

## Information processing bias in anorexia nervosa

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### Abstract

The aim of this study was to investigate preferential information processing style in Eating Disorders (ED). We compared the performance of participants with EDs against healthy controls in a task that measures cognitive style (reflection–impulsivity) and cognitive efficiency (inefficient–efficient). Sixty non-medicated female participants (healthy controls  $n=26$ , anorexia nervosa  $n=20$ , bulimia nervosa  $n=14$ ) took part in the Matching Familiar Figures Test (MFFT), a difficult visual search paradigm with high response uncertainty. Participants with anorexia scored significantly higher on the efficiency dimension score than the control group. No significant differences were found across groups on the dimension ‘reflection–impulsivity’. Participants with anorexia are more efficient (quicker response latencies in conjunction with fewer errors) in this visual search task that requires an analytic approach. This supports the hypothesis that individuals with anorexia have a positive bias toward local detail processing, indicative of weak central coherence.

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### 1. Introduction

The study of information processing can advance our understanding of psychiatric disorders (Keefe, 1995). Neuropsychological data may be used to predict prognosis or course of illness and can also be integrated into aetiological and treatment models (Southgate et al., 2005; Treasure et al., 2005; Cavedini et al., 2006; Baldock and Tchanturia, 2007).

Review of the neuropsychological literature in Eating Disorders (ED) highlights that information processing

styles mirror phenotypic characteristics (Southgate et al., 2006). Links are clearly seen between obsessive-compulsive personality traits (preoccupation with details, lists and order; perfectionism; inflexible, rigid and stubborn mental set), significant vulnerability factors in the complex aetiology of EDs (Jacobi et al., 2004), and deficits in set-shifting ability or ‘cognitive flexibility’ in anorexia nervosa (AN) (Holliday et al., 2005; Tchanturia et al., 2005; Roberts et al., 2007). Heightened impulsivity, as reported in self-report personality measures and displayed in multi-impulsive behaviours, has been associated with binge/purge symptoms, with or without a diagnosis of AN (Lacey and Evans, 1986; Vitousek and Manke, 1994; Claes et al., 2002; Fassino et al., 2004). Two studies employing the matching familiar figures test (MFFT) as a measure

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of information processing style have reported analogous findings (Toner et al., 1987; Kaye et al., 1995).

Discrepancy in the performance seen across tests of visuo-spatial processing is suggestive of another information processing bias in AN that corresponds to clinical characteristics. Superior performance has been reported in tasks that require local information processing (e.g. embedded figures test) in comparison to those that require global information processing (e.g. object assembly, Rey-figure, Bender Gestalt test) (Jones et al., 1991; Gillberg et al., 1996; Kingston et al., 1996; Sherman et al., 2006; Tokley and Kemps, *in press*; Gillberg et al., 2007). This pattern of performance is consistent with the concept of weak central coherence, a cognitive style in which information remains fragmented as opposed to integrated, with processing occurring at the level of ‘detail’ as opposed to ‘whole’ (Happé and Frith, 2006). The hypothesis that weak central coherence reflects a preferential processing style in AN, concords with the extensive attention to detail found to be an enduring personality trait amongst individuals with AN (Anderluh et al., 2003). Thus cognitive style may account for both optimal and impaired performance across different tasks, depending on their processing requirements.

The aim of the current study was to expand upon previous research. Following a hypothesis driven approach, the MFFT was employed to explore ‘the preferential mode of information processing a subject manifests in the majority of reasoning, learning and memorising experiences during an assigned task’ (Weijers et al., 2001). The MFFT is a difficult matching to sample task that involves high response uncertainty. Participants are required to identify a target object amongst seven very similar distracter objects. Outcome measures include the accuracy of the participant and the time taken to make their response. The use of a dimensional scoring procedure, as opposed to the traditional categorical approach, contributes novel information with regards to performance in this task in ED samples. By distinguishing between the skills/ability required (content) and the way in which participants go about solving this task (process), the dimensional scoring procedure can provide information with regards to the phenotypic characteristics discussed above; reflection–impulsivity, and local–global biases.

Reflection–impulsivity reflects the process employed in problem solving; “the tendency to gather and evaluate information before making a decision” (p. 515; Clark et al., 2006). As performance in the MFFT involves high response uncertainty (a prerequisite for the accurate measurement of reflection–impulsivity; Kagan, 1966),

the trade-off between speed and accuracy in responding is taken into consideration in this dimensional score. Impulsivity relates to fast and inaccurate responding, (decisions are made and acted upon with little consideration with regards to the accuracy). Conversely, at the other end of the continuum, a reflective ‘perfectionist’ cognitive style is implicated by slow and accurate performance.

With regards to content, as a difficult matching to sample task with high demands on visual search skills (Clark et al., 2006), it is clear that performance would benefit from local processing, a focus on the detail of the figures as opposed to processing the stimuli at the level of the gestalt. Local processing bias is therefore measured here using a dimensional efficiency score (efficiency associated with fast and accurate responses).

The hypotheses for this investigation were determined based upon the current knowledge regarding clinical phenotypes in EDs. In comparison to the control group, it was thought that participants with EDs would display information processing styles indicative of elevated impulsivity and efficiency. Firstly, participants with BN would be associated with elevated impulsivity, in accordance with the finding of previous research. Secondly participants with AN would show greater efficiency in the task, in line with the literature that suggests a bias towards detail level processing in this clinical group.

## 2. Methods

### 2.1. Participants

Sixty females took part in this study. Participants with AN ( $n=20$ ) and BN ( $n=14$ ) were recruited from the inpatient and outpatient ED services in the South London and Maudsley (SLAM) NHS trust, the Central and North West London (CNWL) NHS trust and from a confidential volunteer register maintained by the Eating Disorders Research Unit at the Institute of Psychiatry, London. Healthy control participants ( $n=26$ ) were recruited from the local community, with no personal or family history of an ED. All participants were female, with English as their first language, aged between 16–57 years. Exclusion criteria included current use of psychotropic medication, a history of psychiatric illness, previous head injury or neurological illness and alcohol or substance dependency. The study received ethical approval from the SLAM and CNWL Research Ethics Committees. Written informed consent was obtained from each participant before entering into the study.

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