of the literature, while the latter section pertains to the issues that arose during the experimental research process.

In Paper One, a systematic review of the nature of decision making across a range of disordered eating populations was conducted. Decision making was examined in anorexia nervosa (AN), bulimia nervosa (BN), eating disorder not otherwise specified (ED-NOS), recovered AN (ANRec), binge eating disorder (BED) and obesity. Twenty-seven papers were reviewed, and results indicated the presence of characteristically different decision making styles in AN and BN. No evidence of differences in decision making was found in ANRec or EDNOS. However, the available research was limited as few studies have specifically investigated decision making in both these clinical populations. There were inconsistent findings regarding the nature of decision making in BED and obesity; however it is possible that the inclusion of poorer quality studies may have limited the extent to which representative conclusions could be drawn.

Paper Two sought to build on the findings from the systematic review, so as to further advance and develop our understanding of decision making in eating disorders. This research study investigated one particular element of decision making, the 'jumping to conclusions' (JTC) bias, specifically in AN. The JTC bias pertains to a reasoning style where people make hasty decisions, on the basis of little evidence. Results indicated no evidence of this bias in AN. Individuals with AN and healthy controls do not appear to differ on this aspect of decision making. This study did however find that a majority of individuals with AN demonstrated limited insight into their primary eating disorder related beliefs.

Paper One: The nature of decision making in disordered eating populations: A systematic review.

Rationale for Topic Selection

The process of making and refining judgements is of obvious importance in everyday life. Individuals frequently need to make decisions about confusing and/or ambiguous experiences. In order to cope with competing environmental and situational demands, skills in the ability to make rapid judgements that are balanced with considered evaluation are clearly advantageous. However several studies report that characteristically different and often

disadvantageous decision making styles are apparent in many psychiatric disorders, including psychosis (Huq, Garety, & Hemsley, 1988), Obsessive-Compulsive Disorder (Cavedini, Gorini, & Bellodi, 2006), pathological gambling (Brand et al., 2005), and substance abuse (Bechara & Martin, 2004). Decision making is believed to play a role in some aspects of psychiatric disorders, including belief formation and maintenance, choice of behavioural action, problem solving, social and self-regulation skills and coping strategies (Aspinwall, & Taylor, 1997). In clinical contexts, difficulties in decision making in psychiatric disorders can lead to challenges in navigating between short and long term goals. Individuals can often choose immediate goals that, while functional in the short term, are not beneficial over time. In this context, patients can become trapped in cycles that are maladaptive in the long term and that do not facilitate or encourage change.

It was against this backdrop that the rationale for conducting a review of decision making in disordered eating was conceptualised. On initial inspection of the literature, inconsistent results within specific disordered eating categories had been reported; however studies generally reported results in isolation. It was felt that consideration of inconsistent results in the context of related research was essential in order to facilitate comparison of quality of results, choices of measures and research methodology, so that a clearer, more concise overview of the research field as a whole could be facilitated. In doing this, commonalities and discrepancies in results could be highlighted, common themes summarised and discussed, and areas requiring future research and exploration could be ascertained. Consequently it was felt that a systematic review of the nature of decision making would develop our understanding of this aspect of executive function and its role in disordered eating populations.

Rationale for conducting a Systematic Review

When approaching the task of reviewing the literature, it was decided to conduct a systematic review. This decision was taken for a number of reasons. It was felt that a systematic review would be the best mechanism through which the existing research findings pertaining to decision making could be systematically reviewed and summarised. This approach allowed large amounts of previous clinical research in this area to be clearly assimilated in order to gain a clear picture of the existing evidence base. In addition, adopting this systematic and transparent approach to the review limited the likelihood of any bias by removing personal opinion and narrative. Techniques such as using clearly stated objectives, predetermined eligibility criteria and systematic searching were helpful in this regard (Popovich et al., 2012). As mentioned previously, within the field of decision making research in disordered eating, inconsistent and sometimes conflicting results had been reported. It was felt that conducting a

systematic review would enable this existing information be summarised in a thorough and unbiased manner. In doing this, more general conclusions could be drawn than would be possible from individual studies, and the review could act as a prelude to future research (Lang, 2004).

Quality Rating Tool

Notwithstanding these advantages, research has demonstrated that the quality of reporting in systematic reviews is often highly variable and conclusions should be interpreted critically (Moher, Tetzlaff, Tricco, Sampson, & Altman, 2007). This study attempted to address this issue and reduce the variability by assessing the methodological quality of included papers. This aimed to promote standardisation by facilitating comparison between various studies. However, when attempting to choose a quality rating tool, it quickly became apparent that a plethora of measures, used interchangeably by researchers, existed. On further examination, it was noted that many quality rating tools were designed for randomised controlled trials (RCTs) and/or treatment intervention studies, and consequently were not applicable to the experimental studies identified from this systematic review.

Consequently, this study employed the quality rating approach outlined by Gilbert (2009) and advocated by Arcelus, Haslam, Farrow, & Meyer, (2013). Gilbert (2009) developed a checklist for cross sectional studies based on the NICE⁹ checklists for cohort, case-control and qualitative studies (NICE, 2007) and so the review used this checklist in conjunction with the NICE quality rating system (NICE, 2007). This rates studies according to 1). good quality (++); when all or most criteria have been fulfilled; 2). reasonable quality (+); when some criteria have been fulfilled or; 3). poor quality (-); when few/no criteria are fulfilled. Although this tool has been used in previous research (Arcelus et al., 2013), it is possible that as a relatively new quality rating instrument, it may not yet be a standard tool employed by researchers and this limits the extent to which the quality ratings are truly comparable across reviews. On a broader level, while it is widely acknowledged that quality assessments are valuable, the diversity and lack of consistency in implementation is a concern. Rating tools may assess and rank different features of studies and so study quality ratings are potentially highly arbitrary and may fluctuate significantly depending on the rating tool employed. This would have obvious negative implications regarding accurate comparison and representativeness of findings.

⁹ National Institute for Health and Care Excellence

Topic Refinement & Search Term Strategy

Choosing and deciding upon a topic to systematically review was one of the most time-consuming tasks of the project. There were several factors to consider before committing to one specific area. Endeavouring to choose a topic of meaningful interest and clinical applicability was difficult to match with the time and resources available. In addressing this, it was necessary to do a number of separate preliminary literature searches to determine the level and nature of existing research within a particular area, to ensure potential review ideas were not already in publication, and also to identify potential gaps in the evidence base. Several topic revisions were required in conjunction with input from research supervisors to isolate a clinically interesting and relevant area that had sufficient existing literature available to review.

Deciding which terms to include in the systematic search strategy was also somewhat challenging. Search terms endeavoured to reflect representative key words within the existing literature. However, as in much research, different terminology and taxonomy is often used to describe similar processes. Consequently, a wide range of search terms was used to ensure the search was as thorough and inclusive as possible. However, each search yielded a considerable number of irrelevant papers, which could indicate the search strategy was too broad. This process highlighted the challenge in ensuring search terms are inclusive to reduce risk of relevant papers being overlooked, whilst also ensuring the number of irrelevant papers yielded is minimal. As the search term strategy was potentially over inclusive, the process of selecting eligible articles for inclusion was time consuming. However it ensured the search strategy was comprehensive and thorough, which minimised risk of excluding important articles.

Review Procedure

The initial search was conducted in January 2013 during which 24 eligible papers were identified. To ensure the systematic review was as current, up to date and as accurate as possible, the search was conducted again in May 2013 to account for any journal articles published since the initial database search. During this six month interval, three further papers had been published, along with a number of conference abstracts, bringing the final number of papers to 27. This observation was interesting as it reflects a currently dynamic and flourishing field of research. This prompted reflection on the pace at which research can become dated. On a practical level, it provoked reflection on the difficulties inherent in publishing up to date and relevant systematic reviews, given the difficulty in remaining abreast of new and emerging developments within a particular field.

It could be argued that relevant information presented in grey literature such as conference abstracts, poster presentations or unpublished theses was missed. However, publication in a peer-reviewed journal was a predetermined study inclusion criterion to ensure articles were considered of an acceptable standard by those with expertise in the field. This approach is also considered best practice in systematic reviews (Jesson, Matheson, & Lacey, 2011).

Procedural Reflections

Conducting this systematic review was at times, undeniably challenging. Balancing the competing demands of critiquing research studies, conducting an experimental research study and working clinically required considerable time management, organisational and prioritization skills. However, both studies provided many learning opportunities and supported the refinement of existing research skills e.g. conducting literature reviews, disseminating research findings coherently, and participant recruitment. These processes prompted reflection on the unique training and subsequent contribution to research activities that clinical psychology can provide within the NHS, in areas such as supporting evidence based practice in individual work and team members, undertaking service audit and/or making funding/ethics applications. In addition, as a result of these experiences it is felt that clinical psychology can be pivotal in service development by providing consultation to other professionals on research design, methodology and analysis, as well as encouraging and promoting the need for dissemination of research reports in peer-reviewed journals, or more locally at national or regional conferences.

One final reflection noted during this systematic review relates to the widespread observation that studies with positive results are inherently more likely to be published than those with negative or non-significant findings (Bax & Moons, 2011; Guyatt et al., 2008). In light of this positive publication bias within the literature, it is possible that subsequent over-representation of positive studies in systematic reviews may lead reviews to be artificially biased towards positive results (Stewart & Tierney, 2002). Extensive and comprehensive searches are necessary when identifying papers, along with an awareness of a possible positive publication bias among researchers, when making inferences or conclusive recommendations based on review findings.

Implications of Review Findings

A significant strength of this review relates to its comprehensiveness and accessibility. No previous systematic review has specifically investigated empirical studies of decision making across the range of disordered eating populations. Consequently, this review fills a gap in the existing body of literature. It is hoped this review will provide clinicians and researchers

working in the context of eating disorders with a concise overview of the decision making styles demonstrated by people with disordered eating. It is hoped this will also be useful in gaining an understanding between particular patterns of decision making and the behavioural manifestations and clinical presentation of disordered eating. In particular, the review indicated some commonalities in decision making patterns across two of the formal eating disorder diagnostic categories (AN and BN). Within eating disorder research, a debate is ongoing over the benefit of dividing eating disorders into separate categories diagnostically (Birmingham, Touyz, & Harbottle, 2009), rather than adopting a transdiagnostic perspective (Fairburn, Cooper & Shafran, 2003), where common interrelating underlying processes are considered. The findings from this review tentatively lend support to the transdiagnostic model of eating disorders, as there is evidence of similar decision making styles in people with AN and BN. This may indicate the presence of similar core psychopathological processes. Characteristically different eating disorder styles were not found in the remaining diagnostic category (EDNOS); however research was clearly lacking with this clinical population. Ultimately, it is hoped that the findings from this review will make an appreciable contribution to our understanding of the cognitive processes and executive functions in people with disordered eating, and that this enhanced understanding will lead to augmented patient care and treatment.

Paper Two: Empirical Paper: Investigating the ‘Jumping to Conclusions’ bias in people in anorexia.

Rationale

The JTC bias is a reasoning bias evident in a variety of psychiatric disorders, but most notably and reliably demonstrated in people with schizophrenia and psychosis. However comparatively little research has demonstrated whether it is present in other psychiatric disorders, such as AN. Consequently, this research study aimed to fill this gap in the evidence base. A preliminary study investigated the JTC bias in a non-clinical sample that displayed high levels of body dissatisfaction (Sperry, 2010), and the current study aimed to develop this by investigating the bias in a clinical AN sample. The extension of research with non-clinical samples is necessary to determine whether identified concepts are of clinical and therapeutic relevance in clinical populations.

Recruitment

Prior to conducting this research, it was anticipated that participant recruitment could pose some difficulty, given that AN is relatively rare within the general population. Previous literature has acknowledged the difficulty in planning recruitment from small populations such as AN, and it is recommended to recruit from multiple sites over shorter time periods, rather

than from few sites over longer time periods (McDermott et al., 2004). Guided by this, and in an attempt to pre-empt and counteract potential recruitment difficulties, it was decided to recruit from a total of five sites, with the hope that this would maximise potential recruitment opportunities given the relatively short time frame.

Despite taking these preliminary steps, participant recruitment proved to be one of the greatest challenges. Recruitment as a process was quite difficult and slower than anticipated throughout the project. Recruitment for the study took place over an eight month period (September 2012 to April 2013). On reflection it would have been beneficial to begin recruitment earlier in order to attain the target number of participants. Additionally, increasing the number of recruitment sites would have increased likelihood of recruiting participants, and in hindsight, this option should have been pursued more thoroughly at the time. At the initial stages of the project, consideration was given to the possibility of recruiting participants from voluntary organisations or national databases (e.g. BEAT¹⁰) in an effort to bolster sample size. It was decided not to pursue this option as the study endeavoured to investigate a 'pure' AN population; participants who currently met DSM-IV-TR¹¹ criteria for AN. It was felt that there was no assurance that this criterion could be met if recruitment extended beyond clinical services. Preserving the purity of the AN sample was of greater clinical utility and would provide more accurate, representative results. Consideration of these factors prompted reflection on the difficulties inherent in conducting clinical research, such as the conflict between feasibility and purity of samples. Although recruitment was stressful at times, the process provided a useful insight into the obstacles and potential pitfalls present when conducting research with clinical populations.

There were a number of additional factors which may also have negatively affected recruitment. Much of the research was conducted on inpatient units where individuals with extremely low BMI were admitted. Consequently, it is possible that the physical impact of the illness (e.g. lack of physical strength and loss in concentration) may have restricted some individuals' ability to partake. Furthermore, many people with AN have secondary or comorbid diagnoses of depression (Blinder, Cumella, & Sanathara, 2006). The primary features of AN (i.e. starvation) often result in tiredness and a lack of energy, and this coupled

¹⁰ BEAT (Beating Eating Disorders) is a UK organisation supporting people affected by eating disorders, and their families. It is the world's largest eating disorder charity.

¹¹ Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) criteria for Anorexia Nervosa include: A refusal to maintain body weight at or above a minimally normal weight for age and height; an intense fear of gaining weight or becoming fat, even though underweight; disturbance in the way weight and shape are experienced and; amenorrhea (American Psychiatric Association, 2000).

with the symptoms of depression (i.e. lethargy, lack of motivation) may have negatively impacted on their ability to fully engage with the research study.

It may have been helpful to offer participants an incentive for participation (e.g. gift vouchers, monetary incentives, entry into prize draw). This was not included in the initial recruitment design and so did not receive ethical approval. However, this could also have introduced bias into the sample.

Power

Taken together, the factors discussed above may partially have contributed to the smaller-than-intended sample size. In light of this, an obvious and significant limitation of the current study relates to the lack of statistical power. This is a considerable limitation as low power inherently limits the study's ability to detect clinical and statically significant differences, effects or interactions. As discussed by Maxwell, Kelley, & Rausch (2006), the consequences of low power include contradictory and non-representative findings, which limit the ability to draw clinical and conceptual inferences about a particular subject area. Specifically, as this study constitutes a relatively new area of research, it is essential it be replicated with a sufficiently large sample size and statistical power. This is of fundamental importance in order to confirm the validity and representativeness of these study findings.

Reflection followed on the challenges statistical power represents in studies involving clinical populations that are difficult to recruit. While the logistical factors underlying smaller sample sizes are understandable and difficult to avoid (i.e. rare diagnoses, hard to reach populations etc.), the lack of statistical power is a challenge faced by researchers who endeavour to conduct research with these clinical populations (Woods et al., 2006). Despite this, future research involving difficult to reach clinical populations (e.g. AN) should endeavour to achieve sample sizes sufficient to ensure statistical power.

While the overall final sample size was somewhat smaller than the original target number of thirty-five, the sample size in this current study is comparable with experimental research conducted with AN participants (Radomsky, de Silva, Todd, Treasure, & Murphy, 2002; Mountford, Waller, Watson, & Scragg, 2004; Zucker et al., 2013). This prompted reflection on the broader, sometimes conflicting issues of statistical power compared with feasibility within some AN research, whereby difficulties in recruiting participants could result in smaller sample sizes which can negatively impact on generalizability and representativeness of study findings.

Participants

When recruiting the control group, one pertinent issue arose. The data from 17 non-clinical women (from a total of 50) had to be excluded due to inflated scores on the EDEQ¹² (over 1). As the EDEQ is a clinical tool used to establish eating disorder pathology, the high incidence of inflated scores among a non-clinical sample suggests a significant proportion of young women in the general population may display elements of disordered eating behaviour, along with weight and shape preoccupation. This finding is somewhat alarming as in this sample it indicates a high prevalence of subclinical pathological eating behaviours in the female general population. Although the initial cut-off was quite low, it suggests the presence of body dissatisfaction and disordered eating attitudes, which ultimately act as major vulnerability factors for the development of eating disorders (Thompson, Covert, Richards, Johnson, & Cattarin, 1995). This observation is consistent with the existing literature, where rising levels of eating disordered behaviour and beliefs are emerging (Micali, Hagberg, Petersen, & Treasure, 2013). In this context, this current research is timely in helping to advance our understanding of disordered eating, and will be relevant and beneficial when working in clinical practice with this exceptionally difficult-to-treat clinical population.

There were two additional issues which arose regarding participant characteristics. Firstly, all participants were White European highlighting a limitation with regard to ethnic and cultural diversity within the sample. The lack of diversity within the sample limits the extent to which the study's findings may be generalizable to ethnic minority groups. Unfortunately, the underrepresentation of cultural diversity in this sample is congruent with much of the literature, where research on AN in ethnic minorities is relatively limited (Gordon, Perez, & Joiner, 2002). While it is difficult to explain this culturally homogenous sample, it is worth reflecting on some potentially relevant issues this observation provokes. It is possible this finding reflects a broader issue where services do not as readily recognise eating disorder presentations in ethnic minority groups. Historically AN was perceived as an attribute of achievement orientated, upper and middle class individuals in Western societies (Lee & Lock, 2007). A plethora of ensuing research has however demonstrated that eating disorders are evident in virtually all socioeconomic strata and ethnic populations (Pate, Pumariega, Hester, & Garner, 1992; Lee, Ho, & Hsu, 1993). Furthermore, frequency of occurrence and symptomatology appear similar across culturally diverse groups (Crago, Shisslak, & Estes, 1996; Cachelin, Veisel, Barzegarnazari, & Striegel-Moore, 2000). In this context, it is possible that a range of individual and systemic factors may deter ethnic minorities from receiving eating disorder treatment, which may partially explain their subsequent low representation in clinical research. Such factors might include different cultural perspectives of psychiatric

¹² Eating Disorder Examination Questionnaire (Fairburn & Beglin, 1994).

disorders (O'Sullivan, Peterson, Cox, & Kirkeby, 1989), availing of familial or social support (Poma, 1983), unfamiliarity with mental health systems (Keefe & Casas, 1980), inaccessible care facilities (Marin, Marin, Padilla, & de la Rocha, 1983), language barriers (Acosta, 1979) and a lack of ethnically representative professional staff (Acosta & Cristo, 1982). From this perspective, while the study and associated information was available to all patients in all five sites, accessibility to the information would be impossible if ethnic minority patients were not involved or recognised by services as needing treatment in the first instance. Clearly, future research involving AN participants needs to address this limitation, incorporate it into study and recruitment design, and aim to achieve more ethnically diverse and culturally representative samples.

Secondly, while two males were included in the control and clinical groups, the overall sample consisted predominantly of females. This may impact on the generalizability of results to male AN populations. While some research indicates clinical similarities between men and women with eating disorders (Woodside et al., 2001), it would be interesting to explore this more fully in research where males with AN were more fully represented. However, as AN is a difficult population from which to recruit and it is more prevalent among women (Hoek, 2006), the feasibility of this is problematic.

Finally, a diagnostic interview was not used to confirm patients' diagnoses. Case note diagnoses were made according to DSM-IV criteria by skilled psychiatrists, with significant specialist eating disorder experience. By the nature of its presentation, AN is one of the most recognisable and conspicuous psychiatric disorders. In this research study, where the majority of participants were on inpatient admissions or attending day-care units, it seemed unnecessary and somewhat unethical to expose participants to a lengthy clinical and diagnostic interview given the conspicuousness and validity of their already in place diagnoses.

Measures

The process of data collection highlighted a number of interesting issues in relation to the measures used within the study. In particular, some items on the EDEQ seemed irrelevant for people on inpatient admissions. The requirement of following an inpatient routine negated certain items on the scale. For example, some items related to the behavioural features of AN such as dietary restriction, compulsive exercise, purging and use of laxatives, and the frequency with which these behaviours were engaged in over the previous 28 days. However, on an inpatient unit the level of supervision, monitoring and structured dietary, exercise and resting routines would be so restrictive as to prevent individuals from being able to engage in

such behaviours. Consequently, it is possible several participants' scores on the EDEQ may be artificially deflated by the unit environment and therefore may not be an accurate or reliable indicator of eating pathology. In light of this, and notwithstanding the initial patient inclusion criteria, the data of people who scored lower than 3 on the EDEQ were still included in the analysis once a diagnosis of AN was in place.

Furthermore, some inpatients answered certain items on the EDEQ in the context of their admission. For example, item 4 on the EDEQ asks: "*Have you tried to follow definite rules regarding your eating (for example, a calorie limit) in order to influence your shape or weight (whether or not you have succeeded)*". Several women receiving inpatient treatment scored highly on this item by interpreting it in the context of their admission to hospital. Interpreting the item in the context of dietary plans with calorie limits (e.g. 1750 kcal, 2000kcal, 2250kcal) designed to change shape or weight through weight gain, led women to score particularly highly on these items. Therefore, there is a possibility this misinterpretation may inflate their global score and indicate slightly higher levels of eating pathology than may actually be present. As the EDEQ is frequently used in admission and discharge assessments in many eating disorders units, these limitations prompted broader reflection on the applicability of the EDEQ in such settings, given the potential for misinterpretation.

During participation, individuals often offered feedback regarding the measures and tasks employed. In receiving this feedback the value of service user involvement in guiding, informing and refining clinical research was powerfully illustrated. The value of consulting with service users at the initial stages of study design was exemplified, and highlighted that service user involvement is a powerful and valuable resource that should be availed of in research. In hindsight, when some limitations of the tasks used in the study are considered (i.e. salience of words in the survey tasks), consultation with service users at the initial stages of task development would have been extremely beneficial. Obtaining service users' perspectives on the salience or relevance of words could have led to the development of more valid tasks which would ultimately have bolstered the research study. While this is an obvious limitation, future research should aim to avail of service users' experiences and insights to highlight particular issues and inform research processes specific to the clinical population under investigation.

Research Limitations and Implications

Decision making is an immensely complex process that depends on a series of interrelated yet, fundamentally distinct sets of processes. For example, decision making involves the formation of preferences, the selection and execution of actions and the experience and

evaluation of outcomes (Ernst & Paulus, 2005). Given the complexity of decision making as an executive function, it is hardly surprising that multiple disciplines have considered and examined decision making from a variety of perspectives. More recently however, advances from neuropsychology have yielded valuable information in identifying specific brain regions responsible for certain aspects of brain function. For example, coding the probability or certainty of outcomes has been shown to be associated with the parietal cortex (Dehaene, Spelke, Pinel, Stanescu, & Tsivkin, 1999). The anterior cingulate cortex has been associated with processes of uncertainty (Critchley, Mathias, & Dolan, 2001) while reasoning has been proposed to be associated with left middle and inferior frontal gyri (Goel, Gold, Kapur, & Houle, 1998). A significant limitation of the empirical research study was that decision making was assessed solely using an empirical task, and in isolation from other measures of executive functioning. In hindsight, drawing on neuropsychological perspectives would have strengthened the research and validity of findings.

Specifically within the field of eating disorders, research has benefitted from neuropsychological contributions in the investigation of cognitive and executive processes in AN. Difficulties in cognitive flexibility and set shifting have been demonstrated (Tchanturia et al., 2004). Neurocognitive research has indicated that people with AN also demonstrate weak central coherence (Gillberg, Rastam, Wentz, & Gillberg, 2007), a cognitive style where there is a bias towards detailed processing of information, rather than a more global perspective where information is integrated contextually. These findings might be useful in considering the findings from the empirical paper, where a preoccupation with local detail on the beads tasks may contribute to a desire for additional information prior to decision making. It is a recognised limitation that in the empirical study, a single measure of decision making (i.e. the beads tasks) was used. Investigating the JTC bias in conjunction with additional measures of executive functioning would have bolstered the findings from the study, and would potentially have yielded more informative results. Consequently, it is recommended that studies endeavouring to replicate the results of the empirical study should consider the inclusion of additional measures of executive functioning, e.g. the DKEFS¹³ (Delis, Kaplan, & Kramer, 2001) or the WCST¹⁴ (Heaton, 1981). In this context, future research investigating the JTC in AN would benefit from incorporating a more neuropsychological perspective, so that decision making is considered in the context of broader executive functions.

Clinical Implications of Study Findings

This study was original as it was one of the first of its kind to investigate the 'jumping to conclusions' (JTC) bias in AN. While replication is essential to ensure robustness of findings,

¹³ Delis-Kaplan Executive Function System

¹⁴ Wisconsin Card Sorting Test

the results tentatively suggest that people with AN do not display a probabilistic reasoning bias characterised by making decisions on the basis of little or inadequate information. These results indicate that people with AN do not display reasoning biases similar to those evident in other psychiatric disorders, such as psychosis, indicating there may be qualitatively different executive functioning in these clinical populations. Consideration of these decision making styles is important in the context of the development and maintenance of disorder-maintaining beliefs, and warrant careful consideration in patient care and treatment.

The results also indicate that, similar to previous research (Steinglass, Eisne, Attia, Mayer, & Walsh, 2007), while a majority of people demonstrated limited insight into their primary eating disorder beliefs, only a minority subgroup held beliefs that could be classified as 'delusional'. It is more likely therefore, that people with AN may hold over-valued beliefs (Veale, 2002) regarding their eating disorder, but can generally acknowledge that their beliefs may not be objectively true and would be considered unusual by significant others. These results lend support to existing research which proposes a delusional variant of AN may exist (Konstantakpoulous et al., 2012), where delusional lies along a continuum, ranging from overvalued ideation to delusional. In clinical contexts, these results are important as impairments in insight can contribute to a range of difficulties including treatment non adherence (Smith et al., 2004), which is associated with poor clinical and therapeutic outcomes (Lincoln, Lullmann, & Rief, 2007). When working with patients whose beliefs could be considered delusional, clinicians should consider the importance of this limited insight in treatment planning and individual goal setting. Increasing insight could constitute an important therapeutic goal, as increases in insight across psychiatric disorders are positively associated with recovery orientation (Mohammed et al., 2009).

Personal Reflection

One personal challenge which arose during the conduct of this research related to the need to adhere to the boundaries of the role of researcher, rather than clinician. At the time of recruitment, the researcher was also working clinically with people with AN, and in this context, the importance of implementing clear and consistent boundaries was paramount. In particular, one questionnaire required eliciting patient beliefs related to AN and often participants would speak about their histories and experiences. At these times maintaining appropriate boundaries and signposting individuals to staff was difficult, but necessary.

Dissemination of Study Findings

It is intended to disseminate the findings from both studies through publication in peer-reviewed articles. It is intended to submit the systematic review for publication in the journal

Clinical Psychology Review, and to submit the empirical research study for publication in the journal *Behaviour Research and Therapy*.

Conclusions

Overall this thesis aimed to advance our understanding of one aspect of executive function (i.e. decision making) in people with disordered eating. The aims were two-fold: 1). to systematically review and summarise the existing literature in relation to the nature of decision making across the spectrum of disordered eating and; 2). to build on this foundation by conducting a novel research study investigating a specific form of decision making i.e. 'jumping to conclusions', in individuals diagnosed with AN. Overall, the results from this thesis suggest that while people with AN and BN appear to demonstrate characteristically different decision making styles in the context of gains and losses (i.e. they tend to choose immediate gains despite long term negative consequences), they do not appear to make hasty decisions on the basis of little evidence. Furthermore, people with AN appear to demonstrate limited insight into their primary eating disorder related beliefs; however, in only a minority of individuals with AN could their beliefs be classified as 'delusional'. Limitations of the approaches and research methodology used in both studies have been identified, along with areas or directions for future research. Amendments for future research methodologies are also proposed. The overall research however is considered appropriate, relevant and valuable and the conclusions drawn from both studies are believed to be valid.

References

- Acosta, F.X. (1979). Barriers between mental health services and Mexican Americans: An examination of a paradox. *American Journal of Community Psychology, 7*, 503–520.
- Acosta, F.X., & Cristo, M.H. (1982). Bilingual-bicultural interpreters as psychotherapeutic bridges: A program note. *Journal of Community Psychology, 10*(1), 54-56.
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed.,text rev.).Washington, DC.
- Arcelus, J., Haslam, M., Farrow, C., & Meyer, C. (2003). The role of interpersonal functioning in the maintenance of eating pathology: A systematic review and testable model. *Clinical Psychology Review, 33*, 156-167.
- Aspinwall, L.G., & Taylor, S.E. (1997). A stitch in time: Self-regulation and proactive coping. *Psychological Bulletin, 121*(3), 417-436.
- Bax, L., & Moons, K.G. (2011). Beyond publication bias. *Journal of Clinical Epidemiology, 64*(5), 459-462.
- Bechara, A., & Martin, E.M. (2004). Impaired decision making related to working memory deficits in individuals with substance addictions. *Neuropsychology, 18*, 152-162.
- Birmingham, C.L., Touyz, S., & Harbottle, J. (2009). Are anorexia nervosa and bulimia nervosa separate disorders? Challenging the 'transdiagnostic' theory of eating disorders. *European Eating Disorders Review, 17*(1), 2-13.
- Blinder, B.J., Cumella, E.J., & Sanathara, V.A. (2006). Psychiatric comorbidities of female inpatients with eating disorders. *Psychosomatic Medicine, 68*(3), 454-462.
- Brand, M., Kalbe, E., Labudda, K., Fujiwara, E., Kessler, J., & Markowitsch, H.J. (2005). Decision-making impairments in patients with pathological gambling. *Psychiatry Research, 133*, 91-99.
- Cachelin, F.M., Veisel, C., Barzegarnazari, E., & Striegel-Moore, R.H. (2000). Disordered eating, acculturation, and treatment-seeking in a community sample of Hispanic, Asian, Black, and White women. *Psychology of Women Quarterly, 24*(3), 244-253.
- Cavedini, P., Gorini, A., & Bellodi, L. (2006). Understanding obsessive-compulsive disorder: focus on decision making. *Neuropsychology Review, 16*(1), 3-15.
- Crago, M., Shisslak, C.M., & Estes, L.S. (1996). Eating disturbances among American minority groups: A review. *International Journal of Eating Disorders, 19*(3), 239-248.
- Critchley, H.D., Mathias, C.J., & Dolan, R.J. (2001). Neural activity in the human brain relating to uncertainty and arousal during anticipation. *Neuron, 29*, 537-545.
- Dehaene, S., Spelke, E., Pinel, P., Stanescu, R., & Tsivkin, S. (1999). Sources of mathematical thinking: Behavioural and brain-imaging evidence. *Science, 284*, 970-974.
- Delis, D., Kaplan, E., & Kramer, J. (2001). *Delis-Kaplan Executive Function Scale*. San Antonio: Psychological Corporation.

- Ernst, M., & Paulus, M.P. (2005). Neurobiology of decision making: a selective review from a neurocognitive and clinical perspective. *Biological Psychiatry*, *58*, 897-904.
- Fairburn, C.G., & Beglin, S. (1994). Assessment of eating disorder psychopathology: interview or self-report questionnaire? *International Journal of Eating Disorders*, *16*, 363-370.
- Fairburn, C.G., Cooper, Z., & Shafran, R. (2003). Cognitive behaviour therapy for eating disorders: a "transdiagnostic" theory and treatment. *Behaviour Research and Therapy*, *41*(5), 509-528.
- Gilbert, N. (2009). *Disclosure of eating disorders and subsequent help seeking*. Unpublished Doctoral Dissertation, Volume I. Birmingham: University of Birmingham.
- Gillberg, I., Rastam, M., Wentz, E., & Gillberg, C. (2007). Cognitive and executive functions in anorexia nervosa ten years after onset of eating disorder. *Journal of Clinical and Experimental Neuropsychology*, *29*, 170-178.
- Goel, V., Gold, B., Kapur, S., & Houle, S. (1998). Neuroanatomical correlates of human reasoning. *Journal of Cognitive Neuroscience*, *10*, 293-302.
- Gordon, K.H., Perez, M., & Joiner, T.E. Jr. (2002). The impact of racial stereotypes on eating disorder recognition. *International Journal of Eating Disorders*, *32*(2), 219-224.
- Guyatt, G.H., Oxman, A.D., Vist, G., Kunz, R., Falck-Ytter, Y., Alonso-Coello, P., & Schünemann, H.J. (2008). Rating quality of evidence and strength of recommendations GRADE: an emerging consensus on rating quality of evidence and strength of recommendations. *BMJ*, *336*, 924-926.
- Heaton, R.K. (1981). *Wisconsin Card Sorting Testing manual*. Odessa, FL: Psychological Assessment.
- Hoek, H.W. (2006). Incidence, prevalence and mortality of anorexia nervosa and other eating disorders. *Current Opinion in Psychiatry*, *19*(4), 389-394.
- Huq, S.F., Garety, P.A., & Hemsley, D.R. (1988). Probabilistic judgments in deluded and non-deluded subjects. *Quarterly Journal of Experimental Psychology*, *40A*, 801-812.
- Jesson, J. K., Matheson, L. & Lacey, F. M. (2011). *Doing your literature review: Traditional and systematic techniques*. Sage: Los Angeles.
- Keefe, S. E., & Casas, J. M. (1980). Mexican-Americans and mental health: A selected review and recommendations for mental health service delivery. *American Journal of Community Psychology*, *8*, 303-326.
- Konstantakopoulos, G., Varsou, E., Dikeos, D., Ioannidi, N., Gonidakis, F., Papdimitriou, G., & Oulis, P. (2012). Delusionality of body image beliefs in eating disorders. *Psychiatry Research*, *200*, 482-488.
- Lang, T.A. (2004). The value of systematic reviews as research activities in medical education. *Academic Medicine*, *79*(11), 1067-1072.
- Lee, S., Ho, T. & Hsu, L. (1993). Fat phobic and non-fat phobic anorexia nervosa: a comparative study of 70 Chinese patients in Hong Kong. *Psychological Medicine*, *23*, 999 -1017.

- Lee, H.Y., & Lock, J. (2007). Anorexia nervosa in Asian-American adolescents: do they differ from their non-Asian peers. *International Journal of Eating Disorders*, 40(3), 227-231.
- Lincoln, T.M., Lullmann, E., & Rief, W. (2007). Correlates and long-term consequences of poor insight in patients with schizophrenia. A systematic review. *Schizophrenia Bulletin*, 33, 1342-2324.
- Marin, B., Marin, G., Padilla, A.M., & de la Rocha, C. (1983). Utilization of traditional and non-traditional sources of health care among Hispanics. *Hispanic Journal of Behavioral Sciences*, 5, 65–80.
- Maxwell, S.E., Kelley, K., & Rausch, J.R. (2006). Sample Size Planning for Statistical Power and Accuracy in Parameter Estimation. *Annual Review of Psychology*, 59, 537-563.
- McDermott, C., Agras, W.S., Crow, S.J., Halmi, K., Mitchell, J.E., & Bryson, S. (2004). Participant recruitment for an anorexia nervosa treatment study. *International Journal of Eating Disorder*, 35 (1), 33-41.
- Micali, N., Hagberg, K.W., Petersen, I., & Treasure, J.L. (2013). The incidence of eating disorders in the UK in 2000-2009: findings from the General Practice Research Database. *BMJ Open*, 3, e002646.
- Mohamed, S., Rosenheck, R., McEvoy, J., Swartz, M., Stroup, S., & Lieberman, J.A. (2009). Cross-sectional and longitudinal relationships between insight and attitudes toward medication and clinical outcomes in chronic schizophrenia. *Schizophrenia Bulletin*, 25, 336-346.
- Moher, D., Tetzlaff, J., Tricco, A.C., Sampson, M., & Altman, D.G. (2007). Epidemiology and Reporting Characteristics of Systematic Reviews. *PLoS Med* 4(3), e78.
- Mountford, V., Waller, G., Watson, D., & Scragg, P. (2004). An experimental analysis of the role of schema compensation in anorexia nervosa. *Eating Behaviours*, 5, 223-230.
- National Institute for Health and Clinical Excellence. (2007). *The guidelines manual*. Retrieved from <http://www.nice.org.uk/guidelinesmanual>.
- O'Sullivan, M.J., Peterson, P.D., Cox, G.B., & Kirkeby, J. (1989). Ethnic populations: Community mental health services ten years later. *American Journal of Community Psychology*, 17(1), 17-30.
- Pate, J. E., Pumariega, A. J., Hester, C., & Garner, D. M. (1992). Crosscultural patterns in eating disorders: A review. *Journal of the American Academy of Child & Adolescent Psychiatry*, 31, 802–809.
- Poma, P.A. (1983). Hispanic cultural influences on medical practice. *Journal of the National Medical Association*, 75, 941–946.
- Popovich, I., Windsor, B., Jordan, V.M., Showell, M., Shea, B., & Farquhar, C. (2012). Methodological Quality of Systematic Reviews in Subfertility: A Comparison of Two Different Approaches. *PLoS One*, 2(12), e50403.
- Radomsky, A.S., de Silva, P., Todd, G., Treasure, J., & Murphy, T. (2002). Thought-shape fusion in anorexia nervosa: an experimental investigation. *Behaviour Research and Therapy*, 40, 1169-1177.

- Smith, T.E., Hull, J.W., Huppert, J.D., Silverstein, S.M., Anthony, D.T., & McClough, J.F. (2004). Insight and recovery from psychosis in chronic schizophrenia and schizoaffective disorder patients. *Journal of Psychiatric Research*, 38, 169-176.
- Sperry, H. (2010). *Jumping to Conclusions Bias and Attitudes Toward Body Image and Food*. (Unpublished thesis). Butler University. United States.
- Steinglass, J.E., Eisne, J.L., Attia, E., Mayer, L., & Walsh, B.T. (2007). Is anorexia nervosa a delusional disorder? An assessment of eating beliefs in anorexia nervosa. *Journal of Psychiatric Practice*, 13(2), 65-71.
- Stewart, L.A., & Tierney, J. F. (2002). To IPD or not to IPD?: Advantages and Disadvantages of Systematic Reviews Using Individual Patient Data. *Evaluation and the Health Professions*, 25, 76-97.
- Tchanturia, K., Morris, K. G., Anderluh, M. B., Collier, D., Nikolaou, V., & Treasure, J. (2004). Set shifting in anorexia nervosa: an examination before and after weight gain, in full recovery and relationship to childhood and adult OCPD traits. *Journal of Psychiatric Research*, 38, 545-552.
- Thompson, J.K., Coovert, M.D., Richards, K.J., Johnson, S., & Cattarin, J. (1995). Development of body image, eating disturbance, and general psychological functioning in female adolescents: Covariance structure modelling and longitudinal investigations. *International Journal of Eating Disorders*, 18(3), 221-236.
- Veale, D. (2002). Over-valued ideas: A conceptual analysis. *Behaviour Research and Therapy*, 40, 383-400.
- Woods, S.P., Rippeth, J.D., Conover, E., Carey, C.I., Parsons, T.D., & Troster, A.I. (2006). Statistical power of studies examining the cognitive effects of subthalamic nucleus deep brain stimulation in Parkinson's disease. *The Clinical Neuropsychologist*, 20, 27-38.
- Woodside, D.B., Garfinkel, P.E., Lin, E., Goering, P., Kaplan, A.S., Goldbloom, D.S., & Kennedy, S.H. (2001). Comparisons of men with full or partial eating disorders, men without eating disorders, and women with eating disorders in the community. *American Journal of Psychiatry*, 158(4), 570-574.
- Zucker, N.L., Merwin, R.M., Bulik, C.M., Moskovich, A., Wildes, J.E., & Groh, J. (2013). Subjective experience of sensation in anorexia nervosa. *Behaviour Research and Therapy*, 51, 256e265.

APPENDICES

Appendix 1

Author Guidelines for Clinical Psychology Review



CLINICAL PSYCHOLOGY REVIEW

AUTHOR INFORMATION PACK

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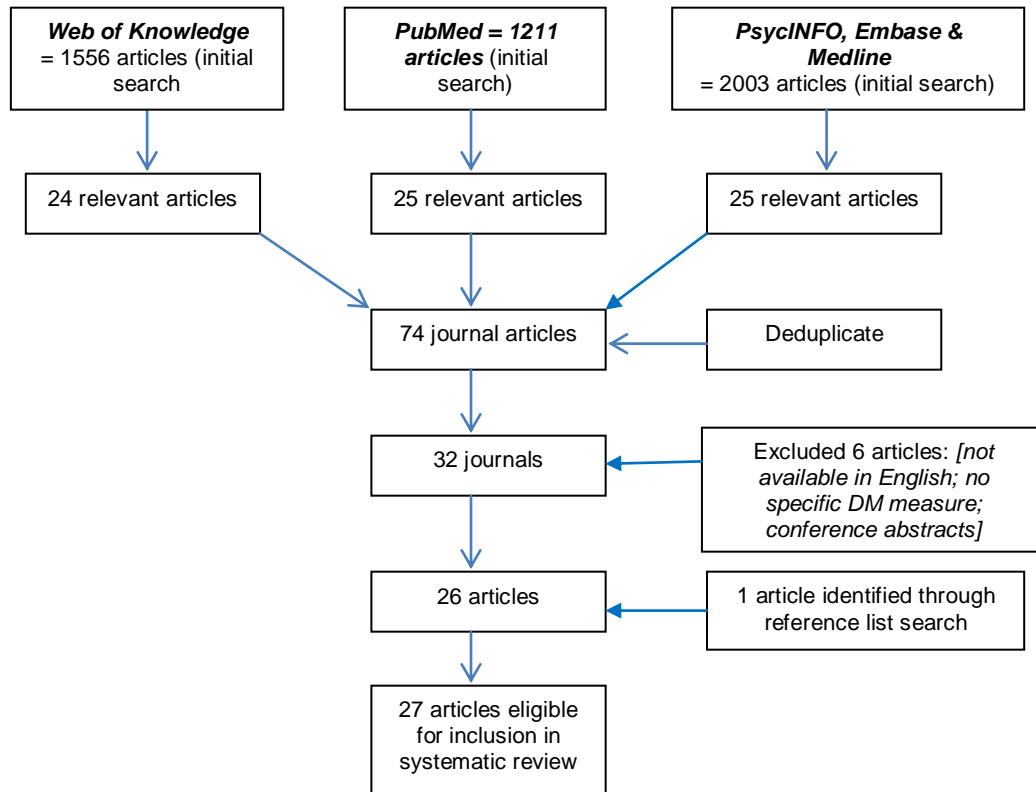
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Appendix 2

Flowchart of Literature Search Stages



Flowchart of literature search stages, adapted from Moher, Liberati Tetzlaff & Altman (2009).

Appendix 3

Quality Rating Tool

Checklist for rating the methodological quality of studies (taken from Gilbert, 2009; utilised by Arcelus et al., 2013).

Section 1: Internal Validity		In this study the criterion is :
1.1 The study addresses an appropriate and clearly focused question	Well covered	Not addressed
	Adequately covered	Not reported
	Poorly addressed	Not applicable
<i>Selection of subjects</i>		
1.2 Recruitment is appropriate to the aims of the research	Well covered	Not addressed
	Adequately covered	Not reported
	Poorly addressed	Not applicable
1.3 Representative cases from relevant population	Well covered	Not addressed
	Adequately covered	Not reported
	Poorly addressed	Not applicable
1.4 The study indicates how many people asked to take part did so	Well covered	Not addressed
	Adequately covered	Not reported
	Poorly addressed	Not applicable
1.5 Comparison is made between participants and non-participants to establish their similarities or differences	Well covered	Not addressed
	Adequately covered	Not reported
	Poorly addressed	Not applicable
1.6 Inclusion criteria made explicit and sample characteristics sufficiently described	Well covered	Not addressed
	Adequately covered	Not reported
	Poorly covered	Not applicable
1.7 Were subjects recruited over the same period of time?	Well covered	Not addressed
	Adequately covered	Not reported
	Poorly covered	Not applicable
<i>Data collection</i>		
1.8 Confidence in the quality of individual responses (e.g. telephone questionnaires might produce better quality answers than postal	Well covered	Not addressed
	Adequately covered	Not reported
	Poorly covered	Not applicable
1.9 Outcome is measured in an objective, standard, valid and reliable way	Well covered	Not addressed
	Adequately covered	Not reported
	Poorly covered	Not applicable
1.10 Reliance on current info rather than recall/hypothetical scenarios	Well covered	Not addressed
	Adequately covered	Not reported
	Poorly covered	Not applicable
<i>Confounding</i>		

1.11 The main potential confounders are identified and taken account in the design and analysis	Well covered	Not addressed
	Adequately covered	Not reported
	Poorly covered	Not applicable
1.12 Minimisation of bias- participant bias, observer bias, halo effects	Well covered	Not addressed
	Adequately covered	Not reported
	Poorly addressed	Not applicable
<i>Statistical analysis</i>		
1.13 Appropriate use of statistical analysis?	Appropriate	
	Not appropriate	
	Not clear	
1.14 Actual p values reported (e.g. 0.037 rather than <0.05 for the main outcome, except when the p value is <0.001.	Yes	
	No	
Section 2		
2.1 How well does the study minimise the risk of bias or confounding, and meet its aims?	++	
	+	
	-	
2.2 Taking into account clinical durations, your evaluation of the methodology used and the statistical power of the study, are you certain that the findings could be replicated?	Yes	
	No	

Appendix 4

NICE Guidelines

NICE rating system for methodological quality of studies using methodological checklists (NICE, 2007).

++	All or most of the criteria have been fulfilled. Where they have not been fulfilled the conclusion of the study or review are thought <i>very unlikely</i> to alter.
+	Some of the criteria have been fulfilled. Those criteria that have not been fulfilled or not adequately described are thought unlikely to alter the conclusions.
-	Few or no criteria fulfilled. The conclusions of the study are thought <i>likely</i> or <i>very likely</i> to alter.

Appendix 5

Behaviour Research and Therapy Guidelines



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DESCRIPTION

Behaviour Research and Therapy encompasses all of what is commonly referred to as **cognitive behaviour therapy** (CBT). The focus is on the following: theoretical and experimental analyses of **psychopathological processes** with direct implications for prevention and treatment; the development and evaluation of empirically-supported interventions; predictors, moderators and mechanisms of behaviour change; and dissemination and implementation of evidence-based treatments to general clinical practice. In addition to traditional **clinical disorders**, the scope of the journal also includes **behavioural medicine**. The journal will not consider manuscripts dealing primarily with measurement, psychometric analyses, and personality assessment.

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- Full postal address
- Phone numbers

All necessary files have been uploaded, and contain:

- Keywords
- All figure captions
- All tables (including title, description, footnotes)

Further considerations

- Manuscript has been 'spell-checked' and 'grammar-checked'
- References are in the correct format for this journal
- All references mentioned in the Reference list are cited in the text, and vice versa
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Appendix 6

NRES Ethical Approval



**Health Research Authority
National Research Ethics Service**

NRES Committee North West - Cheshire
3rd Floor
Barlow House
4 Minshull Street
Manchester
M1 3DZ

Telephone: 0161 625 7816
Facsimile: 0161 625 7299

23 April 2012

Ms Grainne G McKenna
School of Psychological Sciences
Second Floor, Zochonis Building
University of Manchester
Manchester
M13 9PL

Dear Ms McKenna

Study title: Investigating the "Jumping to Conclusions' Bias in
people with anorexia
REC reference: 12/NW/0284
Protocol number: N/A

The Research Ethics Committee reviewed the above application at the meeting held on 12 April 2012. Thank you for attending to discuss the study.

Ethical opinion

1. The Committee queried why the healthy volunteer recruitment poster for men had not been submitted, and where the posters will be placed.

You agreed the poster should be multi gender and will be placed in and around Manchester University and Community Groups in the region, you are hoping that the recruitment strategy will have a snow-ball effect.

2. The Committee questioned why the Participant Demographic Questionnaire would include further information regarding the participant's marital status.

You informed the Committee you would like to gain a better understanding of the participant's background.

3. The Committee pointed out typographical errors in the Survey task.

You agreed to amend the documentation appropriately.

4. The Committee referred to the BABS Scale and advised you to ensure the text is converted to make it more relevant to the UK as it is currently Americanised.

5. The Committee asked you what policies are in place should the participants become distressed.

You explained to the Committee that the participants will have assistance in contacting their

A Research Ethics Committee established by the Health Research Authority

GP should they become distressed during the completion of the questionnaires and confirmed the participant would not be left alone in a distressed state.

The Committee advised you that the University lone worker policy should be followed and information regarding this should be included in the Patient Information Sheet.

6. The Committee asked you if the results of this study could inform future treatments.

You informed the Committee that if the participants are shown to be considered delusional it could show different ways of treating and working with this group of patients in the future.

7. The Committee asked you whether the participants are aware of the Assessment Tools as knowing how they work could skew the results.

You advised the Committee that you will check before hand if they have completed the Assessment Tools prior to the study.

8. The Committee raised concern over what would happen should the researchers discover any abnormalities within the healthy volunteer group.

You explained to the Committee that the healthy volunteers will be asked to complete the EDE-Q questionnaire and if their score is greater than 1 then they would be excluded from the study.

You was thanked for attending and left the meeting.

The members of the Committee present gave a favourable ethical opinion of the above research on the basis described in the application form, protocol and supporting documentation, **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).

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

Other conditions specified by the REC

1. Provide a copy of the advertisement / poster to be used for male healthy volunteers.
2. The Committee would like to see the Survey Task revised to:
 - a) Page 4, paragraph 1, change 'beads' to 'words'.
 - b) Page 26, paragraph 3, change 'food' to 'tools'.
 - c) Page 3, paragraph 3, change 'beads' to 'words'.
3. The Committee would like to see the BABS Scale converted to make it more relevant to the UK as it is currently Americanised.
4. The Committee would like to see the Participant Information Sheet revised to:
 - a) Under the heading 'What will happen to me if I take part' include the sentence: 'the interviews may take place in your own home, if you decide this option the Manchester University Lone Worker Policy will be followed.'
 - b) Under the heading 'What are the possible disadvantages of taking part?'
 - i. Omit the first five words and replace with 'It may be possible'
 - ii. The Last sentence should be amended as follows: 'If you do become distressed during the interviews the researcher will stop the interviews and an appropriate person such as your GP will be contacted.'

Suggestion

1. The Committee suggests you remove Point 6 from the Participant Demographic Information Questionnaire.

It is 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).

You should notify the REC in writing once all conditions have been met (except for site approvals from host organisations) and provide copies of any revised documentation with updated version numbers. Confirmation should also be provided to host organisations together with relevant documentation

Approved documents

The documents reviewed and approved at the meeting were:

<i>Document</i>	<i>Version</i>	<i>Date</i>
Advertisement	1.0	04 February 2012
Covering Letter		28 March 2012
Evidence of insurance or indemnity	University of Manchester	12 March 2012
Evidence of insurance or indemnity - Certificate of Employers Liability Insurance - Priory Investments Holdings Ltd		
GP/Consultant Information Sheets	1	05 December 2011
Investigator CV - Ms Grainne McKenna		14 January 2012
Letter from Sponsor - University of Manchester		12 March 2012
Letter from Statistician		08 February 2012
Other: Protocol for Participants in Emotional Distress	1.0	28 March 2012
Other: Referee and/or Scientific Critique - Anja Wittkowski		21 November 2011
Other: Evidence of Registration		28 March 2012
Other: Participant Debrief Sheet	1	05 December 2011
Other: CV - Dr John Edward		08 February 2012
Other: CV - Gillian Haddock		08 February 2012

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Participant Consent Form	1	05 December 2011
Participant Consent Form: Control Group	1	16 February 2012
Protocol	1.0	07 January 2012
Questionnaire: Participant Demographic Information Questionnaire	1	07 January 2012
Questionnaire: HADS	Validated	
Questionnaire: GAD-7 Anxiety	Validated	
Questionnaire: GFFS	Validated	
Questionnaire: EDE-Q 6.0	Validated	
Questionnaire: Beads Task	1.0	07 February 2012
REC application	3.4	07 December 2011
Summary/Synopsis	1.0	10 January 2012

Membership of the Committee

The members of the Ethics Committee who were present at the meeting are listed on the attached sheet.

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

12/NW/0284	Please quote this number on all correspondence
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With the Committee's best wishes for the success of this project

Yours sincerely



Mr Jonathan Deans
Chair

Email: diane.catterall@northwest.nhs.uk

Enclosures: List of names and professions of members who were present at the meeting and those who submitted written comments
"After ethical review – guidance for researchers"

Copy to: Ms Lynne/L Macrae (Lynne.k.macrae@manchester.ac.uk)
Ms Lisa Dowell, Manchester Mental Health and Social Care Trust
(lisa.dowell@mhsc.nhs.uk)

NRES Committee North West - Cheshire

Attendance at Committee meeting on 12 April 2012

Committee Members:

<i>Name</i>	<i>Profession</i>	<i>Present</i>	<i>Notes</i>
Mrs Maureen Benbow	Senior Lecturer	Yes	
Dr Nick Bronnert	GP	No	
Rev'd Stephen Burmester	Vicar	No	
Mr Jonathan Deans (Chair)	Consultant ENT Surgeon	Yes	
Dr Sue Elves	Consultant Clinical Psychologist	Yes	
Mrs Elizabeth Gordon	Lay Member	Yes	
Mr Ezzat Kozman	Consultant Member	Yes	
Dr Fred Mostafa	Consultant Anaesthetist/Intensivist	Yes	
Dr Noel Murphy	Consultant Paediatrician	Yes	
Dr Jane Richardson	University Lecturer in Health Research	Yes	
Mrs Pam Rushworth	Pharmacist Member	No	
Dr Lenny Thornton	Consultant Member	No	
Mr Peter Ward (Vice-Chair)	Lay member	Yes	
Mrs Jean Welch	Lay Member	No	
Mrs Ann Williams	Lay Member	Yes	

Written comments received from:

<i>Name</i>	<i>Position</i>
Mrs Jean Welch	Lay Member

Also in attendance:

<i>Name</i>	<i>Position (or reason for attending)</i>
Miss Shehnaz Ishaq	Co-ordinator
Miss Diane Catterall	Acting Co-ordinator
Mr Ashley Totenhofer	Assistant Co-ordinator



**Health Research Authority
National Research Ethics Service**

NRES Committee North West - Cheshire

HRA NRES Centre North West
Ratlow House
3rd Floor
4 Minshull Street
Manchester
M1 3DZ

Tel: 0161 625 7816
Fax: 0161 625 7289

08 August 2012

Ms Grainne/G McKenna
School of Psychological Sciences
Second Floor, Zacharias Building
University of Manchester
M13 9PL

Dear Ms McKenna

Study title: Investigating the "Jumping to Conclusions" Bias in people with anorexia
IRAS project number: 96750
REC reference: 12/NW/0234
Protocol number: N/A
Minor Amendment number: 1
Amendment date: 03 August 2012

Overview of amendment

Minor word changes to the computer tasks.

Thank you for your email of 03 August 2012, notifying the Committee of the above amendment.

The Committee does not consider this to be a "substantial amendment" as defined in the Standard Operating Procedures for Research Ethics Committees. The amendment does not therefore require an ethical opinion from the Committee and may be implemented immediately, provided that it does not affect the approval for the research given by the R&D office for the relevant NHS care organisation.

Documents received

The documents received were as follows:

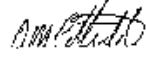
Document	Version	Date
Notification of a Minor Amendment	1	03 August 2012

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.

12/NW/0284: Please quote this number on all correspondence

Yours sincerely



Miss Diane Catterall
Committee Co-ordinator

E-mail: diane.catterall@northwest.nhs.uk

Copy to: Ms Lynne/L. Macrae (Lynne.k.macrae@manchester.ac.uk)
Ms Lisa Dowell, Manchester Mental Health and Social Care Trust
(lisa.dowell@mhsc.nhs.uk)

NRES Committee North West - Cheshire

HRA NRES Centre North West
Barlow House
3rd Floor
4 Minshull Street
Manchester
M1 3DZ

Tel: 0161 625 7816
Fax: 0161 625 7299

17 October 2012

Ms Grainne/G McKenna (grainne.mckenna-2@postgrad.manchester.ac.uk)
School of Psychological Sciences
Second Floor, Zochonis Building
University of Manchester
M13 9PL

Dear Ms McKenna

Study title: Investigating the "Jumping to Conclusions" Bias in people with anorexia
IRAS project number: 96750
REC reference: 12/NW/0284
Minor Amendment number: 2
Amendment date: 01 October 2012

Overview of amendment

To amend the recruitment criteria of control participants age group from 18 years and above to 16 years and above.

Thank you for your email of 01 October 2012, notifying the Committee of the above amendment.

The amendment has been considered by the Chair.

The Committee does not consider this to be a "substantial amendment" as defined in the Standard Operating Procedures for Research Ethics Committees. The amendment does not therefore require an ethical opinion from the Committee and may be implemented immediately, provided that it does not affect the approval for the research given by the R&D office for the relevant NHS care organisation.

Documents received

The documents received were as follows:

Document	Version	Date
Notification of a Minor Amendment	2	01 October 2012

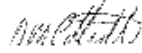
Statement of compliance

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.

12/NW/0284:

Please quote this number on all correspondence

Yours sincerely



Miss Diane Catterall
Committee Co-ordinator

E-mail: nrescommittee.northwest-cheshire@nhs.net

Copy to: Ms Lynne/L Macrae (Lynne.k.macrae@manchester.ac.uk)
Ms Lisa Dowell, Manchester Mental Health and Social Care Trust
(lisa.dowell@mhsc.nhs.uk)

Appendix 7

R & D Approval

Our Ref: ID 249
Your Ref:

Research Department
Hollins Park Hospital
Hollins Lane
Winwick
Warrington
WA2 8WA

3 August 2012

Tel: 01925 664475
Fax: 01925 664086
Email: sue.kirby@5bp.nhs.uk

Gainne McKenna
Trainee Clinical Psychologist
Manchester Mental Health and
Social Care Trust
Chorlton House
70 Manchester Road
Chorlton
Manchester
M21 9UN

Dear Gianne,

LETTER OF ACCESS FOR RESEARCH

As an existing NHS employee you do not require an additional Honorary Research Contract with this NHS organisation. We are satisfied that such checks as are necessary have been carried out by your employer and that the research activities that you will undertake in this NHS organisation are commensurate with the activities you undertake for your employer. Your employer is responsible for ensuring such checks as are necessary have been carried out. This letter confirms your right of access to conduct research through 5 Boroughs Partnership NHS Foundation Trust for the purpose and conditions as set out below. This right of access commences on 3/8/2012 and ends on 31/7/2013 unless terminated earlier in accordance with the clauses below.

You have a right of access to conduct such research as confirmed in writing in the letter of permission for research from this NHS organisation. Please note that you cannot start the research until the Principal Investigator for the research project has received a letter from us giving permission to conduct the project.

You are considered to be a legal visitor to the 5 Boroughs Partnership NHS Foundation Trust premises. You are not entitled to any form of payment or access to other benefits provided by this organisation to employees and this letter does not give rise to any other relationship between you and this organisation, in particular that of an employee.

Chief Executive: Mr. Simon J. Barber
Chairman: Mr. Bernard Pilkington
Trust Headquarters, Hollins Park House, Hollins Lane, Winwick, Warrington, WA2 8WA
Mini Com Number 01925 664094



2.

While undertaking research through 5 Boroughs Partnership NHS Foundation Trust, you will remain accountable to your employer the Manchester Mental Health and Social Care Trust, but you are required to follow the reasonable instructions of your nominated manager, the Head of Research in this NHS organisation, or those given on their behalf in relation to the terms of this right of access.

Where any third party claim is made, whether or not legal proceedings are issued, arising out of or in connection with your right of access, you are required to co-operate fully with any investigation by this NHS organisation in connection with any such claim and to give all such assistance as may be reasonably required regarding the conduct of any legal proceedings.

You must act in accordance with 5 Boroughs Partnership NHS Foundation Trust policies and procedures, which are available to you upon request, and the Research Governance Framework.

You are required to co-operate with 5 Boroughs Partnership NHS Foundation Trust in discharging its duties under the Health and Safety at Work Act 1974 and other health and safety legislation and to take reasonable care for the health and safety of yourself and others while on 5 Boroughs Partnership NHS Foundation Trust premises. Although you are not a contract holder, you must observe the same standards of care and propriety in dealing with patients, staff, visitors, equipment and premises, as is expected of a contract holder and you must act appropriately, responsibly and professionally at all times.

You are required to ensure that all information regarding patients or staff remains secure and ***strictly confidential*** at all times. You must ensure that you understand and comply with the requirement of the NHS Confidentiality Code of Practice (<http://www.dh.gov.uk/assetRoot/04/06/92/54/04069254.pdf>) and the Data Protection Act 1998. Furthermore, you should be aware that under the Act, unauthorised disclosure of information is an offence and such disclosures may lead to prosecution.

5 Boroughs Partnership NHS Foundation Trust will not indemnify you against any liability incurred as a result of any breach of confidentiality or breach of the Data Protection Act 1998. Any breach of the Data Protection Act 1998 may result in legal action against you and/or your substantive employer.

You should ensure that, where you are issued with an identity or security card, a bleep number, e mail or library account, keys or protective clothing, these are returned upon termination of this arrangement. Please also ensure that while on the premises, you wear your ID badge at all times, or are able to prove your identity if challenged. Please note that this NHS organisation accepts no responsibility for damage or loss of personal property.

We may terminate your right to attend at any time either by giving 7 days written notice to you or immediately without any notice if you are in breach of any of the terms or conditions described in this letter or if you commit any act that we

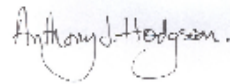
Chief Executive: Mr. Simon J. Barber
Chairman: Mr. Bernard Pilkington
Trust Headquarters, Hollins Park House, Hollins Lane, Wirwick, Warrington, WA2 8WA
Mini Com Number 01925 684094



reasonably consider to amount to serious misconduct or to be disruptive and/or prejudicial to the interests and/or business of this NHS organisation or if you are convicted of a criminal offence. Your substantive employer is responsible for your conduct during this research project and may in the circumstances described above instigate disciplinary action against you.

If your circumstances change in relation to your health, criminal record, professional registration or any other aspect that might impact on your suitability to conduct research, or your role in research changes, you must inform the NHS organisation that employs you through its normal procedures. You must also inform your nominated manager in this NHS organisation.

Yours sincerely



Anthony Hodgson
Head of Research

Copies to:

HR Department – substantive employer of researcher

4 July 2012

Gráinne McKenna
Department of Clinical Psychology
School of Psychological Sciences
Second Floor, Zochonis Building
University of Manchester
M13 9PL

Research & Development Office
Room F036, Harrop House
Bury New Road
Prestwich
Manchester M25 3BL

Tel: 0161 772 3591/3954/3492
Email: kathryn.harney@gmw.nhs.uk
jennifer.higham@gmw.nhs.uk
sandra.gbodo@gmw.nhs.uk

Dear Ms McKenna

Letter of Access for Research

As an existing NHS employee you do not require an additional honorary research contract with this NHS organisation. We are satisfied that the research activities that you will undertake in this NHS organisation are commensurate with the activities you undertake for your employer. Your employer is fully responsible for ensuring such checks as are necessary have been carried out. Your employer has confirmed in writing to this NHS organisation that the necessary pre-engagement check are in place in accordance with the role you plan to carry out in this organisation. This letter confirms your right of access to conduct research through Greater Manchester West Mental Health NHS Foundation Trust for the purpose and on the terms and conditions set out below. This right of access commences on 4 July 2012 and ends on 30 September 2013 unless terminated earlier in accordance with the clauses below.

You have a right of access to conduct such research as confirmed in writing in the letter of permission for research from this NHS organisation. Please note that you cannot start the research until the Principal Investigator for the research project has received a letter from us giving permission to conduct the project.

You are considered to be a legal visitor to Greater Manchester West Mental Health NHS Foundation Trust premises. You are not entitled to any form of payment or access to other benefits provided by this organisation to employees and this letter does not give rise to any other relationship between you and this NHS organisation, in particular that of an employee.

While undertaking research through Greater Manchester West Mental Health NHS Foundation Trust, you will remain accountable to your employer, Manchester Mental Health & Social Care Trust, but you are required to follow the reasonable instructions of the service managers in this NHS organisation or those given on her/his behalf in relation to the terms of this right of access.

Where any third party claim is made, whether or not legal proceedings are issued, arising out of or in connection with your right of access, you are required to co-operate fully with any investigation by this NHS organisation in connection with any such claim and to give all such assistance as may reasonably be required regarding the conduct of any legal proceedings.

You must act in accordance with Greater Manchester West Mental Health NHS Foundation Trust policies and procedures, which are available to you upon request, and the Research Governance Framework.

Greater Manchester West Mental Health NHS Foundation Trust
Trust HQ, Bury New Road, Prestwich, Manchester M25 3BL Tel 0161 773 9121

Chair: Alan Maden Chief Executive: Bev Humphrey

v2.1

You are required to co-operate with Greater Manchester West Mental Health NHS Foundation Trust in discharging its duties under the Health and Safety at Work etc Act 1974 and other health and safety legislation and to take reasonable care for the health and safety of yourself and others while on Greater Manchester West Mental Health NHS Foundation Trust premises. Although you are not a contract holder, you must observe the same standards of care and propriety in dealing with patients, staff, visitors, equipment and premises as is expected of a contract holder and you must act appropriately, responsibly and professionally at all times.

You are required to ensure that all information regarding patients or staff remains secure and *strictly confidential* at all times. You must ensure that you understand and comply with the requirements of the NHS Confidentiality Code of Practice (<http://www.dh.gov.uk/assetRoot/04/06/92/54/04069254.pdf>) and the Data Protection Act 1998. Furthermore you should be aware that under the Act, unauthorised disclosure of information is an offence and such disclosures may lead to prosecution.

Greater Manchester West Mental Health NHS Foundation Trust will not indemnify you against any liability incurred as a result of any breach of confidentiality or breach of the Data Protection Act 1998. Any breach of the Data Protection Act 1998 may result in legal action against you and/or your substantive employer.

You should ensure that, where you are issued with an identity or security card, a bleep number, email or library account, keys or protective clothing, these are returned upon termination of this arrangement. Please also ensure that while on the premises you wear your ID badge at all times, or are able to prove your identity if challenged. Please note that this NHS organisation accepts no responsibility for damage to or loss of personal property.

We may terminate your right to attend at any time either by giving seven days' written notice to you or immediately without any notice if you are in breach of any of the terms or conditions described in this letter or if you commit any act that we reasonably consider to amount to serious misconduct or to be disruptive and/or prejudicial to the interests and/or business of this NHS organisation or if you are convicted of any criminal offence. Where applicable, your substantive employer will initiate your Independent Safeguarding Authority (ISA) registration in-line with the phasing strategy adopted within the NHS and the applicable legislation. Once you are ISA-registered, your employer will continue to monitor your ISA registration status via the on-line ISA service. Should you cease to be ISA-registered, this letter of access is immediately terminated. Your substantive employer will immediately withdraw you from undertaking this or any other regulated activity and you MUST stop undertaking any regulated activity.

Your substantive employer is responsible for your conduct during this research project and may in the circumstances described above instigate disciplinary action against you.

If your circumstances change in relation to your health, criminal record, professional registration or ISA registration, or any other aspect that may impact on your suitability to conduct research, or your role in research changes, you must inform the NHS organisation that employs you through its normal procedures. You must also inform your nominated manager in this NHS organisation.

Yours sincerely



Andrew Maoney
Director of Organisational Development & Human Resources

AM

Greater Manchester West Mental Health NHS Foundation Trust
Trust HQ, Bury New Road, Prestwich, Manchester M25 3BL Tel 0161 773 9121
Chair: Alan Maden Chief Executive: Bev Humphrey

20th June 2012

Our Ref: 12/10

Ms Grainne McKenna
Trainee Clinical Psychologist
University of Manchester
Doctorate in Clinical Psychology
2nd Floor, Zochonis Building
Manchester
M13 9PL

Dear Ms McKenna,

Letter of access for research

Project Title: Investigating the jumping to conclusions' bias in people with anorexia

As an existing NHS employee you do not require an additional honorary research contract with this NHS organisation. We are satisfied that the research activities that you will undertake in this NHS organisation are commensurate with the activities you undertake for your employer. Your employer is fully responsible for ensuring such checks as are necessary have been carried out. Your employer has confirmed in writing to this NHS organisation that the necessary pre-engagement check are in place in accordance with the role you plan to carry out in this organisation. This letter confirms your right of access to conduct research through Lancashire Care NHS Foundation Trust for the purpose and on the terms and conditions set out below. This right of access commences on 20th June 2012 and ends on 1st July 2013 unless terminated earlier in accordance with the clauses below.

You have a right of access to conduct such research as confirmed in writing in the letter of permission for research from this NHS organisation. Please note that you cannot start the research until the Principal Investigator for the research project has received a letter from us giving permission to conduct the project.

You are considered to be a legal visitor to Lancashire Care NHS Foundation Trust premises. You are not entitled to any form of payment or access to other benefits provided by this

organisation to employees and this letter does not give rise to any other relationship between you and this NHS organisation, in particular that of an employee.

While undertaking research through Lancashire Care NHS Foundation Trust, you will remain accountable to your employer [Manchester Mental Health and Social Care NHS Trust] but you are required to follow the reasonable instructions of your nominated manager/Head of relevant NHS Department/research supervisor in this NHS organisation or those given on her/his behalf in relation to the terms of this right of access.

Where any third party claim is made, whether or not legal proceedings are issued, arising out of or in connection with your right of access, you are required to co-operate fully with any investigation by this NHS organisation in connection with any such claim and to give all such assistance as may reasonably be required regarding the conduct of any legal proceedings.

You must act in accordance with Lancashire Care NHS Foundation Trust policies and procedures, which are available to you upon request, and the Research Governance Framework. You are required to co-operate with Lancashire Care NHS Foundation Trust in discharging its duties under the Health and Safety at Work etc Act 1974 and other health and safety legislation and to take reasonable care for the health and safety of yourself and others while on Lancashire Care NHS Foundation Trust premises. Although you are not a contract holder, you must observe the same standards of care and propriety in dealing with patients, staff, visitors, equipment and premises as is expected of a contract holder and you must act appropriately, responsibly and professionally at all times.

You are required to ensure that all information regarding patients or staff remains secure and *strictly confidential* at all times. You must ensure that you understand and comply with the requirements of the NHS Confidentiality Code of Practice (<http://www.dh.gov.uk/assetRoot/04/06/92/54/04069254.pdf>) and the Data Protection Act 1998. Furthermore you should be aware that under the Act, unauthorised disclosure of information is an offence and such disclosures may lead to prosecution.

Lancashire Care NHS Foundation Trust will not indemnify you against any liability incurred as a result of any breach of confidentiality or breach of the Data Protection Act 1998. Any breach of the Data Protection Act 1998 may result in legal action against you and/or your substantive employer.

You should ensure that, where you are issued with an identity or security card, a bleep number, email or library account, keys or protective clothing, these are returned upon termination of this arrangement. Please also ensure that while on the premises you wear your ID badge at all times, or are able to prove your identity if challenged. Please note that this NHS organisation accepts no responsibility for damage to or loss of personal property.

We may terminate your right to attend at any time either by giving seven days' written notice to you or immediately without any notice if you are in breach of any of the terms or conditions described in this letter or if you commit any act that we reasonably consider to amount to serious misconduct or to be disruptive and/or prejudicial to the interests and/or business of this NHS organisation or if you are convicted of any criminal offence. Where applicable, your substantive employer will initiate



Chairman: Mr Steve Jones Chief Executive: Professor Heather Tierney-Moore OBE



your Independent Safeguarding Authority (ISA) registration in-line with the phasing strategy adopted within the NHS (as from 26th July 2010 at the earliest). Once you are ISA-registered, your employer will continue to monitor your ISA registration status via the on-line ISA service. Should you cease to be ISA-registered, this letter of access is immediately terminated. Your substantive employer will immediately withdraw you from undertaking this or any other regulated activity and you MUST stop undertaking any regulated activity.

Your substantive employer is responsible for your conduct during this research project and may in the circumstances described above instigate disciplinary action against you.

If your circumstances change in relation to your health, criminal record, professional registration or ISA registration, or any other aspect that may impact on your suitability to conduct research, or your role in research changes, you must inform the NHS organisation that employs you through its normal procedures. You must also inform your nominated manager in this NHS organisation.

Yours sincerely




Louise Worrell
Quality & Research Lead

cc: donna.brown@mhsc.nhs.uk

Ethical Approval for Participant Recruitment at Priory Group
-The Priory Hospital Cheadle Royal and the Priory Hospital Preston

Ethical approval to recruit individuals for participation from the Priory Hospital Cheadle Royal and Priory Hospital Preston was negotiated and agreed verbally by the Research Supervisor (Dr. John Fox) and the Clinical Services manager, at the Clinical Governance Meeting, as per service protocol.

Signed:



Dr. John Fox (Research Supervisor)

Date:

28/6/2013

Appendix 8

Participant Information Sheets (Clinical & Control Groups)

Participant Information Sheet - Version 2.0 (15.05.2012)

1. What is the purpose of this study?

Very little research has focused specifically on how people with anorexia make decisions. This research study is attempting to fill that gap, by exploring how, as a person with anorexia you come to reason or make decisions.

2. Why is this research being done?

This research study is being done as a requirement for the qualification of Doctorate in Clinical Psychology at the University of Manchester. The research is being sponsored by the University of Manchester. No payment is being received by any of the organisers for conducting this study.

3. Why have I been chosen?

You have been identified by your clinician as someone who may be suitable to take part in this research project.

4. Do I have to take part?

It is entirely up to you whether you decide to take part in the study or not. Your decision will not affect the service you receive in any way. If you decide to take part in the study but then change your mind, you can withdraw from the study at any time, without giving a reason, and any information you have given to us will not be used in the study. If you want to withdraw, all you have to do is contact the chief investigator Grainne McKenna.

5. What will happen to me if I take part?

If you decide to take part, the chief investigator will contact you to arrange a meeting at a time and place that is suitable for you. The chief investigator will go through this information sheet with you again and answer any questions you may have. You can then decide if you want to take part. If you don't want to take part, tell the chief investigator and they will leave. Your care will not be affected in any way. However, if you do wish to take part, they will then ask you to sign a 'consent form' to show that you agree to take part in the study. The consent form is a record to show that we have explained the study to you properly and have given you time to decide whether to participate.

If you consent to the study, the chief investigator will first ask you to provide some basic information about yourself, e.g. your age, gender, education etc. They will then start the main interview by asking you to complete some questionnaires about your eating disorder, and whether you feel anxious or depressed. These questionnaires will take about 30 minutes. You will be able to stop the questionnaires at any time if you want. There are no right or wrong answers. Following this, the chief investigators will do a structured interview about your beliefs about eating, which will take around 30-40 minutes.

Then, the chief investigator will ask you to complete three short computer tasks, which will take around 20 minutes. If you wish to stop at any point, please tell the chief investigator and the study will stop. This will not be a problem.

It may be possible, in some instances, to arrange the interviews to take place in your own home. If you decide this option, the Manchester University Lone Worker Policy will be followed.

6. What are the possible disadvantages of taking part?

It may be possible that answering questions about eating might be a sensitive topic for you. If the questionnaires or computer tasks become difficult you will be able to stop any of these at any time. You will also be able to ask any questions once it has finished. If you do become distressed during the interviews the researcher will stop the interviews and an appropriate person such as your GP or qualified clinician will be contacted.

7. What are the possible benefits of taking part?

You may find that you get some satisfaction from having the opportunity to talk about your experiences with someone who is interested in your point of view. However, the main benefit of taking part in the study is that you will be helping us to have a better understanding of how people with anorexia make decisions, and if this is affected by the type of information presented.

8. What if I want to make a complaint?

If you have a concern about any aspect of this study then please contact Grainne McKenna or Dr. John Fox on **0161 306 0400** who will try to answer your questions. If they are unable to solve your concern or you wish to make a complaint regarding the study, please contact a University Research Practice and Governance Co-ordinator on 0161 2757583 or 0161 2758093, or by email to research-governance@manchester.ac.uk.

9. What happens if I have a relapse?

If you have a relapse or a significant deterioration in your mental health while participating in the research you will be withdrawn from the study and none of your responses will be used for the research as your capacity to consent may be compromised. However, if you have a relapse or a significant deterioration after you have participated in the study, we will still use your responses and your consent to participate will still be valid.

10. Is the information I give confidential?

Only the Chief Investigator (Grainne McKenna) will have access to the information you provide in the interviews. **However, you need to remember that your name will never be linked up with the questionnaire. You will only be identified by a number. They will all be placed in blank envelopes upon completion.** The only instance in which this confidentiality will be broken is if you tell us something that means that either you or someone else is at risk of harm. If this occurs, we have a duty to inform your care team. Your G.P. will also be informed that you are participating in the study.

Also, if you disclose information about current criminal activity, then the chief investigator would be obliged to discuss this with your care team. If this happens, we will tell you what we are going to do first.

11. What will happen to the results of this study?

You can be sent a summary of the results of the study through the post. In addition, a report of the study will be put forward for publication in psychology and/or other mental health journals. **You will not be personally identifiable in any publications, reports or presentations.**

12. Contacts for further information

We hope that this information is helpful and reassuring, and that after reading it you feel able to help us with our research. If you have any questions or concerns about this project please contact Grainne McKenna on 0161 306 0400.

Thank you for taking the time to read this information

Consent to be contacted

Please read the following statements carefully and please initial the boxes to indicate that you have read and agree with each statement.

Please initial

1. I confirm that I have read and understood the Participant Information sheet dated 07.01.2012 for the above study.
2. I agree that the chief investigator (Grainne McKenna) can contact me to discuss the above study in more detail.
3. I agree that my clinical team can share some limited information about me with the chief investigator to check that I am suitable to take part in the study and that the chief investigator can screen my notes to ensure I am suitable to take part.
4. I understand that giving my consent to be contacted does not mean that I am agreeing to part in the study.

Name (please print) _____ Signature: _____ Date: _____

Contact Details:

The best way for the chief investigator to contact me is:

1. Telephone: _____
2. Through my clinician (please give their name): _____
3. Other (please give details): _____

Please return this form to your clinician or staff team. Thank you.

Participant Information Sheet for Participants in Control Group

Version 1.0 (16/02/2014).

1. What is the purpose of this study?

Very little research has focused specifically on how people with anorexia make decisions. This research study is attempting to fill that gap, by looking at how people with anorexia make decisions compared with healthy people. The results that you would provide, if you wished to participate, would be compared with the results from the anorexia group, to see if there are any significant differences in the way people with anorexia make decisions.

2. Why is this research being done?

This research study is being done as a requirement for the qualification of Doctorate in Clinical Psychology at the University of Manchester. The research is being sponsored by the University of Manchester. No payment is being received by any of the organisers for conducting this study.

3. Do I have to take part?

It is entirely up to you whether you decide to take part in the study or not. If you decide to take part in the study but then change your mind, you can withdraw from the study at any time, without giving a reason, and any information you have given to us will not be used in the study. If you want to withdraw, all you have to do is contact the chief investigator Grainne McKenna.

4. What will happen to me if I take part?

If you decide to take part, the chief investigator will contact you to arrange a meeting at a time and place that is suitable for you and will go through this information sheet with you again and answer any questions you may have. You can then decide if you want to take part.

If you do wish to take part, they will then ask you to sign a 'consent form' to show that you agree to take part in the study. The consent form is a record to show that we have explained the study to you properly and have given you time to decide whether to participate.

If you consent to the study, the chief investigator will first ask you to provide some basic information about yourself, e.g. your age, gender, education etc. They will then start the main interview by asking you to complete some questionnaires about eating and your mood or emotions. These questionnaires will take about 30 minutes. You will be able to stop the questionnaires at any time if you want. There

are no right or wrong answers. Following this, the chief investigators will do a structured interview about your beliefs about eating, which will take around 30-40 minutes. Then, the chief investigator will ask you to complete three short computer tasks, which will take around 20 minutes. If you wish to stop at any point, please tell the chief investigator and the study will stop. This will not be a problem.

5. What are the possible disadvantages of taking part?

It is not anticipated that there any disadvantages to taking part. If the questionnaires or computer tasks become difficult you will be able to stop at any time. You will also be able to ask any questions once it has finished.

6. What are the possible benefits of taking part?

The main benefit of taking part in the study is that you will be helping us to have a better understanding of how people with anorexia make decisions, and if this is affected by the type of information presented.

7. What if I want to make a complaint?

If you have a concern about any aspect of this study then please contact Grainne McKenna or Dr. John Fox on **0161 306 0400** who will try to answer your questions. If they are unable to solve your concern or you wish to make a complaint regarding the study, please contact a University Research Practice and Governance Co-ordinator on 0161 2757583 or 0161 2758093, or by email to research-governance@manchester.ac.uk.

8. Is the information I give confidential?

Only the Chief Investigator (Grainne McKenna) will have access to the information you provide in the interviews. **However, you need to remember that your name will never be linked up with the questionnaire. You will only be identified by a number. They will all be placed in blank envelopes upon completion.** The only instance in which this confidentiality will be broken is if you tell us something that means that either you or someone else is at risk of harm. Also, if you disclose information about current criminal activity, then the chief investigator would be obliged to disclose this. If this happens, we will tell you what we are going to do first.

9. What will happen to the results of this study?

You can be sent a summary of the results of the study through the post, if you wish. In addition, a report of the study will be put forward for publication in psychology and/or other mental health journals. **You will not be personally identifiable in any publications, reports or presentations.**

10. Contacts for further information

We hope that this information is helpful and reassuring, and that after reading it you feel able to help us with our research. If you have any questions or concerns about this project please contact Grainne McKenna on 0161 306 0400.

Thank you for taking the time to read this information

Appendix 9

Participant Consent Forms (Clinical & Control Groups)



Participant Consent Form Study 1 (Version 1-05.12.2011)

Title of Study: Investigating the 'Jumping to Conclusions' Bias in people with anorexia

Name of Chief Investigator: Grainne McKenna

Name of Research Supervisors: Dr. John Fox, Professor Gillian Haddock; Dr. Rani Prasad.

Please read the following statements carefully and please initial the boxes to indicate that you have read and agree with each statement.

Please Initial

1. I confirm that I have read and understood the information sheet (Version _____) dated _____ for the above study. I have had the opportunity to consider the information, ask questions and have these answered satisfactorily.
2. I agree that the chief investigator can access my clinical notes to get information for this study.
3. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care being affected.
4. I understand that my responses will still be used if I have a relapse or significant deterioration in my mental health at a later date.
5. I agree to take part in the above study.
6. I understand that my medical notes and relevant sections of data collected during the study may be looked at by responsible individuals from the

University of Manchester, from regulatory authorities or from the NHS Trust, where it is relevant to my taking part in the research. I give permission for these individuals to have access to this data.

7. I agree to my GP being informed of my participation in the study.

Name of Participant

Date

Signature

Name of Chief investigator

Date

Signature

Participant Consent Form for Participants in Control Group (Version 1-16.02.2012)

Name of Chief Investigator: Grainne McKenna

Name of Research Supervisors: Dr. John Fox, Professor Gillian Haddock; Dr. Rani Prasad.

Please read the following statements carefully and please initial the boxes to indicate that you have read and agree with each statement.

Please

Initial

1. I confirm that I have read and understood the information sheet (Version _____) dated _____ for the above study. I have had the opportunity to consider the information, ask questions and have these answered satisfactorily.
2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.
3. I agree to take part in the above study.
4. I understand that data collected during the study may be looked at by responsible individuals from the University of Manchester, from regulatory authorities or from the NHS Trust, which is relevant to my taking part in the research. I give permission for these individuals to have access to this data.

Name of Participant

Date

Signature

Name of Chief Investigator

Date

Signature

Appendix 10

Research Poster Advertisement (Control Group)

Get Involved - Men & Women aged 18-65!

Why? Volunteer in psychological research examining decision-making about food and eating.

Where? School of Psychological Sciences, University of Manchester.

What do I have to do? Volunteers will be required to complete a small number of questionnaires and complete three short computer tasks. It will take less than 1 hour.

How? Just email:
grainne.mckenna-2@postgrad.manchester.ac.uk.

All information will be kept confidential.

Appendix 11

Participant Demographic Questionnaire

Participant Demographic Information Questionnaire – Version 1 (07/01/2012)

Participant ID number: _____

Date: _____

1. Age of Participant: _____

2. Gender: Male _____

Female: _____

3. Employment Status:

• Employed _____

Occupation _____

• Unemployed _____

• Student _____

4. Ethnicity: _____

5. Number of years in Education: _____

6. Marital Status:

Single _____

Married _____

Separated _____

Divorced _____

Cohabiting _____

7. Current Medication:

8a. Primary diagnosis:

When did you receive this diagnosis?

b. Other diagnoses:

When did you receive this/these diagnoses?

9. What is your Body Mass Index? _____

10. How long have you been a patient on this ward/ been receiving treatment (please circle as appropriate)?

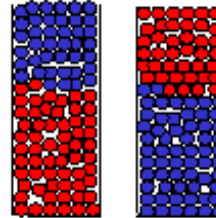
Appendix 12

Neutral Beads Task

Beads task

Long Title: Investigating the Impact of Confidence Bias in People with Autism
Short Title: Investigating the TTC bias in autism patients
Version: 1.0 (03/2012)

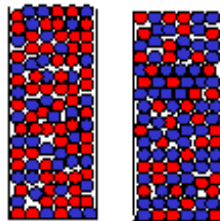
There are two jars. A mainly red jar containing 60 red and 40 blue beads and a mainly blue jar containing 40 blue and 60 red beads.



Mainly Red Jar
(60 red, 40 blue)

Mainly Blue Jar
(40 blue, 60 red)

The beads have been mixed up in the jar.



Mainly Red Jar
(60 red, 40 blue)

Mainly Blue Jar
(40 blue, 60 red)

One of the jars has been chosen at random. Beads will be drawn from the selected jar and shown. The beads will always come from the same jar and will be replaced afterwards so that the proportions stay the same.

It is your job to decide from which jar the beads have come. You may see as many beads as you like before making a decision. After a bead has been shown to you, you can ask for another bead or you can tell me that you know which jar has been chosen, and you can tell me whether it is the Mainly Red Jar or the Mainly Blue Jar.

Remember you can see as many beads as you like before you decide from which jar the beads are from. Only decide when you are certain.

You will now see the first bead.

- When you feel you have seen enough beads to make your decision, please press the STOP button.
- You will then be asked how confident you are in your decision. Please type this in.
- You will now see the first bead.

The bead drawn is:



Would you like to see any more beads or have you decided now?

BEADS PREVIOUSLY SEEN

The bead drawn is:



Would you like to see any more beads or have you decided now?



The bead drawn is:



Would you like to see any more beads or have you decided now?



The bead drawn is:



Would you like to see any more beads or have you decided now?



The bead drawn is:



Would you like to see any more beads or have you decided now?



The bead drawn is:



Would you like to see any more beads or have you decided now?



The bead drawn is:



Would you like to see any more beads or have you decided now?



The bead drawn is:



Would you like to see any more beads or have you decided now?



The bead drawn is:



Would you like to see any more beads or have you decided now?



The bead drawn is:



Would you like to see any more beads or have you decided now?



The bead drawn is:



Would you like to see any more beads or have you decided now?



The bead drawn is:



Would you like to see any more beads or have you decided now?



The bead drawn is:



Would you like to see any more beads or have you decided now?



The bead drawn is:



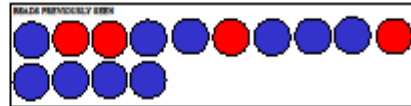
Would you like to see any more beads or have you decided now?



The bead drawn is:



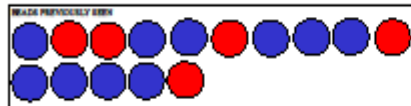
Would you like to see any more beads or have you decided now?



The bead drawn is:



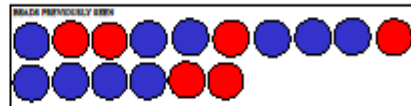
Would you like to see any more beads or have you decided now?



The bead drawn is:



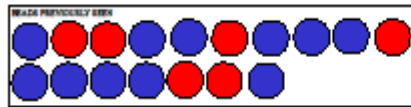
Would you like to see any more beads or have you decided now?



The bead drawn is:



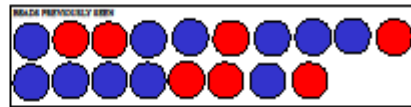
Would you like to see any more beads or have you decided now?



The bead drawn is:



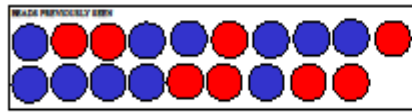
Would you like to see any more beads or have you decided now?



The head draws is:



You must decide now:



Appendix 13

Body Image Task

Survey Task



Long Title Investigating the Impact of Cerebral Palsy in People with Hearing Loss
Short Title Investigating the ITT Use in academic papers
Version 1.0 (10/02/08)

One of the surveys has been chosen at random. Words will be drawn from the selected survey and shown. The words will always come from the same survey and will be replaced afterwards so that the proportions stay the same.

It is your job to decide from which jar the words have come. You may see as many words as you like before making a decision. After a word has been shown to you, you can ask for another word or you can tell us that you know which survey has been chosen. Remember you can see as many words as you like before you decide from which survey the words are from. Only decide when you are certain.

You will now see the first word.

The word drawn is:

Heavy

Would you like to see any more words or have you decided now?

WORDS PREVIOUSLY SEEN

Imagine that two surveys have been conducted about a person just like you.

Survey A has 60 fat words and 40 thin words

Survey B has 40 fat words and 60 thin words.



When you feel you have seen enough words to make your decision, please press the STOP button.

You will then be asked how confident you are in your decision. Please type this in.

You will now see the first word

The word drawn is:

Slender

Would you like to see any more words or have you decided now?

WORDS PREVIOUSLY SEEN

Heavy

The word drawn is:

Slim

Would you like to see any more words or have you decided now?

WORDS PREVIOUSLY SEEN
Heavy Ender Slim

The word drawn is:

Chubby

Would you like to see any more words or have you decided now?

WORDS PREVIOUSLY SEEN
Heavy Ender Slim

The word drawn is:

Plump

Would you like to see any more words or have you decided now?

WORDS PREVIOUSLY SEEN
Heavy Ender Slim Chubby

The word drawn is:

Lean

Would you like to see any more words or have you decided now?

WORDS PREVIOUSLY SEEN
Heavy Ender Slim Chubby Plump

The word drawn is:

Fat

Would you like to see any more words or have you decided now?

WORDS PREVIOUSLY SEEN
Heavy Ender Slim Chubby Plump Lean

The word drawn is:

Big

Would you like to see any more words or have you decided now?

WORDS PREVIOUSLY SEEN
Heavy Ender Slim Chubby Plump Lean Fat

The word draws is:

Obese

Would you like to see any more words or have you decided now?

WORDS PREVIOUSLY SEEN									
Every	Slender	Thin	Chubby	Plump	Lean	No	Big		
Close									

The word draws is:

Slight

Would you like to see any more words or have you decided now?

WORDS PREVIOUSLY SEEN									
Every	Slender	Thin	Chubby	Plump	Lean	No	Big		
Close									

The word draws is:

Overweight

Would you like to see any more words or have you decided now?

WORDS PREVIOUSLY SEEN									
Every	Slender	Thin	Chubby	Plump	Lean	No	Big		
Close	Slight								

The word draws is:

Flabby

Would you like to see any more words or have you decided now?

WORDS PREVIOUSLY SEEN									
Every	Slender	Thin	Chubby	Plump	Lean	No	Big		
Close	Slight	Overweight							

The word draws is:

Broad

Would you like to see any more words or have you decided now?

WORDS PREVIOUSLY SEEN									
Every	Slender	Thin	Chubby	Plump	Lean	No	Big		
Close	Slight	Overweight	Flabby						

The word draws is:

Large

Would you like to see any more words or have you decided now?

WORDS PREVIOUSLY SEEN									
Every	Slender	Thin	Chubby	Plump	Lean	No	Big		
Close	Slight	Overweight	Flabby	Broad					

The word draws is:

Thin

Would you like to see any more words or have you decided now?

WORDS PREVIOUSLY SEEN									
Every	Slender	Slim	Chubby	Plump	Lean	No	Big		
Chase	Slight	Overweight	Plucky	Beast	Large				

The word draws is:

Skinny

Would you like to see any more words or have you decided now?

WORDS PREVIOUSLY SEEN									
Every	Slender	Slim	Chubby	Plump	Lean	Fit	Big		
Chase	Slight	Overweight	Plucky	Beast	Large	Thin			

The word draws is:

Stocky

Would you like to see any more words or have you decided now?

WORDS PREVIOUSLY SEEN									
Every	Slender	Slim	Chubby	Plump	Lean	No	Big		
Chase	Slight	Overweight	Plucky	Beast	Large	Thin	Slender		

The word draws is:

Gaunt

Would you like to see any more words or have you decided now?

WORDS PREVIOUSLY SEEN									
Every	Slender	Slim	Chubby	Plump	Lean	Fit	Big		
Chase	Slight	Overweight	Plucky	Beast	Large	Thin	Slender		
Body									

The word draws is:

Little

Would you like to see any more words or have you decided now?

WORDS PREVIOUSLY SEEN									
Every	Slender	Slim	Chubby	Plump	Lean	No	Big		
Chase	Slight	Overweight	Plucky	Beast	Large	Thin	Slender		
Body	Beast								

The word draws is:

Stout

You must decide now

WORDS PREVIOUSLY SEEN									
Every	Slender	Slim	Chubby	Plump	Lean	Fit	Big		
Chase	Slight	Overweight	Plucky	Beast	Large	Thin	Slender		
Body	Chase	Little							

Appendix 14

Food Survey Task

Wordly, at the end of the
classroom.

THEY'RE AVAILABLE TO ANYONE WITH ACCESS TO THE INTERNET. YOU CAN USE THEM ANYWHERE, ANYTIME, AND ON ANY DEVICE.

Survey Task 2

Two surveys have been conducted:

Survey A has 60 food words and 40 tools words

Survey B has 40 food words and 60 tool words.



vs



Tools

Food

One of the surveys has been chosen at random. Words will be drawn from the selected survey and shown. The words will always come from the same survey and will be replaced afterwards so that the proportions stay the same.

It is your job to decide from which survey the words have come. You may see as many words as you like before making a decision. After a word has been shown to you, you can ask for another word or you can tell me that you know which survey has been chosen.

Remember you can see as many words as you like before you decide from which jar the words are from. Only decide when you are certain.

You will now see the first word.

When you feel you have seen enough words to make your decision, please press the STOP button.

You will then be asked how confident you are in your decision. Please type this in.

You will now see the first word

The word drawn is:

Wrench

Would you like to see any more words or have you decided now?

WORDS PREVIOUSLY SEEN

The word drawn is:

Bananas

Would you like to see any more words or have you decided now?

WORDS PREVIOUSLY SEEN

Wrench

The word drawn is:

Chips

Would you like to see any more work or have you decided now?

WORDS PREVIOUSLY SEEN
Screw Spanner

The word drawn is:

Drill

Would you like to see any more work or have you decided now?

WORDS PREVIOUSLY SEEN
Screw Spanner Clips

The word drawn is:

Saw

Would you like to see any more work or have you decided now?

WORDS PREVIOUSLY SEEN
Screw Spanner Clips Drill

The word drawn is:

Strawberries

Would you like to see any more work or have you decided now?

WORDS PREVIOUSLY SEEN
Screw Spanner Clips Drill Saw

The word drawn is:

Screwdriver

Would you like to see any more work or have you decided now?

WORDS PREVIOUSLY SEEN
Screw Spanner Clips Drill Saw Strawberries

The word drawn is:

Spanner

Would you like to see any more work or have you decided now?

WORDS PREVIOUSLY SEEN
Screw Spanner Clips Drill Saw Strawberries Screwdriver

The word drawn is:

Clamp

Would you like to see any more words or have you decided now?

WORDS PREVIOUSLY SEEN

Wrench	Saw	Clay	Dill	Saw	Clay	Saw
Saw	Saw	Clay	Dill	Saw	Clay	Saw

The word drawn is:

Burger

Would you like to see any more words or have you decided now?

WORDS PREVIOUSLY SEEN

Wrench	Saw	Clay	Dill	Saw	Saw	Saw
Saw	Saw	Clay	Dill	Saw	Saw	Saw

The word drawn is:

Chisel

Would you like to see any more words or have you decided now?

WORDS PREVIOUSLY SEEN

Wrench	Saw	Clay	Dill	Saw	Saw	Saw
Saw	Saw	Clay	Dill	Saw	Saw	Saw

The word drawn is:

Hammer

Would you like to see any more words or have you decided now?

WORDS PREVIOUSLY SEEN

Wrench	Saw	Clay	Dill	Saw	Saw	Saw
Saw	Saw	Clay	Dill	Saw	Saw	Saw

The word drawn is:

Pliers

Would you like to see any more words or have you decided now?

WORDS PREVIOUSLY SEEN

Wrench	Saw	Clay	Dill	Saw	Saw	Saw
Saw	Saw	Clay	Dill	Saw	Saw	Saw

The word drawn is:

Nails

Would you like to see any more words or have you decided now?

WORDS PREVIOUSLY SEEN

Wrench	Saw	Clay	Dill	Saw	Saw	Saw
Saw	Saw	Clay	Dill	Saw	Saw	Saw