# Malingered Cognitive Symptoms in Severe Mental Illness

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# CONTENTS

**LIST (IN ORDER OF APPEARANCE IN THE TEXT) OF TABLES AND FIGURES IN RESULTS SECTION (page numbers in parentheses)**

# LIST OF APPENDICES

# OVERVIEW

Part I of this thesis comprises a review paper which will contextualise the empirical paper that forms Part II of the thesis. Section A of the literature review offers the reader an introduction to the often-misunderstood phenomenon of malingering. Although avoided by psychologists perhaps due to its seeming incompatibility with the establishment of a therapeutic alliance (Rogers, 1997), the case for the importance of research into improving malingering detection methods is presented. The reader is then orientated to the contemporary understanding of malingering as an elected means of adaptation to circumstance, and this adaptational perspective is used to elaborate on what and how individuals might malinger. Whilst thinking about malingering might be interesting of itself, the aim of any malingering research must be to improve upon the accuracy of classification and detection methods. Section B of the review paper provides the reader with a summary of the development of methodologies and strategies used in the clinical assessment of malingering. This is presented with reference to the theoretical account of the malingering construct elucidated in Section A. Detection methods used in malingered mental illness and malingered cognitive impairment are presented independently, and the distinct domains in which these assessments tend to focus is emphasised. Specifically, individuals suspected of malingering mental illness are assessed predominantly in the psychiatric (not cognitive) domain, and although corroborative evidence of malingering on cognitive tests is routinely sought in order to augment classification accuracy, no cognitive tests have been developed *specifically* to assess malingered mental illness. This constitutes a gap in the research literature since feigning on tests of cognition among persons malingering mental illness has been repeatedly evidenced (e.g. Boone et al., 2002).

Advances in the literature on malingered cognitive impairment (in the context of traumatic brain-injury) are presented and considered then, in the context of developing bespoke cognitive instruments for the assessment of malingered cognitive symptoms in the context of mental illness.

Part II of this thesis constitutes the empirical study that was designed and executed in the aim of investigating the utility and validity of a test battery designed to assess malingered cognitive symptoms in severe mental illness. A three-group "fully controlled" simulation study is described, in which psychiatric inpatients, simulating malingerers and healthy controls (total n = 105), were administered a multi-method malingered cognitive symptoms test battery, comprising interview- and performance-based tasks. Established malingering tests were also administered in order that simulated malingering could be externally validated, and also so that classification according to the cognitive battery, could be compared with that according to 'gold standard' instruments. Tests of true ability and pathology were administered in order to explore the potential confound of true mental illness with malingering measures, and also so that the true symptom status of simulating malingerers could be quantified. Results demonstrate a high degree of precision of discrimination between simulating malingerers and their genuine counterparts on the basis of composite scores on the cognitive symptoms battery. Results also show that composite scores on the cognitive symptoms battery are not correlated with true pathology in genuine patients, estimated IQ and level of educational attainment.

Part III of this thesis constitutes the critical review section in which qualitative information pertaining to the execution processes of the study is discussed. This

information pertains mainly to the engagement of acutely mentally ill patients in this research, and also includes personal reflections on conducting a study entailing simulation.

# PART I: REVIEW PAPER

# SECTION A: THE MALINGERING CONSTRUCT

## WHAT IS MALINGERING?

### The DSM-IV definition

In DSM-IV, malingering is defined as "the intentional production of false, or grossly exaggerated physical or psychological symptoms, motivated by external incentives such as avoiding military duty or work, obtaining financial compensation, evading criminal prosecution, or obtaining drugs" (American Psychiatric Association, 1994). Although malingering can occur in the context of genuine mental illness, it is not considered to be a form of psychopathology or mental illness in its own right. In contrast with genuine psychiatric illnesses, malingering refers to a voluntary behavioural manipulation in which symptoms that are not experienced are reported and portrayed. Malingering is not listed as a diagnosis in DSM-IV, but rather is appended, and assigned a 'V' code to mark it as a condition that requires further attention and elucidation. Despite frequent reference in the literature to 'diagnosing malingering', strictly speaking malingering is detected, not 'diagnosed'.

Further to the above definition of malingering, DSM-IV provides guidelines for contexts in which the presence of malingering should be suspected. It suggests that the veracity of reported symptoms, and the intended goal of behaviour, warrants further investigation if: (1) the context is a medico-legal one; (2) there is a marked discrepancy between claimed symptoms and objective findings; (3) the individual is uncooperative in either evaluation or treatment protocols or (4) there is a concomitant presence of Anti-social Personality Disorder (ASPD). The usefulness and limitations of these guidelines will be discussed later.

**Differential Diagnoses – Non-malingered symptom production**

In DSM-IV, malingering is differentiated from factitious disorder, somatoform and conversion disorders, and also from hypochondriasis. The latter are psychiatric diagnoses where patients either produce *actual* symptoms, or genuinely *believe* in the existence of reported symptoms. In the case of factitious disorder for example, patients report symptoms in the (psychological) interest of assuming the sick-role, and not in order to gain financially or by other external means. When symptoms are malingered however, they are *consciously* fabricated with the intention of achieving specific goals, and these goals are not psychological or 'secondary' in nature.

The empirical validity of the distinction between factitious disorders and malingering has been questioned. Rogers and Neumann (2003) broadly discuss difficulties in measuring the patient's intentionality, which distinguishes malingering from these differential diagnoses. More specifically, they discuss how the psychological gain achieved by patients seeking to adopt the 'sick role' through symptom production in factitious disorder or hypochondriasis, cannot be empirically isolated from the external gains that are potentiated by the adoption of this role. Since persons with factitious disorder (a DSM diagnosis) might externally gain through financial benefits for incapacity, help from others and dismissal from responsibility, establishing that they do not seek these external gains *as well as* the intrapsychic ones that define their illness is theoretically problematic. It seems possible that the invisibility of patients intentions, might lead to under-diagnosis of malingering in such contexts. This might be particularly true since the 'setting conditions' according to DSM-IV, of concurrent lack of treatment and assessment co-operation and comorbid ASPD are more likely to be absent than present in patients *apparently* presenting with factitious, somatoform and hypochondriac disorders. Furthermore, there is little research on whether these

disorders can co-exist with malingering (Rogers, 1997). The fact that evidence of malingering does not preclude the presence of genuine (unspecified) psychopathology suggests that this coincidence is theoretically possible, augmenting the difficulties in malingering classification.

## THE MERE SUGGESTION OF MALINGERING

### Avoiding or denying the issue

Clinicians and the public alike regard malingering, like all forms of deception, pejoratively. According to Rogers and Cavanaugh (1983) malingering is automatically equated with the negative traits of "deviousness and manipulativeness". Labelling someone as a malingerer has far-reaching medico-legal, economic and personal ramifications for both the accuser and the accused. Consequently, this stigmatising topic which sits awkwardly in our social context, has until recently been poorly researched and couched under a variety of military and medical euphemisms (Rogers, 1997). Sensitivity to issues surrounding malingering and illness deception in both modern medicine and social security policy in most Western democracies, has also contributed to the paucity of research in this area (Halligan, Bass & Oakley, 2003).

According to Rogers and Neumann (2003) three fundamental misconceptions within the biomedical model about the nature of illness deception prohibit advancements in our understanding of malingering, and hence in our ability to detect it. These "untruths" are listed as: (1) that all illness behaviours have a medical cause; (2) that all patients in describing their impairments and disabilities do so accurately and (3) that illness deception is not common.

Misplaced compassion, plus an inability to distinguish between real and feigned symptoms, can lead to reticence on the part of practitioners in questioning the veracity of reported complaints (Rogers, 1997). Clinicians may routinely seek to minimise or avoid raising doubt regarding the genuineness of illness complaints, since this would compromise the therapeutic relationship, flouting the ground rules laid down in training about the primary role of the clinician in the care of the patient (Halligan, Bass & Oakley, 2003). However, in neglecting non-medical or non-psychiatric explanations for illness behaviours, modern medicine and psychiatry risk underestimating the capacity of individuals to control their actions, as they successfully do in many other areas of their lives. There is no logical basis for why illness deception should be any less common than other forms of deceptive behaviour (e.g. lying or fraud) that are commonly present in non-medical contexts (Halligan, Bass & Oakley, 2003). Also the *routine* assessment of malingering in certain (e.g. forensic psychiatric) settings is advisable since, in the act of diagnosis where hypotheses must be ruled in or out based on available evidence, neglecting to assess for malingering, means that it cannot logically be ruled out (Rogers & Bender, 2003).

The 'patient-doctor relationship' involves a spectrum of psychosocial factors that contribute to symptom presentation, and within the biopsychosocial tradition, more contextual paradigms for the conceptualisation of malingering are required (Halligan, Bass & Oakley, 2003). Malingering is best described and understood within a social legal framework that considers social responsibility and freewill as paramount, and this is the central premise for the Adaptational Model of Malingering (Rogers, 1990a) which will be described later.

**The role of the clinician in investigating malingering**

According to some writers (e.g. Sharpe, 2003), in assessing malingering, clinicians should confine themselves to a judgement about the extent to which they are convinced that the patient in question is suffering from a relevant psychiatric disorder. They should *not* be in the business of 'diagnosing' malingering, and should hold in mind the probabilistic nature of their opinion, presenting this with objective indicators and statistics where possible. Clinicians must be aware of the potential biases that may influence their judgements, including whether they 'like' a patient and their own trusting, sympathetic or indeed sceptical predisposition (Sharpe, 2003). In their capacity as medical experts, clinicians are invited by lawyers to comment upon the likely veracity of a claimant's symptoms, in contrast to being asked their opinion on the claimants' honesty.

**Malingered psychopathology – Reliance on subjective report**

Uncomfortable pejorative overtones seem inescapable and permeate the very defining language of malingering. Consequently, the majority of clinicians shy away from routine investigations of malingering, and fail to question the objective veracity of their patients' reports, it would appear in some cases, as a matter of principle (Halligan, Bass & Oakley, 2003). Malingering is rarely considered or evidenced where observable and measurable physical pathology can explain reported symptoms. Psychiatric illnesses however, offer a particular challenge with respect to malingering, since few psychiatric diagnoses have an associated or observable pathology, and their diagnoses are made on the basis of subjective report. This not only means that genuine psychiatric patients may be open to the accusation of malingering, but also that persons inclined to malinger may tactically do so in this domain. They may believe themselves less likely to be detected since a CT or MRI scan, or a blood or

urine test cannot unequivocally prove *or* disprove their purported complaints (Halligan, Bass & Oakley, 2003).

Theoretically, in the psychiatric domain malingering is distinguished from psychiatric illness by the absence of psychopathology, and the identification of potential external incentives and an intent to deceive in order to obtain these gains. For symptoms to indicate a psychiatric illness, they must not only be severe and persistent, but they must also match a recognised pattern, according to established diagnostic criteria (e.g. DSM-IV, APA 1994). These criteria define *relatively* homogenous groups of patients for the purposes of clinical practice and research, yet specific diagnoses do not actually have precise boundaries. To complicate matters, it is recognised that even if a patient's symptoms do not clearly fit a particular diagnostic criteria, that they may have an 'atypical' form of a condition. These diagnostic limitations indicate that 'degree of fit' with defined categories, is a useful but imperfect way of distinguishing between genuine and feigned psychiatric illnesses (Halligan, Bass & Oakley, 2003).

Psychiatric illness is validated and diagnosed when the presence of psychopathology is determined. But this determination is necessarily an inference since psychopathology, unlike physical pathology, is a hypothetical concept. If our inferences are based on subjective reports, how do we *systematically* distinguish between genuine and feigned presentations of psychiatric illness? The core of this judgment is based on the concept of consistency, since clinicians expect genuine psychiatric illness to be consistent in a variety of ways. These include consistency within the patient's history, between reported symptoms and both observed behaviour and published diagnostic criteria, and also across sources of information (Rogers, 1988a).

**Do clinicians 'know' malingering when they see it?**

Whilst the greatest asset of clinical interviewing is its versatility and adaptability to diverse patient populations, clinical decisions and evaluations of malingering based on unstructured traditional interviews are unreliable, and according to Rogers (1997) base themselves on an "over-reliance on unvalidated hunches". Furthermore, the non-standardisation of unstructured clinical interviewing renders it unamenable to empirical and scientific enquiry, since its reliability and validity cannot be verified, or indeed falsified (Popper, 1959).

Clinicians' confirmatory bias and attribution error, can and does lead to under or over diagnosis of malingering when using a clinical interview alone (Sharpe, 2003). Evidence also illustrates that examiners tend to overestimate their ability to make correct judgements about presence or absence of malingering in patients with whom they have established a rapport (Halligan, Bass & Oakley, 2003). Such social factors reinforce the inadequacy not only of our awareness and therefore investigation of malingering in clinical settings, but also of our investment in malingering research (Rogers, 1997).

According to Rogers and Bender (2003) the presupposition that malingering can be intuited, means not only that decisions are unlikely to be critically reviewed, but also that no additional data is likely to be sought to confirm or disconfirm such "unvalidated hunches" (Rogers, 1997). The classic research by Rosenhan (1973) evidences the potential woeful inaccuracy of such intuitive judgements, where individuals feigning hallucinations evaded suspicion or detection, and instead were hospitalised. Furthermore, as shall be discussed in the later critique of the criminological perspective of malingering, strong adherents to the conceptualisation

of malingering provided in DSM-IV, are likely to over-emphasise malingering in 'bad' persons and under-emphasise it in 'good' persons. Misclassifications on this basis could result in genuine patients in forensic psychiatric settings being punished and not treated on the basis that they are thought to be malingering. On the other hand, malingerers whose pleasant and compliant dispositions assist them in evading detection, might receive inappropriate medication or therapy, or be exculpated from offences on the basis of (feigned) mental illness.

If Rogers' (1997) hypothesis that clinicians do not possess an adequate threshold model in conducting their unstructured interviews for when malingering should be suspected, an augmentation in malingering knowledge and an orientation towards screening tools or strategies ought be operationalised. According to Rogers, where the setting conditions for malingering are present, given the enormity of the costs of false positive or negative classification, standardised, context-relevant malingering investigations should be conducted as a matter of routine.

## MALINGERING – EXISTENCE, PREVALENCE AND COST

### Malingering *is* a reality, albeit an uncomfortable one

There is an implicit recognition and acceptance that an individual's choice to feign or exaggerate illness, is a legitimate explanation for some illness behaviours associated with personal or financial incentives (Halligan, Bass, & Oakley, 2003). More generous benefits have become more widely available over the last 30 years, and it seems unlikely that medical factors alone can adequately explain the large uptake in work-related incapacity benefits since the 1970s despite improvements on most objective measures of health (Halligan, Bass & Oakley, 2003). Significantly, most of the conditions associated with this increase are symptom-based illnesses, which

ultimately rely on the credibility of the complainant's report. It also seems likely that the increasing cultural acceptability of the possibility of psychological sequelae of stress or injury, affords claims of disability on this basis a new legitimacy that is greater now that ever before (Halligan, Bass & Oakley, 2003). It is not surprising then, that numbers of reported complainants have increased commensurately, and hypothetically then, so have numbers of malingerers in this area. These facts highlight the significance of continued investment into the exploration of malingered cognitive and psychiatric symptoms.

Rogers (1997) notes that concern about defendants faking mental illness in order to avoid criminal responsibility dates back at least to the 10th century. Today it is commonly known that a person who is found by psychiatric and legal assessment to have committed a grievous offence in involuntary obeisance of pathological cognitions and experiences, may be deemed incompetent to stand trial for his offences on the basis of mental illness. In this event, a patient (in the UK) would be detained under the Mental Health Act (DOH, 1983), issued a Hospital Order and administered treatment and rehabilitation in an appropriately secure psychiatric setting. It is not difficult to imagine how the possibility of being exculpated from offences, and thereby avoiding punishment by prison, might motivate a proportion of offenders to malinger mental illness. It might be that malingerers' misconceptions about the comparative idyll of the psychiatric hospital are instrumental in crystallising decisions to affect a malingered mental illness, and cases of undetected malingerers admitting their sanity following the commencement of hospital treatment for feigned symptoms are not unheard of (Broughton & Chesterman, 2001).

**The cost of malingering**

The use of the National Health Service, and its resources is severely impacted by individuals who malinger. Access to clinicians by patients with valid concerns might be obstructed, as well as costs escalated by needless tests and treatments for falsified symptoms. Whether the goal is to obtain drugs, to secure financial benefits such as disability payment, or to avoid punishment following an offence, the costs to health care delivery systems in terms of money, time and energy commitment have been shown to be sizeable (Rogers, 1997). In the context of private litigation and insurance claims, the assets of insurance companies are at stake in the event of malingering, affecting consumers of insurance whose premiums are raised in the event of the illegitimate 'windfalls' of successful malingering clients.

Quantification of the cost of malingering logically requires knowledge of its prevalence. Since malingering prevalence must be estimated, and remains elusive for the theoretical and practical reasons outlined below, we cannot definitively name the true cost of malingering to our health system and society in general.

**The prevalence of malingering**

Since most clinicians are not formally trained to actively consider deception in their patients, it is reasonable to assume that a large proportion of sophisticated malingerers pass undetected. In this way, it is likely that cases of 'poor' or blatant malingering, that give rise to suspicion and are easily detected, provide for a low estimate of the true prevalence of malingering. Also, since the potential prevalence of malingering is mediated by unpredictable environmental change (i.e. the commission of an offence), it is a non-static variable unlike genuine disorders, and its base-rate prevalence is difficult to obtain.

No generally acknowledged epidemiological data exist on the base rate or prevalence of malingering. Myriad estimations however have been posited, both across and within various diagnostic groups and settings (Miller, 2001). It is not disputed however, that malingering is more prevalent in legal and forensic settings, than in general clinical settings, where potential external incentives are less overtly available. In 2000, Rogers and Cruise estimated malingering to occur in approximately one sixth of all forensic psychiatric cases, stating also that this figure probably underestimated the actual prevalence of malingering, since it logically excluded individuals who successfully feigned psychopathology.

Estimates of the base-rate of neuropsychological malingering occurrence in litigating or 'benefit seeking' populations range from approximately 7.5-15% (Trueblood & Schmidt, 1993), to 18-33% (Binder, 1993). Mittenberg et al. (2002) in a more recent study of 131 practising members of The American Board of Clinical Neuropsychology, provided estimates for the prevalence of malingering in a variety of different clinical conditions. These included estimates of 39% in the case of mild head injury, and 15% for depressive disorders. Whilst the figures quoted here are estimates of malingering prevalence, and their ranges are large, they are undeniably significant.

## WHY DO PEOPLE MALINGER?

Since malingering refers to responses and behaviours that are produced for a circumscribed purpose, it is important to answer the question of *why* people malinger in order to usefully consider potential detection methods. In order to elucidate the primary motivators of malingering, Rogers (1990a,b) proposed three non-mutually exclusive explanatory models. These were the Pathogenic Model, the Criminological

Model and the Adaptational Model of Malingering, and will be outlined in detail below. Most clinicians currently understand malingering from an adaptational perspective (Rogers, 1997), with its determinants rooted in the idiosyncratic environmental context rather than within the malingering, or deceptive individual. Malingering then, is considered to be a behaviour that individuals produce, rather than a propensity that they have. This understanding emerged from a research-driven process of elimination of the conceptual difficulties underpinning earlier conceptualisations of malingering. This adaptational perspective has repeatedly been shown to encompass the most prototypical characteristics of malingered presentations (Rogers et al., 1994b, 1998) as shall be elaborated later.

**The Pathogenic Model of Malingering**

Historically malingering has been understood from a pathogenic perspective, at the crux of which is the notion that 'faking' symptoms is driven by the underlying force of a *true* mental disorder. It was thought that in order to gain control over emerging and worsening psychotic symptoms, patients might create symptoms and portray them as genuine. Motivation, according to this explanation of malingering, appears to have a defence-like quality in the psychodynamic tradition and, in this way, is internal to the patient, rather than emblematic of a conscious adjustment to environmental variables. Although it is not currently disputed that malingering can coexist with true impairment, it is the intrapsychic motivational implications of the pathogenic model that have become outdated, with its proposition that symptom fabrication is an extension of genuine psychopathology.

The Pathogenic Model of malingering is underpinned by the medicalisation of illness deception with its assumption that a person must be ill to 'want' to feign the sick role.

It suggests that the simulation of insanity irrespective of how consciously or unconsciously motivated, should be regarded as a manifestation of mental illness. It ignores the fundamental notions of responsibility, free will and choice to its detriment.

**The Criminological Model of Malingering**

Moralistic notions of badness and crime were bound to the very diagnostic nomenclature of malingering in DSM-III (APA, 1980), where a criminological model of malingering was first articulated. Language such as "high index of suspicion" and "strongly suspected", continues to be associated with the phenomenon of malingering ( DSM-IV: APA, 1994). According to this model, malingering is most likely to be seen in persons with ASPD, who are uncooperative with forensic evaluations and treatments, or whose purported symptoms are discrepant with objective findings. On the basis of the DSM-IV definition, malingerers form an immoral and criminal group, and a causal link between "bad character" and motivation to malinger appears to have been spuriously presupposed. Although clinicians' estimates of the prevalence of malingering is significantly higher in forensic psychiatric (15.7%) than non-forensic psychiatric (7.4%) settings (Rogers, Sewell & Goldstein, 1994), it appears erroneous and simplistic to attribute this increased prevalence to a convergence of 'badness' (bad person, in bad circumstances, performing badly). To critics of a criminological perspective, the association between ASPD and malingering is an illusory correlation between the forensic setting of most malingering research, and the high prevalence of ASPD in these settings (Rogers, 1997). Yet this model gives ASPD causal and essential status in the 'development' of malingering, which is misleading since it seems likely that not *all* malingerers fulfil the ASPD criteria (Rogers, 1997). Malingering is conceptually more specific than a deviant personality portraying untruths. Furthermore, although forensic psychiatric patients are rarely voluntary and

may be motivated to manage the impression they portray for external gain (i.e. avoidance of punishment), we cannot assume that malingering would be their chosen form of response distortion in this regard. Other response styles that patients may use when being less than objectively truthful include denial and defensiveness and, according to evidence it is these response styles that forensic patients are most likely to use, not malingering (Rogers & Dickey, 1991). It is not difficult to see how exaggerating symptoms (i.e. malingering), would not be the most favourable choice of response style for a sex offender seeking to portray a favourable impression to evaluators. Furthermore DSM-IV's inclusion of "uncooperativetiness" as a feature of malingering does *not* fit well with what is currently understood about persons who malinger. It has been suggested that malingerers actually appear highly cooperative in assessment (Rogers, 1997), frequently seeking out treatment for feigned symptoms, and discussing these voluntarily. Playing down or denying symptoms, perhaps in attempts to evade contact with services, is in fact an associated feature of many true Axis I disorders (e.g. schizophrenia), rather than their malingered counterparts (Resnick, 1988).

It is evident then that adherence to a criminological perspective and its associated diagnostic criteria in the detection of malingering, might eventuate in lowered specificity and sensitivity of detection, risking more false positive (true patients diagnosed as malingerers) and false negative (undetected malingerers) classifications.

**The Adaptational Model of Malingering**

Rogers' Adaptational Model (1990a) was proposed in order to transcend the reductionist conceptualisations of malingering offered by the mad (pathogenic) and bad (criminological) perspectives described above. As the name suggests,

malingering is viewed as an adaptive behaviour, purposefully chosen to fit a particular situation. The adaptational perspective assumes that most malingerers attempt to resolve difficult circumstances through some form of cost-benefit analysis, in accordance with their idiosyncratic context. This cost-benefit analysis is likely to be influenced by the individual's estimation of their abilities to succeed in feigning without detection. Malingering is proposed to be more likely to occur when (1) the context of the evaluation is perceived as adversarial, (2) personal stakes are very high, and (3) no other alternatives appear viable. The Adaptational Model provides the broadest and least pejorative explanation of malingering, and affords a template for individual case formulation. It also provides a theoretically robust standpoint from which to consider avenues for research on detection tools and strategies.

**Prototypical analysis – Which model best describes what is observed clinically?**

Because the three explanatory models lack clear parameters (Rogers, 1990a), a prototypical analysis was performed (Rogers, Sewell & Goldstein, 1994) to determine which model encompassed the most prototypical characteristics of malingering. 320 forensic experts were asked to rate evaluations of malingering in both forensic and non-forensic psychiatric patients, according to prototypical characteristics belonging to each explanatory model. Prototypically pathogenic items addressed underlying psychopathology, continued deterioration and the development of genuine symptoms. Prototypically criminological characteristics included DSM-IV indices supplemented by psychopathic characteristics as delineated by the Psychopathy Checklist (PCL: SV; Hare et al, 1994). Adaptational items focused on adversarial context and cost-benefit analysis. Conclusions from these studies were that the Adaptational Model was the most prototypical, followed by the Criminological and Pathogenic models. Focusing on non-forensic cases, the pathogenic model was least applicable to feigned cognitive

impairment. When the distinct components of the Adaptational Model (adversarial context and cost benefit analysis) were analysed in isolation, adversarial context appeared more applicable to feigned mental disorders than to either feigned cognitive impairment or fake medical syndromes. I shall discuss later how an individual's assessment of the fit of malingered symptoms to a given context, is key to how they will behave in order to minimise the likelihood of detection, and maximise the likelihood of achieving their desired outcome.

**The Adaptational Model – The way forward for research into detection methods**

To date, evidence indicates that the Adaptational Model is the most satisfactory in its provision as an empirically driven theoretical framework for understanding why malingering profiles are observed. Analysis of malingering behaviour from this perspective allows us to ask what impression the individual is trying to project (goal), and how they are going about it (strategy). For example, given an individual's circumstance and the range of possible outcomes, would this person stand to gain if they were to malinger mental illness, cognitive impairment, physical difficulties or some combination of these? Anticipating how people might malinger and why, is the key to devising detection methods since, if we have knowledge about how an individual might go about falsifying symptoms to achieve their goals, we can investigate detection models that will allow us to uncover and measure likely falsification. Since ultimately detecting malingering involves a judgement call, the most useful detection tools and techniques are those that are shown to *best* discriminate between genuine and malingered complaints in a particular setting.

In the remainder of this review I will summarise the literature on observed malingered profiles and behaviour across contexts, using an adaptational perspective to consider

*why* particular malingered styles and profiles are observed. The properties of useful detection tools and techniques will be considered, with the aim of deductively customising detection methods for malingered mental illness, to maximise discrimination between feigned and genuine complaints. The use of cognitive paradigms that might covertly *invite* an individual to produce a malingered profile that is maximally discrepant with that of a genuine patient is considered. Whilst some evidence suggests that cognitive profiles are malingered in forensic settings by individuals purporting to be mentally ill, these response styles remain relatively unresearched. This is perhaps because cognitive symptoms do not encapsulate the most salient (positive) symptoms of severe mental illness, and consequently the layman is possibly less aware of how they might manifest, and therefore less 'readily' feigns them. The fact that feigned cognitive symptoms are not *as* spontaneously evidenced by malingerers in forensic settings as positive symptoms, does not mean that malingerers do not produce them on tests of cognitive performance *if given the opportunity*. These ideas are testament to the fact that the cognitive assessment of malingered psychopathology is a ripe area for research into detection methods.

## HOW DO PEOPLE MALINGER?

**Step One – Cost-benefit analysis – Do I really want to do this?**

The ultimate aim for an individual who has elected to malinger is to evade detection and thereby achieve their goal. Malingering occurs only when the stakes are high, and the outcome in the event of detection is perceived by the malingerer to be either highly aversive (Rogers, 1990a) perhaps in the form of punishment, or unbearably regrettable perhaps in the form of the loss of potentially huge compensation monies. Furthermore, detected malingering can carry huge penalties depending on the gravity of fraud that is judged to have been committed. A litigant malingering symptoms of

cognitive impairment from a purported head injury at work with the aim of securing a compensatory pay-out if detected will undoubtedly endure criminal proceedings, resulting in possible loss of his liberty, or crippling financial ruin in the form of a counter-sue by his maligned employer. A multiple murderer malingering a psychotic profile with the aim of being deemed incompetent to stand trial, in the event of detection would be tried not only for his crimes, but also for his fraudulent self-representation. Such an individual's sentence would likely be increased to account for their lack of remorse and thus augmented risk category. These examples are intended to be considered from an adaptational perspective, and hence to illustrate the investment with which malingerers pursue their desired outcome. They are not intended to align malingering with traits of deviousness and malice, in the tradition of the Criminological Model. Malingerers mostly find themselves in desperate predicaments where they feel that malingering is their 'only' option in evading perceived adversity in the form of poverty, prison or perhaps even death (e.g. avoidance of the death penalty in the USA). In fact, as illustrated by Rogers' (1990a) explanatory formula for malingering motivation, the higher the stakes, the higher the likelihood of malingering.

**Step Two - Consider the context – What form should my malingering take?**

So, individuals produce malingered presentations according to the situation in which they find themselves, and the way in which they interpret their circumstances in terms of possible outcomes.

**(a) The forensic context**

In forensic settings, it has been demonstrated repeatedly both in simulation and case studies, that people malinger (what they believe to be) severe mental illness (Rogers,

1997). Depression and anxiety would likely involve inappropriate symptomatology to render an individual exculpable from his crimes and, although these syndromes are malingered, they will not be focused on here. Malingering individuals in forensic predicaments generally seek to create the impression that they were 'out of their mind' at the time of their offence and therefore not responsible for their actions. Malingerers may report hallucinations and delusions for example, and whatever psychosis-related symptomatology they believe may convincingly demonstrate that they were driven to commit the offence by, and that they are indeed suffering from, a serious mental illness. A minority of malingerers in forensic settings malinger global cognitive impairment, claiming that they have a learning disability or an acquired head injury. This sub-type of malingering presents less detection difficulties to evaluators as it is usually accompanied by higher-level behaviours that defy the possibility of the reported intellectual impairment, and is nonsensical in terms of onset and history (Rogers, 1997). Malingerers in forensic settings evidently perceive a profile of malingered mental illness to be more adaptive than one of malingered neuropsychological impairment (Rogers, Sewell & Goldstein, 1994). Research in the area of malingered mental illness has focused on the development of psychiatric assessments (e.g. the SIRS, the M-FAST) that discriminate between self-reported symptoms of feigned and genuine complainants. This will be discussed in more detail later.

**(b) The non-forensic context**

In medico-legal settings where potential access to compensation as a result of an accident or crime exists, the malingering individual is more likely to fake the psychological sequelae of a neurological insult, as he sees them. A malingerer attempting to produce psychotic symptoms, in the context of apparently having had a

head injury, would not be very convincing to assessors, who would question the medical sense of his presentation. Research in the area of malingered Traumatic Brain Injury (TBI), where physical evidence (e.g. scanning) is inconclusive, has focused on the development of neuropsychological assessment tools and techniques that best discriminate between feigners and genuinely impaired individuals. This will be reviewed in a later section of this paper.

Whilst many other psychiatric syndromes such as PTSD and stress-induced anxiety are malingered in clinical practice, these will not be focused upon in this review. External incentives are potentially available to individuals who are impaired as a result of mental health problems. This fact alone dictates that context-relevant fabrications will inevitably be produced in a variety of scenarios when stakes are high.

**Step Three- What knowledge do I have about what I am faking? – How do I need to behave?**

In electing to malinger, an individual's aim is to convey the responses and behaviour of a genuine complainant according to his best knowledge so as to render him indiscriminable from 'the genuine article'. He must develop a strategy according to what he understands about the profile he will attempt to produce. The layman's exaggerated and inaccurate understanding of the symptoms and manifestations of both mental illness and TBI is well documented (e.g. Resnick, 1988). Also, simulation studies have demonstrated that despite this 'ignorance' people instructed to feign on both psychiatric interviews and neuropsychological measures, believe that they have performed markedly more realistically than is the case (Rogers, 1997). These misconceptions provide critical information applicable to the development of detection methods, since they indicate ways in which malingerers might be identified.

Although variables such as skill, intelligence and confidence are no doubt relevant, one would expect knowledge (in the form of preparation where available) about psychiatric profiles to be positively related to 'malingering skill', and presumably to evading detection. It has however, been variously demonstrated that this is not always the case, and provision of literature and information about detection strategies to simulating malingerers does not always 'improve' malingering (Lezak, 2004). It is possible though, that such evidence is an artefact of the simulation paradigm, for it is difficult to imagine how a potential malingerer would not be 'best-advised' to prepare as much as possible before the execution of malingering in order to know 'what to do'. Preparation opportunities in the form of consulting diagnostic manuals, literature about detection strategies, documentaries about relevant syndromes might be less available to detained malingering offenders than to litigating patients awaiting assessment or a court case, although this is not documented in the literature.

**Heterogeneity – No two malingerers are the same**

Just as no two patients with mental illness are the same, malingering styles vary enormously according to the idiosyncratic combinations of situational and personal variables in which they may be encountered (Rogers, 1990a). This heterogeneity raises difficulties for clinicians investigating tools and methodologies that will invite and capture malingered responses that are *common to most* malingerers, whilst *relatively less common* to true patients. What is it that all malingerers do that true patients do not? Of course such a 'malingering variable' has not been located (Cornell & Hawk, 1989), and classification decisions must be made on the basis of multi-level assessments. Advancements in this area will be discussed later, but large standard deviations observed in the responses of simulating malingerers, contribute to

the difficulty of developing scientifically and statistically viable methods of describing and detecting malingering.

# SECTION B: THE ASSESSMENT OF MALINGERING

In recognition of the paucity of clinicians' abilities to detect malingering on the basis of clinical judgement alone (Ziskin, 1984), a vast literature has emerged in the pursuit of test procedures and techniques that might assist detection (Neis & Sweet, 1994). Before discussing clinical advancements in the identification of detection strategies and the development of standardised tools and interviews, it should be reasserted that malingering presentations are situation and individual specific. Despite the development then of norm-based and standardised instruments to detect it, it is not 'malingering' per se that is detectable since 'malingering' does not exist as a trait or entity in its own right. What is assessed therefore, is whether a particular individual is malingering on a particular test, at a particular time, rather than whether an individual is a malingerer.

Since the pejorative and antagonistic overtones evoked by the very possibility of malingering appear to deter some clinicians even from its consideration, it should be clarified at this juncture, that the impetus behind the investigation of malingering is the desire to correctly classify genuine patients *as well as* malingerers. A specific malingering evaluation might serve to disprove a clinician's "intuitive hunch" (Rogers, 1997) that a patient's atypical presentation is not genuine, as well as it might add weight to the suspicion of malingering (Halligan, Bass & Oakley, 2003). Although the risk of genuine patients being incorrectly classified as malingerers cannot be denied, genuine patients need not be fearful of the malingering detection endeavour. Since classification of malingering on the basis of test scores is probabilistic rather than definitive, the trend in applied malingering research is to provide specificity and sensitivity rates for particular instruments at particular cut-off

scores (e.g. The Test of Memory Malingering (TOMM) Tombaugh, 1997). In this way, evaluators can judge how *likely* it is that observed scores indicate differential decisions, and on this basis quantify the risk of making false positive or negative errors. Since valid interpretation of status cannot be accomplished on the basis of test scores alone, other sources of information *must always* be included in an assessment, such as a thorough history, the context of the evaluation, and the patient's attitude towards it (Slick, Hopp, Strauss, Hunter & Pinch, 1994). If in doubt, following a comprehensive assessment, a clinician should *always* err on the side of caution and *not* diagnose malingering, since a false positive diagnosis is universally considered to be more catastrophic than a false negative one (e.g. Miller, 2001).

## SPECIFIC CONCERNS FOR MALINGERING RESEARCH

### Demonstrating intentionality

Since gain sought by a malingering individual is necessarily primary, and not covert or psychological, it follows that malingering should only be diagnosed where there is *no doubt* as to the individual's motivation for symptom fabrication. This criterion of intentionality gives rise to serious difficulties in the detection and diagnosis of malingering, since there are no reliable or valid methods for objectively testing whether deception is consciously motivated. In the absence of availability of observable external gain and therefore the motivation to malinger, malingering need not be suspected or investigated.

### Methodology

#### (a) Simulation studies

Theoretically, detection of malingering can only be verified in individuals who admit to having malingered within a particular context. However, this admission rarely

happens in practice, since the notion of deception is embedded in the very definition of malingering, and admission of faking would logically sabotage the fulfilment of malingerers' gains (e.g. insurance payment, or access to drugs). Although some research has employed true or "at risk" malingerers, the presupposed unreliability of participant responding in this context, has meant that results require measured interpretation and may be of limited external validity (Rogers, 1997). Furthermore, much 'real malingerer' research has been conducted within a forensic setting, where a high prevalence of ASPD has lead to premature and spurious conclusions about the role of internal or personality variables in the production of malingering profiles. More recently research into malingering has employed simulating malingerers, who are instructed to fake particular clinical profiles, such as those of severe mental illness or brain injury. This allows well-controlled experimental manipulation of variables, and systematic comparisons between groups. Using simulators in malingering research however, presents a significant external validity problem termed the 'simulation-malingering paradox' (Rogers & Cavanaugh, 1983). Generalising, from the performance of simulating 'malingerers' to the performance of real 'fakers' who find themselves in predicaments that afford *genuine* motivation to present fabricated symptoms and to evade detection, is not straightforward. However, these difficulties can be minimised through methodological considerations which will be discussed later.

**(b) Criterion- groups validation**

According to Rogers (1997) a substantial minority of simulation studies are missing a critical component, namely the clinical comparison group. A study that establishes significant differences between healthy controls and simulating malingerers, serves only to (possibly) validate that the malingering group were indeed responding

differently according to instructions to do so. It does not tell us anything about malingering since without a clinical comparison group we do not know whether the differences found in malingerers would not also be found in genuine patients. Methods of detecting malingering are only useful if they discriminate between genuine and feigning patients, since malingerers are feigning being patients, not feigning being healthy controls!

### (c) Known-groups validation

The difficulty of establishing known groups of malingerers has already been discussed. However the enormous problem associated with the generalisability of results from simulation studies must also be addressed. The use of an "at risk" of malingering comparison group in research has become increasingly common, although this should perhaps correctly be called a "suspected-group" rather than a "known-group" comparison. In this paradigm researchers compare the responses of patients who are considered to be likely to be malingering, to the responses of genuine patients and healthy controls, in order to increase the (external) validity of an instrument in the detection of *real* malingering. For example, in their research on the TOMM, Rees et al., (1998) placed TBI patients who were litigating and who had symptoms discrepant with known neurological disease in the "at risk" group, and found that the TOMM discriminated between "at risk" and genuine patients.

Miller, in her known-groups validation of the Miller Forensic Assessment of Symptoms Test (M-FAST: Miller, 2001) placed patients into "malingering" (psychopathology) and "non-malingering" groups according to their scores on the Structured Interview of Reported Symptoms (SIRS: Rogers, Gillis, Dickens & Bagby, 1991), an instrument whose ability to discriminate between these two groups is well

validated. Briefly, the M-FAST is a 25-item screening interview that provides information about the probability of malingered psychiatric illness. Interviewees are scored on whether they endorse symptoms that have been demonstrated to be erroneously associated with mental illness by malingerers. The SIRS briefly, is a 172-item structured interview that has been robustly validated for use in the detection of malingered mental illness, and also of other response styles associated with feigning (e.g. inconsistency). In her "known-groups" validation referred to above, Miller found that the M-FAST discriminated as well as the SIRS between the "malingering" and "non-malingering" groups. M-FAST responses of suspected-groups were also compared with those of simulating malingerers to provide information about external validity. Whilst these examples demonstrate attempts to validate instruments with "true" as well as simulating malingerers, they also serve to elucidate the fact that the phenomenon of "true malingering" is impossible to isolate for the purposes of systematic applied research.

**(d) A methodological 'gold standard'**

Rogers (1990b) established three stringent methodological criteria for the validation of malingering detection strategies. These were as follows: (1) that findings should converge across research designs (i.e. simulation and known groups comparisons); (2) that findings should converge across methods of assessment (e.g. structured interviews and neuropsychological tests); and (3) that detection strategies should be carefully cross validated on clinically diverse samples. These criteria are indeed stringent, and few strategies have been validated to this extent (Rogers, 1997). It is not difficult though to see the methodological flaws associated with the absence of a known-groups comparison, or with pronouncement of an instrument or strategy as valid in its detection of malingering without establishing its convergence with other

tools of known validity. Also, since both true clinical profiles and their malingered counterparts have heterogeneous presentations, for an instrument to be robust it should be validated on a heterogeneous clinical sample, and should maintain its detection power across clinical groups. The TOMM has been validated on differentially diagnosed clinical groups, namely TBI (Rees et al, 1998) and mental illness (Weinborn, Orr, Woods, Conover & Feix, 2003). This elaborates on Rogers' third criteria giving the TOMM status as a robust and useful instrument for the detection of malingering *across diagnoses.*

## BEYOND SUSPICION AND 'OBSERVED' INCONSISTENCY – MALINGERING INSTRUMENTS

The core of the judgement about whether neuropsychological or psychiatric presentations are genuine or feigned is the concept of consistency. Rogers' 'Clinical Decision Model' (1997) advises that clinicians should suspect malingering when inconsistency is observed in one of the following areas: (1) within the patient's history; (2) between reported symptoms and observed behaviour; (3) between reported symptoms and published diagnostic criteria, or (4) across other sources of information. Once clinicians have equipped themselves with as much background information as possible, and are satisfied that a thorough malingering evaluation is warranted, their task is to differentiate, on the basis of scientific knowledge, between genuine neurologically- or psychiatrically-based phenomena, and their feigned counterparts.

Traditionally different tools and techniques have been empirically established and researched according to the malingering context, and the malingering of specific

profiles. The literature on the assessment of malingered cognitive impairment as mostly applied to compensation-seeking contexts will be presented first, followed by the literature on the evaluation of malingered severe mental illness, as applied mostly to forensic contexts. The scope of this thesis dictates that the following review of malingering assessment methods is illustrative rather than exhaustive. The literature on malingered cognitive symptoms will be presented in greater detail, since this literature provides the empirical and theoretical background for the Empirical Paper described in Part II. The literature on assessment of malingered mental illness using psychiatric interviews and multi-scale inventories will therefore be described comparatively briefly.

## ASSESSMENT OF MALINGERED COGNITIVE IMPAIRMENT

In the research, detection strategies for feigned cognitive deficits have traditionally differed (and continue to do so) from those employed in the detection of malingered psychopathology. According to Rogers (1997) *"unlike the fabrication of a mental disorder (e.g. a constellation of symptoms and associated features with a convincing onset and course), feigned cognitive deficits do not require the creation of anything. Instead malingerers simply claim "not to know" or appear to expend effort but provide an incorrect response."* This idea has underpinned the development of strategies and tools for the detection of feigned cognitive impairment, that demonstrate responding that is so poor that it defies credulity.

### Standard neuropsychological test batteries

Standard neuropsychological tests have been researched for their utility in the detection of feigned cognitive impairment, and some discrimination between true and feigned performances has been demonstrated. The forward and backward digit-span

subtests on the WAIS have been shown to be performed consistently less well by simulating malingerers than by genuinely impaired patients (e.g. Heaton, Smith, Lehman and Vogt, 1978). This is thought to be due to the failure of malingerers to appreciate that digit span tests measure attention and concentration rather than memory, and also that attention and concentration are relatively preserved in genuine TBI patients. Hence malingerers produce scores that are significantly lower than those of true patients, allowing discrimination between groups to be made on this basis (Lenvin, Benton & Grossman, 1982). Trueblood and Schmidt (1993) also demonstrated the utility of the vocabulary and picture completion subtests of the WAIS in discriminating between mildly brain-injured (litigating) patients suspected of response exaggeration and severely brain injured patients, in a study that reminds us that genuine pathology and malingering are *not* mutually exclusive. Malingering (mild TBI) patients were found to deliberately fail items, and also to slow item responses. They produced responses indicative of severe impairment, that was functionally inconsistent, and that apparently exceeded the impairment of patients *known* to be more impaired in reality. Lezak (2004) provides a summary of the many WAIS indices that have been developed from research into observed discrepant score profiles of genuine patients, simulating malingerers and suspected malingerers of TBI.

Other standard neuropsychological test batteries have been used in the study of malingering, and in fact concern about identifying response distortion on neuropsychological tests was first raised in a study using the Halstead-Reitan Battery (Heaton, Smith et al, 1978). This work demonstrated how the heterogeneity of simulated malingered responses, can inhibit the achievement of consistent, statistically significant differences between malingered and genuine responses. Multiple studies cited by Lezak (2004) have illustrated this 'statistical' difficulty. In

summary, simulators' responses have differed across studies on identical tests, both in error size *and* direction, precluding the generation of meaningful and replicable cut-off scores.

Neuropsychological test batteries are designed to assess complex aspects of cognitive functioning and thus may confound with genuine impairment more than specialised tests (Lezak, 2004). Correlation on a malingering test, between severity of cognitive impairment and malingering is undesirable, since the likelihood of true patients being classified as malingering is increased, compromising test specificity. More focused malingering research, has examined narrowly defined abilities and disabilities of genuine patients, and ways in which they might be measured and operationalised for the development of malingering sensitive (and true impairment insensitive) instruments. Most of this research into tests and techniques that might 'capture' malingered cognitive impairment has been in the memory domain.

**Memory tests**

Memory complaints are very common symptoms in most clinical practice. The availability of external incentives in the context of memory impairment, for example where a head injury has occurred and may be compensated for financially in the form of compensation award or availability of benefits for incapacitation, provides a ripe environment for the production of malingered impairment. In such cases, the clinician's task is to differentiate, based on knowledge of pathophysiological mechanisms, between genuine memory phenomena and their simulated counterparts. In a forensic context, offenders may see an opportunity to escape culpability not only through pleading incompetent to stand trial on the basis of psychiatric illness where they would logically feign psychopathology, but also on the basis of memory

impairment around events surrounding their offences, and thus their having committed them.

Much of the earlier evidence on malingered memory impairment stems from the procedure commonly referred to as symptom validity testing (SVT) which operationalises a two-choice forced recognition paradigm, where the probability of a given outcome conforms to a binomial distribution allowing probability levels for chance responding to be established (e.g. Hiscock & Hiscock, 1989). In this way, responding that produces scores below chance level (i.e. less than 50% correct) provides strong evidence that correct responses are being *actively* avoided, and/or that incorrect responses are being *actively* produced. However, few malingerers perform this poorly or believe that true patients do (Lezak, 2004). SVT procedures lacking standardised scores other than chance, generate a high number of false negative classifications (i.e. they lack specificity), and have questionable face validity. In this context this means that they appear too easy to the potential malingerer, and appear to be 'trick tests' (i.e. tests of malingering). On the whole, SVT methodologies are fairly rudimentary, and their use is limited mostly to initially alerting the clinician that responding is less than truthful.

More recently, research has centred on the development of specific tests that are sensitive to feigned memory impairment, but not sensitive to genuine impairment. The requirement of these simultaneous properties is fulfilled by tasks that take advantage of the "floor effect strategy" (Rogers, Harrell, & Liff, 1993), which assumes that the naïve faker will overplay the role, and fail on very simple tasks on which genuinely impaired individuals demonstrate competence. The heterogeneity of the functional presentations of patients with true memory impairments however,

contributes to the difficulty of isolating such tasks. Also, the requirement that a task is adequately simple so as to be insensitive to genuine impairment whilst retaining face validity so as not to deter feigners who may anticipate detection, dictates highly specified criteria for tasks that might be utilised in this endeavour. This is exemplified by the Rey 15-Item Memory Test (see Lezak, 1983) a very popular test of feigned memory impairment in which the patient is asked to reproduce 15 over-learned stimuli (letters, numbers and shapes) that are presented to them for a period of 10 seconds. Despite Lezak's (1983) recommendation that a score below 9 correctly recalled items be used to discriminate feigned from genuine memory impairment, a number of studies have shown that this instrument lacks specificity (correct identification of non-malingerers) at a variety of cut-off scores and is problematically sensitive to learning disabilities, psychiatric disorders and neurological disorders (Lezak, 2004). The Rey-15 item recall paradigm has been adapted to accommodate the well-documented advantage of recognition over recall memory. A recognition component has been attached, demonstrating incremental validity in discriminating between feigned ("at risk" group comparison), and genuine memory impairment (Boone, Salazar, Warner-Chacon & Razani, 2002). The general public appears not to be cognizant of relative sparing of recognition memory in TBI (Boone, Salazar, Warner-Chacon & Razani, 2002), so malingerers are 'stumped' by the fact that they (wrongly) believe that they should produce worse scores on recognition than on recall tasks. A lower recognition than recall score does not make clinical sense and is not seen in the majority of patients and healthy controls. Malingerers have also been classified by higher recall than recognition scores on the Auditory Verbal Learning Test (Lezak, 2004).

The TOMM (Tombaugh, 1996), a visual recognition test that uses pictures of common objects as stimuli, is the most recently developed and robustly validated test of malingered memory impairment. This test has been demonstrated to achieve high levels of sensitivity and specificity with different types of participant (university students, TBI patients, hospital outpatients), different types of experimental designs (simulation, "at risk" groups) and different procedures for presenting stimulus material (computer, paper-and-pencil). The qualities of the TOMM that account for its impressive discriminatory power between genuine and feigned memory impairment will be outlined in the summary at the end of this section.

**Other cognitive tests**

Tests developed and used in the detection of feigned cognitive impairment have not been *exclusively* in the domain of memory. Other domains have also been explored, and hypothesised discriminatory power has relied on the fact that the lay public holds many inaccurate beliefs regarding the neuropsychological consequences of head injury (Willer, Johnson, Rempel & Linn, 1993). As summarised by Boone, Salazar, Lu, Warner-Chacon and Razani (2002), the general public seems to assume that brain injury causes losses (apart from memory) in basic attention span, over-learned information and motor strength and dexterity, when in actuality these domains are relatively preserved in all but the most severely brain-injured patients. Using this information, tests have been developed to capture malingered losses in mental speed/calculation ability such as The Dot Counting Test (Lezak, 1995). Boone et al. (2002) in their malingering study using the Dot Counting Test, found that they could correctly classify malingered mental illness *and* malingered cognitive impairment using this test, highlighting differential profiles across the two malingered diagnostic groups. In another study, Boone at al's (2000) generation of scores based on unique

types of error on a sight reading task (the b Test) made only by TBI malingerers and not genuine patients, further illustrates the usefulness of this paradigm (distinctive error type) in the discrimination between feigned and genuine cognitive impairment.

**'Commission errors'**

Benton and Spreen (1961) investigated the response profiles of college simulators and genuinely impaired (TBI) patients on the Benton Visual Retention Test (BVRT), noting that malingerers made *less* omission errors that true patients, but *more* distortion errors. This overall error profile of simulating malingerers has been systematically replicated (Lezak, 2004). Bruhn and Reade (1975) found that on the Bender-Gestalt test of constructional praxis, patients with genuine impairment tended to simplify and omit aspects of drawings that they copied from memory, whereas malingerers complicated them, demonstrating a kind of cognitive sophistication and flexibility in *'committed'* rather than *'omitted'* errors. Bruhn and Reade also found that true patients' distortions were consistent across drawings according to genuine (dis)ability. Malingered distortions however, were inconsistent according (presumably) to strategic inconsistency. Some kinds of distortions (e.g. rotations) were made only by true patients. These more 'sophisticated' distortions, pertaining to genuine patient difficulties, were not evidenced in malingerers, whose knowledge or imagination about genuine impairments did not extend to them. These findings indicate that knowledge of the kinds of errors that genuine patients do or don't make on particular tests, which are counter-intuitive to what a malingerer or layman might imagine, affords useful ammunition for the clinician. Cognitive tests that invite the commission of such errors in the malingerer are likely then to be useful as tools that will discriminate in a concrete way between genuine and feigned impairments. Such paradigms might enhance the true positive identification of malingerers, whilst

minimising the false positive identification of true patients as feigners, as they qualitatively (error-type not amount) differentiate between the two groups. This potentiates the generation of scores that maximise the difference between genuine and feigning groups, and minimise score overlap across groups

Boone et al. (2000) in their work on malingered cognitive deficits demonstrated that commission error in the form of false positive identification of letters in a visual letter discrimination task, was the variable that best discriminated between malingerers and true patients (across TBI and schizophrenia clinical comparison groups). This variable was far superior in classification accuracy than was the omission error variable, where participants neglected the identification of correct responses. Omission in this context may confound with genuine impairment and indeed some patients with schizophrenia and head injury were found to produce some omission errors. However, commission errors were seen almost *exclusively* in the malingering group, which comprised litigating TBI patients. It appears that commission-type errors in this study, indicated a *wilful* (i.e. malingered) distortion on the part of the responder, allowing researchers to *qualitatively* distinguish between groups using a categorical (error-type) rather than a continuous (error amount) error-index. In their study mentioned above employing the Rey Dot Counting Test with malingerers who had evidenced malingering on valid diagnostic tools (i.e. not simulators), Boone et al (2002) again found that TBI malingerers were discriminable from other groups using a commission error score. TBI patients did not commit the same errors as malingerers, but tended instead to omit correct responses. Suspected malingerers of mental illness however, were not found to commit (false-positive) errors on this test, and were distinct from all other groups in the amount of time (i.e. longer) taken to complete tasks.

**A summary of desirable parameters for cognitive malingering tests**

The summary of the literature on the assessment of malingered cognitive impairment that has been presented above assists in the elucidation of criteria that render particular cognitive tests or paradigms useful in the quest for tools that will 'invite' discrepant responses from malingerers that are not seen in true patients. These are as follows:

(1) Face validity – If the perceived difficulty of a test exceeds its actual difficulty, malingerers will produce scoring patterns commensurate with this perception, discriminant from their genuine counterparts. The more difficult the task *appears*, the worse the malingerer will perform and the easier his detection will be (e.g. Rees at al., 1998). Strategies have been effectively used to enhance the perceived difficulty of tasks in order to invite 'better' malingering such as using smaller print (e.g. Boone et al., 2000) in the 'more difficult' phase of a task, or stressing the brevity of time available to complete (a very simple) task. Easy tasks, which are perceived to be difficult, are not transparent as 'malingering' tasks, and therefore possess necessary face validity.

(2) Tasks should *not* be sensitive to cognitive impairment, but they should be *perceived* to be so. If tasks are sensitive to genuine impairment this should be *outweighed* by their sensitivity to malingered impairment. Tasks should also not be sensitive to demographic variables such as age, gender, or to differential (and possibly comorbid) diagnoses such as depression or other mental illness.

The most effortful malingerers apply their knowledge of genuine impairment in the production of profiles that they believe to be as realistic as possible. When presented

with a task then, they must process the stimuli, determine a correct response, and then decide whether to respond truthfully or to falsify their answer (Rees et al., 1998). This would indicate that test paradigms where stimuli requiring individual responses are presented in a staccato format that does not allow malingerers time to use this strategy, might be useful in eliciting discrepant and confused responding. Also, if paradigms that elicit automatic responses are presented, this strategy of calculating 'suitable' and 'realistic' responses might be precluded in the malingerer. The latter is hypothesised to be a particularly useful area of inquiry, since automatic, or preattentive processing is relatively well preserved in patients with both cognitive and psychiatric impairment (Anscombe, 1987) compared with effortful processing. Such tasks then would satisfy the lack of confound of genuine impairment and task ability desirable in malingering sensitive tasks.

## ASSESSMENT OF MALINGERED MENTAL ILLNESS

In a litigious society where pecuniary gain or criminal exculpation may rest on the presence or absence of various psychiatric syndromes, a determination of the presence of malingering can be essential (Roger, 1997). Given that most mental disorders are diagnosed primarily on the basis of subjective symptoms, and that DSM guidelines for discrimination between genuine and feigned psychiatric entities is limited, the possibility for diagnostic error is substantial. Whilst Cornell and Hawk (1989) acknowledged that the core problem in developing diagnostic criteria for malingering is the lack of an unequivocal "gold standard" of malingering, they highlighted endorsement of bogus symptoms, expression of suicidal ideation, absurd replies, memory problems and reporting of visual hallucinations as key differentiators between true and 'faking' psychiatric patients. Furthermore, they noted that malingered 'symptoms' did not cohere and cluster into known diagnostic entities.

Clinicians' poor rates of classification of malingered mental illness have been described, and consequent attempts to research malingering detection methods initially employed existent multi-scale personality inventories. These laid the groundwork for the development of more specific tests of malingered mental illness. Developments in these two areas of the assessment of malingered mental illness shall be briefly outlined below. Research into detection methods for malingered mental illness explores the utility of instruments that measure the patient's *subjective* endorsement (or not) of symptoms and experiences. It does *not* comprise any performance driven (i.e. cognitive) indicators of malingered mental illness, although evidence suggests that this might be a useful area of inquiry (e.g. Boone et al., 2002).

**Multi-scale personality inventories**

The first approach employs existing intelligence and personality measures, of which the Minnesota Multi-Phasic Personality Inventory-2 (MMPI-2; Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989) is the most widely used and researched. Myriad MMPI "dissimulation scales" have been developed based on comparisons of differential response patterns of various groups, including healthy controls instructed to "exaggerate" true responding (e.g. Anthony, 1971), simulating malingerers, true patients and randomly generated computer responses. (See Ben-Porath, Graham, Hall, Hirschman & Zaragoza et al., 1995, for a summary of this work).

The MMPI-2 consists of a large number (370) of forced choice items, accounting for its amenability to complex large-scale empirical and statistical analyses, where optimal cut-off points for determining specific group inclusion, such as malingered/non-malingered responding, can be generated. Scales to detect inconsistency of response scatter, inconsistency of item endorsement, inaccuracy of

item endorsement, and many more unreliable response styles have been developed and are summarised by Greene (1988). Distinctive terms used in the development of these scales however, such as 'sub-optimal effort' and 'inconsistent responding', appear to be 'replaced' by the term 'malingering' in discussions of diagnostic conclusions, in a way that is obviously extrapolative and problematic. The difficulties that this raises in synthesising the literature on the assessment of malingering was also discussed with reference to the literature on assessment of malingered cognitive impairment.

Although effective in the detection of dishonest responding, the time administration of the MMPI-2 is lengthy, and its utility varies markedly between populations (Ben-Porath, Graham, Hall, Hirschman & Zaragoza et al., 1995), according to the robustness of the particular index or scale used, in terms of its criterion validity and also its relevance to the context in which it is applied. Clinicians must determine which scale is appropriate for a particular setting and whether raising or lowering cut off scores would facilitate the most reliable detection rates of malingering. The base rates of malingering occurrence in a particular setting should be known, and the consequences of false positive (misidentifying) and false negative (not identifying) classifications is a mandatory consideration in determining which cutting scores should be used and whether a cutting score should be modified. It is also recommended that a number of scales be used in conjunction with one another to further validate hypothesised reasoning about elevated scores. This is particularly important since measures of malingering on the MMPI are confounded by measures of true symptomatology (e.g. the F-Scale, Dalstrom et al., 1972, F minus K Index, Gough, 1950), and because the magnitude of this confound will likely fluctuate according to setting. For example, the confound of genuine pathology with

malingering indicators on the MMPI will be larger in inpatient than outpatient forensic settings where more pervasive symptoms, would be expected.

Other personality inventories provide some means of assessing malingering, and include items designed to measure dishonest and inconsistent responding. The Personality Assessment Inventory (PAI: Morey, 1991) and the Millon Clinical Multiaxial Inventory (MCMI-III: Millon 1978, 1994) for example, contain the Debasement and the Negative Impression scales respectively, which suggest a degree of complaint exaggeration. Additional indexes have been developed to detect malingering on these instruments. The application and development of these indices shall not be elaborated here, as they are less well validated than the MMPI scales, and are useful mainly in their determination of generic dissimulation, rather than of malingering. More specific malingering tests have been developed whose utility and specificity in the detection of malingered psychopathology far outweighs that of the multi-scale personality inventories.

**Specific tests of malingered mental illness**

The M-Test (Baeber, Marston, Michelli & Mills, 1985) was the first attempt to develop a screening measure specifically to detect malingered mental illness. Its utility was based on the differential endorsement of malingered (M-scale) and genuine (S-scale) psychiatric symptoms by simulating malingerers and patients. Malingered items on this scale comprise non-existent entities, and atypical hallucinations and delusions, and were shown to be endorsed at a higher rate by simulating malingerers than by true patients (Baeber, Marston, Michelli & Mills, 1985). However, difficulties with the external validation of this instrument (Gillis, Rogers & Bagby,

1991) and also with its problematically large confound with true pathology (Schretlen, 1992), have resulted in it being superseded by newer instruments.

Interview techniques are currently the most common approach applied to the detection of malingered mental illness. Rogers (1990a) proposed a classificatory model of malingering that incorporated four well-established strategies that were applicable to clinical interviews. This model was generated through analysis of the psychometric and social psychological malingering literature to date, and through a systematic assessment of the validity of evidence presented according to rigorous methodological standards. Rogers' model considered detection strategies to be adequately validated if they met the following criteria: (1) validated by both simulation design and known-groups comparison; (2) established by multiple assessment methods (e.g. interviews and multiscale inventories) and (3) replicated in multiple studies encompassing clinically diverse samples. Rogers found that four detection strategies for feigned psychopathology had been adequately validated across research designs and methods of assessment. These strategies were composed of rare symptoms, indiscriminate symptom endorsement, obvious symptoms and improbable symptoms, and the SIRS (Rogers, Bagby, & Dickens, 1992) was developed to operationalise them within a standardised interview format.

The SIRS is a 172-item structured interview that enquires about patient's experiences of (malingered psychiatric) symptoms. It is established as a standard method for the assessment of malingering and has a high level of reliability and well-established validity. In addition, the SIRS appears unparalleled in its ability to distinguish between feigned and genuine disorders (Rogers, 1997). However, Rogers (1997) emphasises that despite the impressive classification accuracy of the SIRS, it alone

cannot be used to 'diagnose' malingering. The determination of malingering requires a multi-method assessment, which incorporates and integrates data from unstructured interviews, collateral sources, and psychological tests.

The M-FAST (Miller, 2001) is a more recently developed tool, which has also been robustly validated across various patients and malingering samples. Like the SIRS, it is used routinely as a screening tool for malingered mental illness and is advantaged by the brevity of its administration time (approximately 10 minutes). It assesses the endorsement of atypical, inconsistent and incongruent psychiatric symptoms, finding that malingerers commonly endorse these (malingered) symptoms, where true patients do not. Whilst the M-FAST discriminates between true and malingered mental illness with an impressive degree of accuracy, scores on the M-FAST do correlate positively with true symptomatology in true patients. The M-FAST manual like that of the SIRS emphasises the *absolute* need for corroborative data in support of malingering classifications made on this instrument.

In summary then, the screening of malingered mental illness commences predominantly with an assessment of whether individuals endorse experiencing atypical, bogus or inconsistent symptoms that research has shown are not endorsed, (or not endorsed in the same way), by genuine patients. This trend has resulted from (and in), the development of highly validated screening tools that assess in this subjective symptom-reporting domain (e.g. the SIRS and the M-FAST). Following this broad review, which in Section B has focused on the cognitive assessment of malingering (mostly in a malingered TBI context) I will present my Empirical Paper which describes an applied investigation into the utility of a cognitive test battery in the detection of malingered mental illness using a fully controlled simulation design.

# REFERENCES

American Psychiatric Association. (1980). *Diagnostic and statistical manual of mental disorders, 3rd Edition.* American Psychiatric Press, Washington, DC.

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders, 4th Edition.* American Psychiatric Press, Washington, DC.

Beaber, R.J., Marston, A., Michelli, J. & Mills, M.J. (1985) A brief test for measuring malingering in schizophrenic individuals. *American Journal of Psychiatry, 142,* 1478-1481.

Ben-Porath, Y., Graham, J., Hall, G., Hirschman, R., Zaragoza, M. (Eds) (1995). *Forensic Applications of the MMPI-2*, Sage Publications Inc.

Benton, A.L & Spreen, O. (1961). *Visual Memory Test:* The simulation of mental incompetence. *Archives of General Psychiatry, 4,* 79-83.

Binder, L.M. (1993). Assessment of malingering after mild head trauma with the Portland Digit Recognition Test. Journal of Clinical and Experimental Neuropsychology, 15, 170-183.

Boone, K.B., Lu, P., Back, C., King, C., Lee, A., Philpott, L., Shameih, E., & Warner-Chacon, K. (2002). Sensitivity and specificity of the Rey Dot Counting Test in patients with suspect effort and various clinical samples. *Archives of Clinical Neuropsychology, 17,*625-642.

Boone, K.B., Lu, P., Sherman, D., Palmer, B., Black, C., Shameih, E., Warner-Chacon, K., & Sherman., N.G. (2000). Validation of a new technique to detect malingering of cognitive symptoms: The b Test. *Archives of Clinical Neuropsychology, 15,* 227-241.

Boone, K.B., Salazar, X., Lu, P., Warner-Chacon, K. & Razani, J. (2002). The Rey 15-Item Recognition Trial: A technique to enhance sensitivity of the Rey-15

Item Memorization Test. Journal of Clinical and Experimental Neuropsychology, 24(5), *561-573.*

Broughton, N & Chesterman, P. (2001). Malingered Psychosis. *Journal of Forensic Psychiatry,* **12(2),** 407-422.

Butcher J.N., Dahlstrom, W.G., Graham, J.R., Tellegen, A., & Kaemmer, B. (1989). MMPI-2: Manual for administration and scoring. Minneapolis: Univresity of Minnesota Press.

Cornell, D.G. & Hawk, G.L. (1989). Clinical presentations of malingerers diagnosed by experienced forensic psychologists. Law and Human Behaviour, 13(4), 375-383.

Gillis, J.R. Rogers, R., & Bagby, M. (1991) Validity of the M-Test: Simulation design and natural group approaches. Journal of Personality Assessment, 57 (1), 130-140.

Gough, H.G. (1950). The F minus K dissimulation index for the Minnesota Multiphasic Personality Inventory. *Journal of Consulting Psychology, 14,* 408-413.

Green, R. (1988). Assessment of Malingering and Defensiveness by Multiscale Personality Inventories. In Rogers, R. (1997). Clinical Assessment of Malingering and Deception, 2nd Edition. Guilford Press: New York, London.

Halligan, P.W., Bass, C. & Oakley, D.A. (2003). *Malingering and Illness Deception* Oxford University Press.

Heaton, R.K., Smith, H.H.Jr., Lehman, R.A.W. & VogtA.T. (1978) Prospects for faking believable deficits on neuropsychological testing. *Journal of Consulting and Clinical Psychology,* 46, 892-900.

Heslegrave, R.J., Awad, A.G., Voruganti, L.N.P. (1997). The influence of neurocognitive deficits and symptoms on quality of life in schizophrenia. *Journal of Psychiatry and Neuroscience, 22(4),* 235-243.

Hiscock, M. & Hiscock, C.K. (1989). Refining the forced-choice method for the detection of malingering. *Journal of Clinical and Experimental Neuropsychology,* 11, 967-974.

Lezak, M.D. (1983). Neuropsychological Assessment (2nd Edition). New York: Oxford University Press.

Lezak, M.D. (1995). Neuropsychological Assessment (3rd Edition). New York: Oxford University Press.

Lezak, M.D. (2004). Neuropsychological Assessment 4th Edition. New York: Oxford University Press.

Lubow, R.E., Kaplan, O., Abramovitch, P. Rudnick, A. & Loar, N. (2000) Visual search in schizophrenia: Latent inhibition and novel pop-out effects. *Schizophrenia Research, 45(1-2),* 145-158.

Miller, H. (2001). *Miller Forensic Assessment of Symptoms Test: Professional manual.* Odessa, FL: Psychological Assessment Resources.

Mittenburg, W., Arzin, R., Millsaps, C. & Heilbronner, R. (1993) Identification of malingered head injury on the Weschler Memory Scale-Revised. *Psychological Assessement, 5,* 34-40.

Neis, K.J. & Sweet, J. (1994). Neuropsychological assessment of malingering: A critical review of past and present strategies. *Archives of Clinical Neuropsychology, 9,* 501-552.

Popper, K. (1959). The Logic of Scientific Discovery. Routledge Ltd.

Rawling, P. & Brooks, N. (1990) Simulation Index: a method for detecting factitious errors on the WAIS-R and WMS. *Neuropsychology, 4,* 223-238.

Rees, L.M., Tombaugh, T.N., Gansler, D.A. & Moczynski, N.P. (1998). Five validation experiments of the test of memory malingering (TOMM). *Psychological Assessment, 10(1),* 10-20.

Reitan, R.M. & Wolfson, D. (1997a). Consistency of neuropsychological test scores of head-injured subjects involved in litigation compared with head-injured subjects not involved in litigation: Development of the Retest Consistency Index. *The Clinical Neuropsychologist, 11,* 69-76.

Resnick,P. J. (1988) Malingered psychosis. In R.Rogers (ed.) *Clinical Assessment of Malingering and Deception*, 1st Edition (pp 34-53). Guilford Press: New York, London.

Rogers, R. (1988a) Researching dissimulation. In R.Rogers (ed.) Clinical Assessment of Malingering and Deception, 1st Edition (pp309-327). Guilford Press : New York, London.

Rogers, R. (1990a). Development of a new classificatory model of malingering. *Bulletin of the American Academy of Psychiatry and Law*, 18, 323-33.

Rogers, R. (1990b). Models of feigned mental illness. *Professional Psychology: Research and Practice*, 21, 182-8.

Rogers, R. (1997) Clinical Assessment of Malingering and Deception, 2nd Edition. Guilford Press : New York, London.

Rogers, R. & Bender, S.D. (2003) Evaluation of malingering and deception. In *Comprehensive handbook of psychology: forensic psychology* (Ed. A.M. Goldstein), Vol.11, pp.109-29. Wiley, New York, N.Y.

Rogers, R. & Cavanaugh, J.L.Jnr. (1983). "Nothing but the truth"...A re-examination of malingering. Journal of Law and Psychiatry, 11, 443 – 460.

Rogers, R. & Dickey, R (1991). Denial and minimisation among sex offenders: A review of competing models of deception. Annals of Sex Research, 4, 49-63.

Rogers, R., Gillis, J.R., Dickens, S.E. & Bagby, R.M. (1991). Standardised assessment of malingering: Validation of the Structured Interview of Reported Symptoms. *Psychological Assessment: A Journal of Consulting and Clinical Psychology, 3,* 89-96.

Rogers, R. Harrell, E.H., & Liff, C.D. (1993). Feigning neuropsychological impairment: A critical review of methodological and clinical considerations. *Clinical Psychology Review,* 13, 255-274.

Rogers, R., Kropp, P.R., Bagby, M.R. Dickens, S.E. (1992). Faking specific disorders: A study of the Structured Interview of Reported Symptoms (SIRS). *Journal of Clinical Psychology, 48(5),* 643-648.

Rogers, R. & Neumann, C.S. (2003). Conceptual issues and explanatory models of malingering. In Halligan, P.W., Bass, C. & Oakley, D.A. (Eds.).*Malingering and Illness Deception (pp.71-82).* Oxford University Press.

Rogers, R., Sewell, K.W. & Goldstein, A. (1994) Explanatory models of malingering: A prototypical analysis. *Law and Human Behaviour*, 18, 543-552.

Rosenhan, D. (1973). On being sane in insane places. Science, 172, 250-8.

Saccuzzo, D. and Braff, D (1981) Early information processing deficits in schizophrenia, *Archives of General Psychiatry, 38,* 175-179.

Schwartz,B.D. & Winstead, D.K. (1985). Icon formation in chronic schizophrenics. *Biological Psychiatry, 20(9),* 1015-1018.

Sharpe, M. (2003). Distinguishing malingering from psychiatric disorders. In Halligan, P.W., Bass, C. & Oakley, D.A. (Eds.). *Malingering and Illness Deception (pp.156-170).* Oxford University Press.

Slick, D., Hopp, G., Strauss, E., Hunter, M., & Pinch, D. (1994) Detecting dissimulation: Profiles of simulated malingerers, traumatic brain-injury patients, and normal controls on a revised version of Hiscock and Hiscock's

Forced-Choice Memory Test. *Journal of Clinical and Experimental Neuropsychology*, **16**, 472-481.

Sperling, G. (1960). The information available in brief visual presentations. *Psychological Monographs, 74,* 1-29.

Tombaugh, T. (2002). The Test of Memory Malingering (TOMM) in forensic psychology. *Journal of Forensic Neuropsychology, 2(3-4),* 69-96.

Treisman, A., & Gormican, S. (1988). Feature analysis in early vision: evidence from search asymmetries. *Psychological Review, 95,* 15-48.

Trueblood, W. & Schmidt M. (1993) Malingering and other validity considerations in the neuropsychological evaluation of mild head injury. *Journal of Clinical and Experimental Neuropsychology, 15,* 578-590.

Weinborn, M., Orr, T., Woods, S.P., Conover, E. & Feix, J. (2003). A validation of the Test of Memory Malingering in a forensic psychiatric setting. *Journal of Clinical and Experimental Neuropsychology,* **25 (7)**, 979-990.

Willer, B., Johnson, W., Rempel, R., & Linn, R. (1993). A note concerning misconceptions of the public about brain injury. *Archives of Clinical Neuropsychology, 9,* 411-425.

Ziskin, J. (1984). Malingering of psychological disorders. *Behavioural Sciences and the Law, 2,* 39-50.

# PART II: EMPIRICAL PAPER

# ABSTRACT

Previous research has shown that persons malingering mental illness feign cognitive as well as psychiatric symptoms if given the opportunity to do so (e.g. Clark, 1988, Boone et al., 2002). This research aimed to investigate whether it was possible to develop a multi-method cognitive assessment battery, which would validly discriminate between persons simulating mental illness and genuine patients. Six indices including tasks based on the iconic memory paradigm (Sperling, 1960) and the pop-out paradigm (Treisman & Souther, 1985), and an interview-based measure of malingered cognitive symptoms (CDQ) were administered to simulating malingerers, true patients and healthy controls (total n= 105) in a fully controlled simulation design. Scores on each index were converted into stanine scores, and these were combined to create a single (mean) composite score of malingered cognitive symptoms. The M-FAST (Miller, 2001) and the Rey Memory Test (Lezak, 1983) were also administered in order that classifications based on the Malingered Cognitive Symptoms Test Battery (MCSTB) could be compared with those based on performances on these established tests of malingering. ROC curve analyses demonstrated that the MCSTB was able to discriminate between true patients and malingerers with a high degree of accuracy (AUC = 0.829) when 6 indices were combined to form the composite stanine score. However 2 components of the MCSTB did not discriminate between true patients and malingerers, namely RMT scores and total recall scores on the iconic memory paradigm task. When these tasks were omitted from the composite MCSTB stanine score computation, the AUC statistic was marginally increased (AUC = 0.855). Whilst the MCSTB was marginally less effective than the M-FAST (AUC = 0.923) in discriminating between true patients and simulating malingerers, using a combination of the M-FAST and the

MCSTB produced higher classification specificity, resulting in less false positive classifications than the use of the M-FAST alone in this sample group. Whilst the use of the MCSTB alone was less sensitive and less specific than the M-FAST in the classification of simulating malingerers, the MCSTB identified 4 'known' malingerers who did not malinger on the M-FAST. Furthermore, true pathology as measured by the BSI (Derogatis, 1993) was significantly correlated with true patient scores on the M-FAST but not with those on the MCSTB. These findings might suggest that the M-FAST and the MCSTB measure distinct domains of malingering (i.e. psychiatric and cognitive) within malingered mental illness. The MCSTB appears to hold considerable promise as an assessment tool for the specific assessment of malingered cognitive deficits in severe mental illness.

# INTRODUCTION

In 2000 Rogers and Cruise estimated malingered mental illness to occur in approximately one sixth of all forensic psychiatric cases. Any prevalence estimate however, is likely to underestimate the true occurrence of malingering, since it will logically exclude 'successful' malingerers who elude the attention of clinicians (Rogers, 1997). Whatever the prevalence, the cost of undetected malingering to forensic psychiatric services in terms of money, time and energy commitment is likely to be substantial (Rogers, 1997). Undetected malingered mental illness is a concern for clinicians in forensic services (Broughton & Chesterman, 2001), and detection based on standard clinical interviews is likely to be insubstantial (Ziskin, 1984). According to the Adaptational Model of Malingering (Rogers, 1990a) the potential availability of external gains (e.g. exculpation from offences, sentence reduction) on the basis of severe mental illness motivates some individuals to feign or exaggerate (what they believe to be) the symptoms of severe mental illness.

The recognised paucity of clinical detection strategies and the impact of malingering on mental health service resources reinforces the importance of developing empirically driven methods for the assessment of malingered mental illness (Rogers, 1997). Yet, as acknowledged by Cornell and Hawk (1989), research efforts in the development of malingering sensitive instruments is hampered by the lack of an unequivocal "gold standard" of malingering. Just as no two patients with mental illness are the same, malingering styles vary enormously according to the idiosyncratic combinations of situational and personal variables in which they may be encountered (Rogers, 1990a). The symptoms that an individual feigns will depend principally on their understanding of their malingered condition. Malingered

presentations will vary according to the individual's experience, preparation and skill in assuming their malingered 'role' (Pankratz & Binder, 1997). The heterogeneity of malingering styles raises difficulties for detecting clinicians since, in the aim of standardisation, assessment methods should "invite" common profiles in malingerers. To minimise false positive identification, malingering detection methods must discriminate between true and malingered responding. A pivotal question therefore is – What symptoms do malingerers "evidence" that true patients do not?

Existing research in malingered mental illness, has almost exclusively examined this question in the area of malingered psychiatric (as opposed to cognitive) symptoms. Studies have typically adopted a "fully controlled" simulation design (Schretlen, 1988) to compare the responses of simulating malingerers of mental illness, criterion groups (genuine patients) and healthy controls. This methodological paradigm can provide preliminary base-rate information on true and 'malingered' performances on psychological tests (Schretlen, 1988). However, whilst determining that a test discriminates between simulators and true patients with mental illness is significant, generalisability to "real" malingerers is limited, and findings should be replicated with "real" malingerers. Undetected malingerers are unavailable to researchers, and test validation on groups "at-risk" of malingering offers superior external validity than the use of simulators alone (Rogers, 1990b). Individuals have been considered to be "at-risk" of malingering if scores on previously validated instruments have indicated malingering. For example in one of Miller's "known-groups" validations of the M-FAST (Miller, 2001), likelihood of true malingering of mental illness is established on the basis of scores on the SIRS (Rogers, Bagby & Dickens 1992). Whilst Rogers' stringent methodological criteria for validation of malingering detection strategies (1990b) require that adequately validated instruments demonstrate validity with

"known-groups", simulation paradigms are uniquely placed in their use in research into detection methods. It would be profligate to consider validating detection methods with (difficult to find and validate) "known-groups", without these methods having been developed within a simulation methodology.

The M Test (Baeber, Marston, Michelli & Mills, 1985) was the first attempt to develop a screening measure specifically to detect (simulated) malingered psychiatric symptoms, evidencing discriminability between genuine and feigned symptoms in schizophrenia. Simulating malingerers were found to endorse nonexistent and atypical symptoms that true patients did not (Baeber, Marson, Michelli & Mills, 1985). These findings have not however been replicated with suspected malingerers (Gillis, Rogers & Bagby, 1991), and malingering on the M Test may be significantly confounded with genuine functional impairment (Schretlen, 1992). Risk of false positive classification of genuine patients must be quantified and minimised in detection methods, though it is less of a concern in *screening* instruments, because clinicians are strongly recommended to obtain corroborating data (Miller, 2001).

Since severity of genuine mental illness might arguably reduce the reliability of self-report (Ben-Porath, Graham, Hall, Hirschman & Zaragoza, 1995) and increase the likely endorsement of 'unusual' experiences (Miller, 2001), tests measuring self-reported psychiatric symptoms are inevitably confounded with true symptomatology. It is advisable that detection methods be validated in (several) heterogeneous criterion groups, and that cut-off scores be generated, and adjusted in accordance with the clinical (malingering) base rates of the applicable context (Rogers, 1997). For example, classification cut-off scores developed using a sample of acutely unwell psychiatric patients cannot be reliably applied to the assessment of suspected

malingerers of mental illness in an outpatient setting, without adjustment according to base-rates.

The SIRS (Rogers, Bagby, Gillis, 1992) and the M-FAST (Miller, 2001) are the two most robustly validated screening instruments for malingered mental illness in clinical practice today. These structured interviews ask respondents to endorse or refute, rare, indiscriminant, improbable or obvious psychiatric symptoms. Since not all simulating or known malingerers are identifiable on these instruments, and the confound of true mental illness results in a certain probability of misclassifying some (perhaps the most unwell) true patients, classification should be corroborated with further evidence of malingering (Rogers, 1997, Miller, 2001). Classifications of malingered mental illness on the basis of psychiatric screening instruments such as the SIRS and the M-FAST can be incrementally validated with evidence of malingering on tests assessing in a distinct (i.e. performance based) domain (Rogers, 1997). Evidence of malingering on various instruments, across distinct domains, psychiatric but also additionally the cognitive, affords incremental validity to the likelihood of correctly classifying malingerers (Halligan, Bass & Oakley, 2003).

Cognitive neuropsychological tests offer objective information based on performance and behaviour distinct from that gathered on psychiatric malingering assessments (e.g. M-FAST). Instead of endorsing a constellation of symptoms that are 'suggested' by the interviewer (e.g. M-FAST, Miller 2001), cognitive tests require respondents to *perform and behave* the malingered profile they wish to portray. Producing convincing cognitive symptoms might require a different kind of knowledge and sophistication on the part of the malingerer, particularly since the cognitive profile of mental illness is less salient (i.e. visible) than overt psychiatric symptoms. Indeed the

potential malingerer might be less aware of cognitive symptoms in mental illness, and so less able to malinger them realistically.

Evidence exists that malingerers of mental illness feign cognitive impairment in the context of pseudoschizophrenic presentations, reporting being confused, and having difficulties with attention, concentration and memory (e.g. Clark, 1988). These reported cognitive difficulties can be operationalised, measured and thus validated with the use of neuropsychological tests. The likely veracity of these symptoms can be objectively tested with reference to empirically derived normative data on the performance patterns of genuine patients and malingerers. This performance data can be verified or falsified in a way that is free of the ultimate subjectivity of self-reported psychiatric symptoms (e.g. hallucinations and delusions), which cannot be scientifically examined in the same way (Popper, 1959). Also with cognitive performance-based tests, contextual influences (e.g. social desirability in the presence of an interviewer) can be limited, further augmenting the objectivity of responses.

Specific malingering tests developed to discriminate between genuine and feigned cognitive impairment in traumatic brain-injury (TBI), have been applied to the context of malingered mental illness with varying success (e.g. Back et al., 1996). Some memory-based tests that discriminate powerfully between genuine and feigned cognitive impairment in the brain-injury population, have been shown to confound problematically with psychiatrically based cognitive impairment (e.g. Hiscock Forced-choice Method, Back et al., 1996). Use of these tests then for the assessment of malingered mental illness would elevate the risk of false positive identification of true psychiatric patients as malingerers.

It is not surprising that manifestations of cognitive symptoms or impairment differ according to context and source (Boone et al., 2002). One would not expect patients with schizophrenia to perform similarly to patients with brain injury on tests of cognition. Normative performance data are not interchangeable, or instruments indiscriminately useful in the assessment of malingering across diagnoses. Although unsophisticated malingerers of mental illness might be expected to grossly exaggerate cognitive impairment on psychological tests, non-credible patients drawn from TBI and psychiatric settings have been shown to employ differing approaches in their fabrication of cognitive symptoms (Boone et al, 2002). Forensic and non-forensic patients suspected of malingering were found to produce qualitatively distinct errors on the Rey Dot Counting Test, underlying the importance of producing empirically derived normative data relevant to the population in which suspected malingering is being assessed (Boone et al, 2002). Bespoke cut-off scores, maximising sensitivity and specificity of malingering classification were generated in the above study, for each diagnostic context.

The Test of Memory Malingering (TOMM: Tombaugh, 1996), although developed and validated for the detection of malingered cognitive impairment in the context of TBI (Rees, Tombaugh, Gansler & Moczynski, 1998), has recently been applied to a forensic psychiatric setting (Weinborn, Orr, Woods, Conover & Feix, 2003). A "known-groups" design was used, in which forensic psychiatric patients were considered to be at higher risk of malingering cognitive impairment if their Competency to Stand Trial (CST) was under evaluation. Responses on the TOMM of "at risk" patients were compared with those of mentally ill forensic patients who were not suspected of malingering cognitive impairment (Weinborn, Orr, Woods, Conover & Feix, 2003). Findings supported the utility and predictive validity of the TOMM in

this population. Whilst this study illustrates a prevalence of malingered cognitive symptoms (specifically memory) in the context of mental illness, this sample was not suspected of malingering mental illness, but of malingering cognitive impairment in the context of being *genuinely* mentally ill. This distinction further supports the need to develop malingering tests (with context/diagnosis-specific norms and cut-off scores) that assess malingering across psychiatric and cognitive modalities. Specific context-led malingering assessment is advisable, since multifarious potential combinations of true and malingered performance exist within the same individual. For example, Person A might have genuine cognitive impairment (resulting from TBI) and be questionably malingering severe mental illness. An appropriately tailored malingering assessment might consist of a psychiatric screening assessment (e.g. the SIRS) followed by corroborative data evidencing malingered cognitive symptoms of mental illness (i.e. not resulting from TBI). On the other hand Person B might have a genuine mental illness (consistent onset, course etc.) and be suspected of malingering cognitive impairment in a litigating context. A malingering assessment in this scenario, must distinguish between genuine psychiatrically-based, and malingered cognitive impairment (TBI 'type').

So, severe mental illness manifests in cognitive symptoms in some patients, *and* individuals malingering mental illness might feign on tests of cognition, producing the cognitive profiles they perceive to be associated with their malingered condition. This group of malingerers perform distinctly from individuals malingering TBI (Boone et al., 2002) presumably because they associate mental illness and TBI with distinct cognitive deficits/performance. Research into malingered TBI detection has focused on the development of instruments that discriminate between true and feigned profiles, and viable assessment tools possess common qualities. For example, the

utility of the TOMM and its impressive cross-methods, cross-sample validation (Rees et al., 1998) is attributable to its face validity as a test of malingering (i.e. perceived difficulty exceeds actual difficulty) and to its insensitivity to true (TBI) pathology. The TOMM is also insensitive to demographic variables, educational level and to IQ (Rees et al., 1998). This information can be used to construct hypotheses about what paradigms of cognitive tasks and abilities might be usefully tested in the aim of developing a bespoke methodology for the assessment of malingered cognitive symptoms in severe mental illness. The pivotal inquiry in this endeavour then is: What aspects of cognition are unaffected in severe mental illness, but might be considered by the layman (i.e. potential malingerer) to be "distorted"?

Since detailed knowledge about genuine symptomatology is the clinician's greatest asset in recognising malingered profiles (Resnick, 1988), the cognitive profile of severe mental illness is considered. I will specifically consider schizophrenia in this context, since this is the most commonly malingered profile in a forensic psychiatric setting (Resnick, 1988). Primary abnormalities in schizophrenia are typically conceptualised in terms of positive symptoms, including derailment, tangentiality, incoherence, illogicality, circumstantiality, pressure and distractible speech (Andreasen, Arndt, Alliger, Miller & Flaum, 1995). Existing research suggests that a range of cognitive impairments are associated with these abnormalities, including deficits in attention, working memory, anterograde memory and executive functioning (Hogarty & Fletcher, 1992). Attention is of particular interest here since, *not only* does evidence exist that particular aspects of attention are comparatively preserved in schizophrenia (Anscombe, 1987), *but also*, tasks that operationalise these preserved abilities have been developed and researched in the cognitive (e.g. Sperling 1960), and cognitive developmental psychology literature (e.g. Treisman & Souther, 1985).

Attention can be divided into two sub-categories: preattentive (automatic), and selective (effortful). The literature on "preattentive processing" (Neisser, 1967) in schizophrenia is limited and equivocal, with some studies suggesting intactness (Schwartz & Winstead, 1985) and others impairment (Lubow, Kaplan, Abramovich, Rudnick & Laor, 2000). However, the *relative* preservation of preattentive compared with selective processing in schizophrenia is well documented (e.g. Anscombe 1987). This is not surprising, since preattentive processing is considered to be analogous to automatic reflexes, requiring no conscious input (i.e. only sensory) from the processor. Effortful processing however, requires directed and interpretive aspects of cognition, abnormalities of which are central to the schizophrenic process (Garety & Freeman, 1999).

The "pop-out effect" (Treisman & Souther, 1985) refers to the automatic way in which a target stimulus presented with homogenous distractors "pops-out", and can be identified without effortful (or serial) searching. The size of a pop-out effect, and so the automaticity (i.e. speed) with which a target can be identified in a field of distractors is dependent upon the size and nature of the feature whose presence, or absence denotes the distinction (Treisman & Gormican, 1988). Research using forced-choice paradigms in which targets differ from distractors on one dimension only (i.e. presence or absence of a feature) has evidenced a variety of parameters such as line orientation, colour, presence or absence of intersecting lines that can cause stimuli to "pop-out" (Treisman & Souther, 1985). An incomplete circle for example, has a *preattentively* detectable feature (i.e. a gap) that distinguishes it (almost immediately) from a group of intact circles, without any effort on the part of the processor. Furthermore, Treisman and Souther (1985) noted that search latencies for determining whether a pop-out target is present or absent do not increase linearly with

the amount of distractors. This fact demonstrates that pop-out qualities of the target stimulus make it difficult *not* to see it, and also that the automatic effortless processing of "pop-out" stimuli is difficult to interfere with and to over-ride. In other words, in a pop-out paradigm, one cannot help but see the popping-out stimulus. So, not only would individuals with normal functioning be expected to perform pop-out search tasks very quickly, they would also be expected to do so at a very low error rate (Treisman & Souther, 1985).

In the above example, where the pop-out feature (located in the target stimulus) is the gap in the circle, the processor preattentively determines the presence or absence of this feature. If however the pop-out feature were to be located in the distractors and the target stimulus was a unique complete circle, the pop-out effect would be lost. Effortful (reflected in higher response latencies) processing is required to identify the presence or absence of the new target, as it does not possess a pop-out feature. Not only would individuals be expected to perform more slowly on this task, but they may also be expected to make more errors (Treisman & Gromican, 1988).

The pop-out paradigm presents a unique opportunity to operationalise the measurement of a type of processing that is, if not completely spared in severe mental illness, is largely unaffected compared with higher forms of processing. It is further hypothesised that pop-out tasks might have face validity as malingering tests, as they appear illusorily difficult, since they are timed and require respondents to quickly identify *apparently subtle* visual differences (e.g. presence or absence of a *tiny* gap in *one* circle). Instructions given to respondents can be manipulated in order to enhance face validity (in malingerers) and perceived task difficulty.

The iconic memory construct (Sperling, 1960) potentially offers another cognitive paradigm in which genuine and malingered cognitive impairment in the context of severe mental illness may be discriminable. Individuals are able to recall a high rate of letters that have been displayed for almost imperceptible periods (e.g. 50-250 milliseconds, Sperling, 1960) if asked to do so without delay. Iconic memory is a preattentive function, and displayed letters remain in a fast-decaying store without being processed for a short period (Sperling, 1960). Due to the lack of effortful processing entailed in correct recollection of letters, processors are unaware that they have seen the letters, and perceive that they will be unable to recall them. This supports the hypothesis then, that iconic memory tasks might have face validity in the assessment of malingering. Research findings regarding the impact of severe mental illness on iconic memory is sparse, but since recalling items from the icon store does not require cognitive effort or direction, patients with mental illness might conceivably be successful on iconic memory tasks.

The iconic memory and pop-out paradigms allow for the calculation and computation of different error types such as "misses" (omissions) and false positives (commissions) which have been shown to be indicative of malingering-style in previous literature (e.g. Boone et al, 2000; Boone et al, 2002).

## OBJECTIVES OF THE PRESENT STUDY

The primary purpose of the present study was to preliminarily evaluate the predictive validity and clinical usefulness of a multi-modal (performance and interview-based) battery in the assessment of malingered cognitive symptoms in severe mental illness. Simulating malingerers of mental illness were expected to perform worse than true

patients on cognitive tests based on the pop-out and iconic memory paradigms, as tasks were anticipated to have face validity and to measure (preattentive) skills that are *relatively* preserved in severe mental illness, in comparison with more effortful cognitive processing. The test battery also incorporated the Cognitive Dysfunctions Questionnaire (CDQ), an interview-based measure of malingered cognitive symptoms developed (by Adrian Coxell) prior to this study. Again, simulating malingerers were expected to endorse a higher rate of malingered symptomatology on this task than true patients or healthy controls. The Rey Memory Test (with recognition component) and the M-FAST were also administered in order that simulated malingering could be externally validated, and also so that malingered profiles on the cognitive test battery could be compared with those on established indices of malingering.

# METHOD

## PARTICIPANTS

A 3-group simulation design was employed, comprising a psychiatric patient group, a healthy control group, and a psychiatric malingering group. The test battery was administered to 105 male participants in total, of which 35 were healthy controls, 35 were simulating malingerers, and 35 were psychiatric inpatients with a diagnosis of severe mental illness.[11] Procedures for participant recruitment and inclusion and exclusion criteria for each group are described below.

### Simulating Malingerer and Healthy Control Groups

Of the 70 healthy controls recruited through opportunity sampling, 35 were randomly assigned to the malingering group, and 35 to the healthy control group. Inclusion and exclusion criteria for these two groups were identical, and potential participants were asked not to take part if they:

1. Were not native English speakers
2. Had a history of severe mental illness (e.g. schizophrenia, bipolar disorder)
3. Had a learning disability
4. Had a history of dyslexia or other reading difficulty
5. Had ever sustained a serious head injury (more than 10 minutes unconscious)
6. Had a history of neurological disease (e.g. epilepsy)
7. Had a visual impairment that was not corrected by glasses or contact lenses

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[1] These group sizes were chosen on the basis that large effect sizes were expected, as demonstrated in the bulk of previous malingering research.

### True Patient Group

35 psychiatric inpatients formed the true patient group. Patients were asked not to participate if they:

1. Were not native English speakers
2. Did *not* have a diagnosis of severe mental illness (e.g. schizophrenia, bipolar disorder)
3. Had a learning disability
4. Had a history of dyslexia or other reading difficulty
5. Had ever sustained a serious head injury (more than 10 minutes unconscious)
6. Had a history of neurological disease (e.g. epilepsy)
7. Had a visual impairment that was not corrected by glasses or contact lenses
8. Were involved in any form of medico-legal proceedings (e.g. compensation seeking)

## RECRUITMENT PROCEDURES

### Healthy Control Group

Following the receipt of appropriate ethical approval (see Appendix 1) potential participants for the healthy control group were approached and given an information sheet about the study (Appendix 2). This informed them of the exclusion criteria for the study, the anonymity of their participation, and of their right to decline participation or to withdraw at any time, including after having given consent. They were informed that participation entailed the completion of a test battery comprising a variety of short tasks (pen-and paper and computer administered), and a number of questions about psychiatric symptoms, and that this would take about 60 minutes. Arrangements were made with participants who consented, to meet with them at a

convenient time to administer the test battery. The appropriate consent forms were completed and signed before participation commenced (Appendix 3).

**Simulating Malingering Group**

Following the receipt of appropriate ethical approval (see Appendix 1) potential participants for the malingering group were approached and given an information sheet about the study (Appendix 4). This information sheet was identical to that given to the healthy control group, except that it contained an additional clause as follows:

> *"About 15 minutes into these tasks you will be instructed to answer the questions in a particular way. You will not be told the details of this yet, as it is important that you answer questions at the beginning without being aware of the instructions that you will be given later".*

This was in order to be transparent with potential participants that they would be asked to "do something" over and above their normal performance during participation, and to thus ensure that they were providing *informed* consent. Elaboration of this clause was provided for any potential participants who asked questions. The author explained that participants would be asked to role-play a particular scenario, but that this would not involve them having to do anything that they might find aversive or embarrassing. As above, arrangements were made with participants who consented, to meet with them at a convenient time to administer the test battery. The appropriate consent forms were completed and signed before participation commenced (Appendix 3).

**True Patient Group**

Following the receipt of appropriate ethical approval (see Appendix 5), consultant psychiatrists were sent details of the study proposal and asked to provide the names of any male inpatients that might/might not be suitable to take part in the study. A stipulation within the ethical approval application had been that consultant psychiatrists would give consent for patients to be approached prior to the researcher approaching them. Only patients deemed suitable (or not unsuitable) and 'well enough' by their consultant psychiatrist were approached by the researcher and invited to take part.

Patients who were approached were given an information sheet about the study (Appendix 6). This informed the potential participant of the anonymity of their participation, and of what participation would entail. It also stated that the study, their decision to participate and their performance, was not related and would not relate to their treatment on the ward, and that their scores or answers would not be shown to their consultant or to other staff members. Arrangements were made with patients who agreed to take part to administer the test battery in a private room on the ward, and appropriate consent forms were completed before participation commenced (Appendix 7). A copy of the patient consent form was placed with the patient's medical notes according to policy.

Prior to being recruited no participants were informed that the study was about malingering, lest this influence their responding in any way. They were informed that the study was about "different symptoms people with and without mental illnesses might experience". On completion a debriefing was offered to participants who wanted to know more about the study, or to ask any questions.

## INSTRUMENTS/ TEST BATTERY

For the purposes of explication, the test battery is divided into two sections, Section A and Section B. This is an artificial separation for the purpose of describing the rationale behind experimental design and methodology employed, and does not relate to the way in which the battery was presented to participants. Section A, which was administered first, comprises tests that provide information about the true ability and true pathology of *all* participants (assuming honest and effortful responding). Section A then, was administered to the malingering group prior to their being instructed to malinger.

Section B comprises tests of malingered symptom reporting and test performance in the malingering group, and tests of true symptom reporting and test performance in the true patient and healthy control group. This arrangement of the test battery, and its inclusion of true and malingered ability scores for the malingering group, and measures of true cognitive and psychiatric status of the true patient group, adds weight to the meaning that can be drawn from results obtained. Any confound of true cognitive and psychiatric symptomatology on the tests of malingering can be directly measured, as can the performance modification of malingerers according to malingering instruction.

## TESTS OF TRUE ABILITY AND PATHOLOGY: Section A

Section A comprises the four tests that are outlined below. These were administered in the order in which they are presented.[2]

[2] Order of test administration was identical for all participants since rotation of order would have created problems in interpreting the nature of malingered responses.

### (1) The Weschler Test of Adult Reading (WTAR)

The WTAR (Weschler, 2001) comprises a list of 50 words which the participant is asked to pronounce out loud to the best of their ability. The WTAR is a test of premorbid IQ, which can be completed in approximately 2 minutes. Participants' correct scores out of 50 were computed, providing a rudimentary (raw score) measure of IQ. This would be used to investigate correlations with performance on indices of malingering.

### (2) The Camden Pictorial Recognition Memory Test (CPRMT)

The CPRMT (Warrington, 1988) is a forced-choice recognition memory test for pictorial material. Responders are shown 30 photographs at a rate of three seconds per photograph. They are then asked to identify each one when it is presented in a field with 2 distractors in the recognition phase of the task. This test has been demonstrated to be easy for various standardisation samples including persons with significant brain injury. A score out of 30 is computed, based on the number of photographs that are correctly identified.

### (3) Simple Reaction Time Task

A computer-administered test of reaction time was devised and programmed by Adrian Coxell. Participants were required to press (and release) the "enter" button on the keypad as quickly as they could after seeing a uniform stimuli (XXXX) appear on the screen. On pressing the button the screen would go blank, until the next stimulus was generated initiating the individual's next response. This task comprised 30 trials (following 2 sample items), and ended when the screen remained blank. The computer generated a single score of the mean reaction time (the time between the

stimulus appearing, and the participant reacting to it by pressing and releasing the enter button) for each participant.

### (4) Brief Symptom Inventory (BSI)

The BSI (Derogatis, 1993) is a 53-item self-report symptom inventory designed to reflect the psychological symptom patterns of psychiatric and medical patients as well as community non-patient responders. Each item on the BSI is rated on a 5-point scale of distress (0-4) ranging from "not at all"(0) to "extremely" (4). Instructions ask the participant to rate how much (if at all), they were distressed by each item over the last 7 days. Three global indices of psychiatric symptomatology (Global Symptom Index, Positive Symptoms Total, Positive Symptoms Distress Index) were scored for each participant according to the BSI manual.

### Malingering Instructions

Following the administration of Section A of the test battery, participants in the malingering group were given the following instructions:

*"As stated in the information sheet that you read before your participation began, I am now going to ask you to answer all of the remainder of the questions, and to perform on all subsequent tests in a particular way. I want you to respond to all subsequent tasks in a way that you believe that a person with a SERIOUS MENTAL ILLNESS would do so. You should try to portray having a serious mental illness in as realistic and convincing a manner as you can. Imagine that you are in a legal predicament (i.e. you have committed a serious offence) and you believe it is in your best interests to appear to be seriously mentally ill, and therefore "less responsible" or "not responsible" for what you have done. Perhaps for example, you want to appear to be "unfit to plead" at a criminal trial. I want you to answer all subsequent*

*questions about symptoms, and to perform all subsequent tasks in this role. The rest of this procedure should take approximately 25 minutes. I will be performing these tests on approximately 30 other people. The person whose scores on these tests best approximate those of true patients with serious mental illness, will be given a "prize" of £50. It is therefore in your interests to answer in as realistic and convincing a manner as possible. I will also take your details (which I will store in a confidential manner) for this purpose. I will not give you any further information at this stage about "serious mental illness", as I am interested in your perception of this, in regard to the answering of subsequent questions."*

## TESTS OF MALINGERED AND TRUE ABILITY AND PATHOLOGY: Section B

After the completion of tests comprising Section A and the administration of the above instructions to the malingering group, the following tests were completed by all participants, in the order in which they are described below.

### (5) Cognitive Dysfunctions Questionnaire (CDQ)

The CDQ is a questionnaire developed prior to this study by Adrian Coxell. It was developed through researching exceedingly rare cognitive symptoms associated with neurological and psychiatric complaints. The CDQ comprises 69 items (Appendix 8), including exceedingly rare symptoms (n=7), and nonexistent (i.e. malingered) symptoms (n=22). The remaining items are neutral items intended to furnish the CDQ with face validity as a test of malingering. The opening statement of the CDQ (See Appendix 8) introduces the idea that mental illnesses are sometimes associated with unusual and distressing experiences, which is intended to suggest the possibility

of some of the "malingered" items. The CDQ is administered in the form of an interview and participants are asked to respond "yes", "no", or "not sure" according to whether they have experienced each of the 69 "unusual experiences" during the three months prior to testing. After the participant has been asked about each of the 69 items, they are asked to rate the frequency and level of distress associated with each endorsed item, including those to which they have answered "not sure". Response options range from (1) "once only", through (6) "all of the time" for frequency ratings, and from (1) "not at all", through (5) "severely distressing" for level of distress ratings.

Four scores were derived using the malingered and rare symptoms items only (n=29) for each participant as follows:

(i) Total rare and malingered symptoms score (Participants scored (2) for definite affirmative responses, and (1) for "not sure") (Range - 29 x 2 =58)

(ii) Total rating of frequency of occurrence of malingered and rare symptoms (Range - 29 x 6 = 174)

(iii) Total rating of distress caused by symptoms (Range - 29 x 5 = 145)

(iv) CDQ total score based on formula below

| Symptoms reported score X (Total frequency X Total distress) |
|---|

Scores derived from the above formula were divided by 1000 and then rounded to obtain a final CDQ TOTAL SCORE.

A multiplicative formula was used here, in order that the total CDQ scores of malingerers, who might not only endorse nonexistent symptoms but might also endorse high frequency and high associated distress levels, would be amplified

commensurately with this "triple" exaggeration/feigning. This formula then, potentiates maximal discrimination between simulating malingerers and the other two groups, if as hypothesised they malinger on each component index of the total CDQ score.

### (6) Miller Forensic Assessment of Symptoms Test (M-FAST)

The M-FAST (Miller, 2000) is a 25-item forced choice structured interview designed to screen for malingered psychiatric illness. Administration takes approximately 10 minutes, and responders are asked about whether they experience particular 'symptoms' that true psychiatric patients are known *not* to endorse. A total score is computed for each participant indicating how many 'malingered' items they endorsed. A cut-off score of 6 or above is highly indicative of malingering in clinical settings (Miller, 2001). Presenting this 'gold standard' malingering instrument to all participants validated the malingering status of the simulating group, and the honest-responding status of the true patient and healthy control groups.

### (7) Iconic Memory Task

A computer-administered task based on the iconic memory paradigm (Sperling, 1960) was devised and programmed by Adrian Coxell.[3] Following several sample items, 20 trials of 8 letters (2 rows of 4) were presented on the computer for duration of 1.5 seconds each. As the letters disappeared the researcher pronounced the command either "top" or "bottom", and participants named as many letters (if any), that they could remember from the row corresponding to the command. This was not a timed task, and each new set of letters was generated through the keypad by the researcher,

[3] This task was based on the iconic memory paradigm and was not intended to measure true iconic memory. The task was modified (i.e. decreasing exposure times) in order to provide face validity as a malingering task.

following an individual's answers to the previous item. The task was presented to participants as a "task of memory and attention" and the researcher stressed the brevity of the duration for which letters would appear on the screen (in order to reinforce the expected perception that the task was very difficult). (See Appendix 9 for verbatim instructions read to each participant).

Following the initial 20 trials at 1.5 seconds duration, a further 20 trials were presented at 0.75 seconds duration each, followed by a further 20 trials at 0.375 seconds duration each. Each change in duration was preceded by a break in the procedure for a couple of seconds and participants were reminded that presentation would now "get faster". Again this was intended to enhance the (inaccurate) perception of increasing task difficulty. The researcher recorded participants' exact responses to each of the 60 (20x3) trials. Responses were then marked, and the number of correct responses (0-80) and false positive responses (0-80) for each duration period were recorded for each participant.

**(8) Pop-out Task**

Computer-administered tasks based on the pop-out paradigm (Treisman & Souther, 1985) were devised and programmed by Adrian Coxell (See Appendix 10 for verbatim instructions read to each participant). These consisted of 2 distinct tasks, with 2 conditions in each as follows:

Task A – Determination of presence or absence of a full circle target

Participants were required to specify for each of 60 trials, consisting of patterns of randomly computer-generated circles, whether the circles were "all the same" or "one different". The computer had been programmed to randomly generate patterns of

circles, some of which were all closed and fully round ("all the same"), and some of which had one circle that was not fully complete, but the same size as the others, resembling a capital letter 'C'. If present the location of the "different" circle in the field of distractors was randomly varied, and equal amounts of trials in each condition were presented. Half of the trials in each condition consisted of 12 stimuli in total, and the other half of 18 stimuli in total. Participants were instructed to respond as quickly and as accurately as possible, and were informed that each response would initiate the next trial. In this way they could not go back to a trial, and were instructed to move on if they made a mistake.

Participants responded by pressing the '1' button on the keypad if, on scanning the trial, they thought that the circles were "all the same", and the '+/=' button if they saw "one different". The buttons were labelled with coloured stickers marked 'S' (same) and 'D' (different) respectively, and sample trials were administered for each condition prior to commencing. The computer generated error scores for each of the following conditions for each participant:

i. Errors (out of 20) when target was present with 11 distractors

ii. Errors (out of 20) when target was present with 17 distractors

iii. Errors (out of 20) when target was absent (12 stimuli)

iv. Errors (out of 20) when target was absent (18 stimuli)

(i) and (ii) are errors of an omission type (denying the stimulus) and (iii) and (iv) are errors of a commission type (false positive error). The computer also generated mean correct response latency times for each condition.[4]

[4] Due to a computer error response latencies were not recorded as expected. Repeated measures analyses to test for hypothesised slowing of responses with increased distractors in the malingering group could therefore not be performed. Error scores for the 12 and 18 stimuli presentations are conflated into a single score in the results section.

Task B – Determination of presence or absence of incomplete circle target

The format of the above task was repeated but this time with the features of the stimuli reversed. In the "all the same" condition this time, all of the circles were incomplete and resembled the capital 'C' described above. In the "one different" condition on this occasion, participants would see a complete round circle in a field of 'Cs'. Demonstrations of each condition were given prior to commencement. The computer generated error scores for the following conditions:

v. Errors (out of 20) when target was present with 11 distractors

vi. Errors (out of 20) when target was present with 17 distractors

vii. Errors (out of 20) when target was absent (12 stimuli)

viii. Errors (out of 20) when target was absent (18 stimuli)

(v) and (vi) are errors of an omission type (denying the stimulus) and (vii) and (viii) are errors of a commission type (false positive error). The computer also generated mean correct response latency times for each condition.

## 9 The Rey Memory Test

The Rey 15-item memory test (Lezak, 1995) was administered along with the recognition component developed by Boone, Salazar, Lu, Warner-Chacon and Razani (2002). Participants are shown a piece of paper with 15 over-learned stimuli (123, abc etc.) on it and instructed to learn and remember as many symbols as they can during a 10-second exposure. Instructions are intended to emphasise the *apparently* large amount of items to be learned in a short time-period, but in fact this is a very easy test. The stimulus is then removed, and they are asked to write down as many of the 15 items that they can remember. Following this part of the task participants are given a sheet of paper with 30 stimuli on it, and are asked to circle as many of the 15

items that they had previously been shown as they can remember. Each participant's recall, recognition, and combination score[5] was recorded.

Following the administration of the test battery, participants were thanked for their participation and any questions they had were answered. Each participant's age, ethnicity and test scores were entered into a database created in SPSS. All raw data, consent forms and electronic data were kept in accordance with stipulated ethics, and data protection protocols.

[5] This combination score is derived from the following formula: Combination Score = Recall correct + (Recognition Correct – False Positives).

# RESULTS SECTION

## OVERVIEW

In Part I of the results section I will present the results and group differences for the demographic characteristics, measures of true ability and pathology, and the measures comprising the Malingered Cognitive Symptoms Test Battery (MCSTB) for the three participant groups. Differences in group means were examined using ANOVA. If the homogeneity of variance assumption was violated (significant Levene's test finding), group differences were examined using the Kruskal-Wallis procedure. Where ANOVA was appropriate, the significance levels for post-hoc tests were based on the Bonferroni test. Where ANOVA was inappropriate, Dunnett's C test (which does not assume homogeneity of variance) was applied after first checking for a significant overall effect using the Kruskal-Wallis test.

In Part II of the results section, scores on the measures comprising the MCSTB (n=6) were converted into stanine scores from which a single composite (mean stanine) score was derived for each participant. A Receiver Operator Characteristics (ROC) curve analysis was performed on the composite scores of the true patients and simulating malingerers, in order to examine the power of this index in discriminating between the two groups. This ROC curve analysis of composite scores was compared with that of true patients' and malingerers' scores on the M-FAST and on the RMT, since these are established tests of malingering. Optimal cut-off scores for the MCSTB are presented and classifications of *true patients and malingerers* on the basis of this instrument are presented and compared with known group status. Classifications based on the composite scores are compared with classifications based on the M-FAST and RMT scores for the two groups.

The confound between true pathology and ability and malingering indices used in this study, is explored in Part III of the results section. Correlations between educational level, true ability and true pathology, and composite (and component) MCSTB scores are presented for the true patient group. Correlations between the M-FAST scores and true ability, pathology and education for the true patient group, are also presented.

# RESULTS (PART I)

## DEMOGRAPHICS

The demographic characteristics of the true patient, healthy control and simulating malingerer groups are presented in Table 1. Data are presented either as the mean (with the standard deviation in parentheses), or as the number of participants (with the percentage of group total in parentheses). For the education variable, participants were scored according to their highest reported level of educational attainment (less than O'Levels (1), O'Levels (2), A'Levels (3), degree Level (4)). Education was treated as a continuous variable, and means and standard deviations derived.

Table 1: Demographic characteristics of the Healthy Control, True Patient and Simulating Malingerer Groups

| Variable | Healthy Controls | True Patients | Simulating Malingerers |
|---|---|---|---|
| Age | 34.29 (12.56) | 39.89 (11.06) | 34.06 (8.10) |
| Education | 3.31 (1.02) | 2.06 (1.06) | 3.6 (0.70) |
| Employment | | | |
| Manual | 8 (22.9%) | 23 (65.7%) | 6 (17.1%) |
| Professional | 27 (77.1%) | 6 (17.1%) | 29 (82.9%) |
| Never Employed | 0 | 6 (17.1%) | 0 |
| Ethnic Status | | | |
| White | 32 (91.4%) | 18 (51.4%) | 31 (88.6%) |
| Non-white | 3 (8.6%) | 17 (48.6%) | 4 (11.4%) |

An overall significant difference in age was found across the three groups ($F_{2,102}$ = 3.31, $p < 0.05$). However, post-hoc analyses did not reveal any significant difference in age between any group pair.

An overall significant difference in education was found across the three groups ($F_{2,102}$ = 26.78, $p < 0.01$). The Levene test found however that the homogeneity of variance of educational attainment scores differed significantly between groups. Therefore group differences were also assessed using a non-parametric test. The Kruskal-Wallis test found a highly significant difference between the three groups ($\chi^2(2)=35.10$, $p=<0.01$).

Post hoc test of group differences found that educational attainment was significantly lower in the patient group than in the healthy control group ($p<0.01$), and the malingering group ($p <0.01$).

There was a significant association between group membership and previous employment type ($\chi^2(2) = 44.97$, $p=<0.001$).

There was a significant association between group membership and ethnic background (white/non-white) ($\chi^2(2) = 19.8$, $p=<0.01$).

## ASSESSMENT OF TRUE ABILITY

Scores and group differences on tests of true ability are summarised in Table 2.

Table 2: Group means (SDs) and significance levels for tests of estimated IQ, pictorial memory and simple reaction time

| | Healthy Controls | True Patients | Simulating Malingerers | Sig. | Group differences |
|---|---|---|---|---|---|
| WTAR (raw score) | 39.4 (8.3) | 32.8 (12) | 43.3 (6.1) | $\chi^2(2) = 17.12$, ** | TP < HC*; TP < SM**; HC < SM * |
| CPMT | 29.5 (0.9) | 27.6 (2.7) | 28.7 (3.4) | $F_{2,102} = 4.96$ ** | TP < HC** |
| RT | 0.3 (0.06) | 0.59 (0.4) | 0.3 (0.06) | $\chi^2(2) = 26.78$, ** | TP > HC**; TP > SM** |

*p < 0.01; ** p < 0.001

WTAR raw scores differed significantly between groups. Post-hoc analyses found that scores on the WTAR were significantly lower in the patient group than in the healthy control ($p<0.01$) and the malingering group ($p<0.001$). Healthy controls also had significantly lower WTAR scores than the simulating malingering group ($p<0.01$).

Reaction Time scores differed significantly between groups. As predicted, a priori tests found that true patients had significantly slower reaction times than healthy controls ($p<0.001$) and simulating malingerers ($p<0.001$). Reaction Time and WTAR scores were significantly negatively correlated ($r = - 0.199$, $p = <0.05$).

Scores on the Camden Pictorial Memory Test differed significantly between groups. Post-hoc analyses found that scores for the patient group were significantly lower than those for the healthy control group ($p<0.001$). Mean CPMT scores were comparable with those of patients[1] (TBI) and healthy controls provided in the test manual.

## ASSESSMENT OF TRUE PATHOLOGY

### Brief Symptom Inventory (BSI) Scores

Mean (SD) scores for the Global Severity Index (GSI), the Positive Symptoms Total (PST) and the Positive Symptom Distress Index (PSDI) of the BSI are presented in Table 3. Group differences in index scores were analysed using ANOVA. However the Levene statistic was significant in each case, so the Kruskal-Wallis test was also performed.

Table 3: Group means (SDs) and significance levels for the BSI primary symptom dimensions and global indices for each participant group

| Variable | Healthy Controls | True Patients | Simulating Malingerers | Sig. | Group differences |
|---|---|---|---|---|---|
| Global Severity Index (GSI) | 0.34 (0.24) | 1.12 (0.78) | 0.45 (0.43) | $\chi^2(2) = 21.99$ *** | TP > HC***; TP > SM*** |
| Positive Symptom Total | 13.8 (8.6) | 25.34 (13.89) | 14.86 (9.43) | $\chi^2(2) = 13.94$ *** | TP > HC***; TP > SM*** |
| Positive Symptom Distress Index (PSDI) | 0.33 (0.22) | 2.01 (0.80) | 0.43 (0.40) | $\chi^2(2) = 21.28$ *** | TP > HC***; TP > SM*** |

**p < 0.01; *** p < 0.001

[1] Our sample – 27.6 (27), CPMT Manual norms 28.1 (2.7), and 29.1 (1.3)

As predicted, a priori tests found significantly greater scores on *each* global index score for the true patient group than for the healthy control and the malingering groups. No significant group differences were found between the healthy controls and the malingerers on any of the three global index scores.

Mean and standard deviation scores for the 3 global indices in the true patient group were comparable with male adult psychiatric inpatient normative data provided in the BSI test manual. PST[3] and GSI[4] scores were marginally higher in the present sample, and PSDI[5] marginally lower than those in the normative sample (n=158).

Mean and standard deviation scores for the 3 global indices in the non-patient groups were also comparative to those comprising the normative (male non-patient) data in the BSI manual. In the present sample marginally higher GSI and PST scores, and marginally lower PSDI scores were found, compared with the normative sample (n= 361).

## ASSESSMENT OF MALINGERED SYMPTOMATOLOGY

### (1) Cognitive Dysfunctions Questionnaire (CDQ) Scores

4 CDQ indices based on rare (n=7) and 'malingered' (n=22) items endorsed, reported frequency of occurrence, reported associated distress and total CDQ score (see Table 4 for formula), were calculated for each participant. Group differences were examined using ANOVA followed by Kruskal-Wallis tests, since scores were not

[3] Present sample 25.34 (13.89), BSI Manual 24.44 (14.20)

[4] Present sample 1.12 (0.78), BSI Manual 0.97 (0.78)

[5] Present sample 1.04 (0.72), BSI Manual 1.86 (0.74)

homogenous in variance across the three groups in the case of each index. Mean (SD) scores are summarised in Table 4.

Table 4: Means (SD) and group differences for 4 CDQ score indices

| Score Index | Healthy Controls | True Patients | Simulating Malingerers | Sig. | Group differences |
|---|---|---|---|---|---|
| Reporting of rare and malingered symptoms (S) | 3.71 (7.77) | 8.17 (8.25) | 23.02 (12.45) | $\chi^2(2) = 46.74$ *** | SM > HC***; SM > TP***; TP > HC* |
| Total frequency of endorsed symptoms (F) | 3.97 (8.46) | 12.08 (14.71) | 34.86 (21.04) | $\chi^2(2) = 51.11$ *** | SM > HC***; SM > TP***; TP > HC** |
| Total distress from symptoms (D) | 3.91 (10.99) | 10.94 (16.25) | 37.26 (23.14) | $\chi^2(2) = 51.88$ *** | SM >HC***; SM > TP***; TP >HC* |
| TOTAL CDQ $\frac{(S) \times (F \times D)}{1000}$ | 3.2 (14.29) | 9.97 (40.69) | 57.65 (85.15) | $\chi^2(2) = 46.96$ *** | SM >HC***; SM > TP** |

*p < 0.05; ** p < 0.01; *** p < 0.001

As predicted a priori tests found that simulating malingerers endorsed significantly more rare and 'malingered' symptoms than patients and healthy controls. As also predicted, malingerers reported significantly higher frequencies of endorsed symptoms, and significantly greater associated distress.

Contrary to prediction, a priori tests found that true patients endorsed significantly more rare and malingered symptoms, and also reported higher frequencies and associated distress, than healthy controls. Total CDQ scores however, did not differ significantly between the two groups.

### (2) Miller Forensic Assessment of Symptoms (M-FAST) Scores

A summary of mean (SD) M-FAST scores and group differences is presented in Table 5. ANOVA found a significant overall group difference in M-FAST scores. The Levene test however was significant so a Kruskal –Wallis test was also performed.

As predicted, a priori tests of group differences found that malingerers had significantly higher M-FAST scores than true patients ($p<0.001$) and healthy controls ($p<0.001$). Further, as predicted, true patients had significantly higher scores than healthy controls ($p<0.001$).

Table 5: Means (SDs) and group differences in M-FAST scores for true patients, healthy controls and simulating malingerers

| | Healthy Controls | True Patients | Simulating Malingerers | Sig. | Group differences |
|---|---|---|---|---|---|
| MFAST | 0.17 | 2.17 | 9.94 | $\chi^2(2) =$ | SM > TP***; |
| | (0.45) | (2.94) | (4.49) | 70.3 *** | SM > HC***; |
| | | | | | TP > HC*** |

*** p < 0.001, ** p < 0.01

Mean (SD) M-FAST scores for the malingering group in the present sample were lower than the normative scores provided in the M-FAST manual for simulating malingerers (16.0 (0.81)). Mean (SD) M-FAST scores for the present true patient sample were comparable to those provided in the M-FAST manual, which ranged from 0.81 (1.12) to 2.60 (1.43) across various validation studies.

### (3) Iconic Memory Task Scores

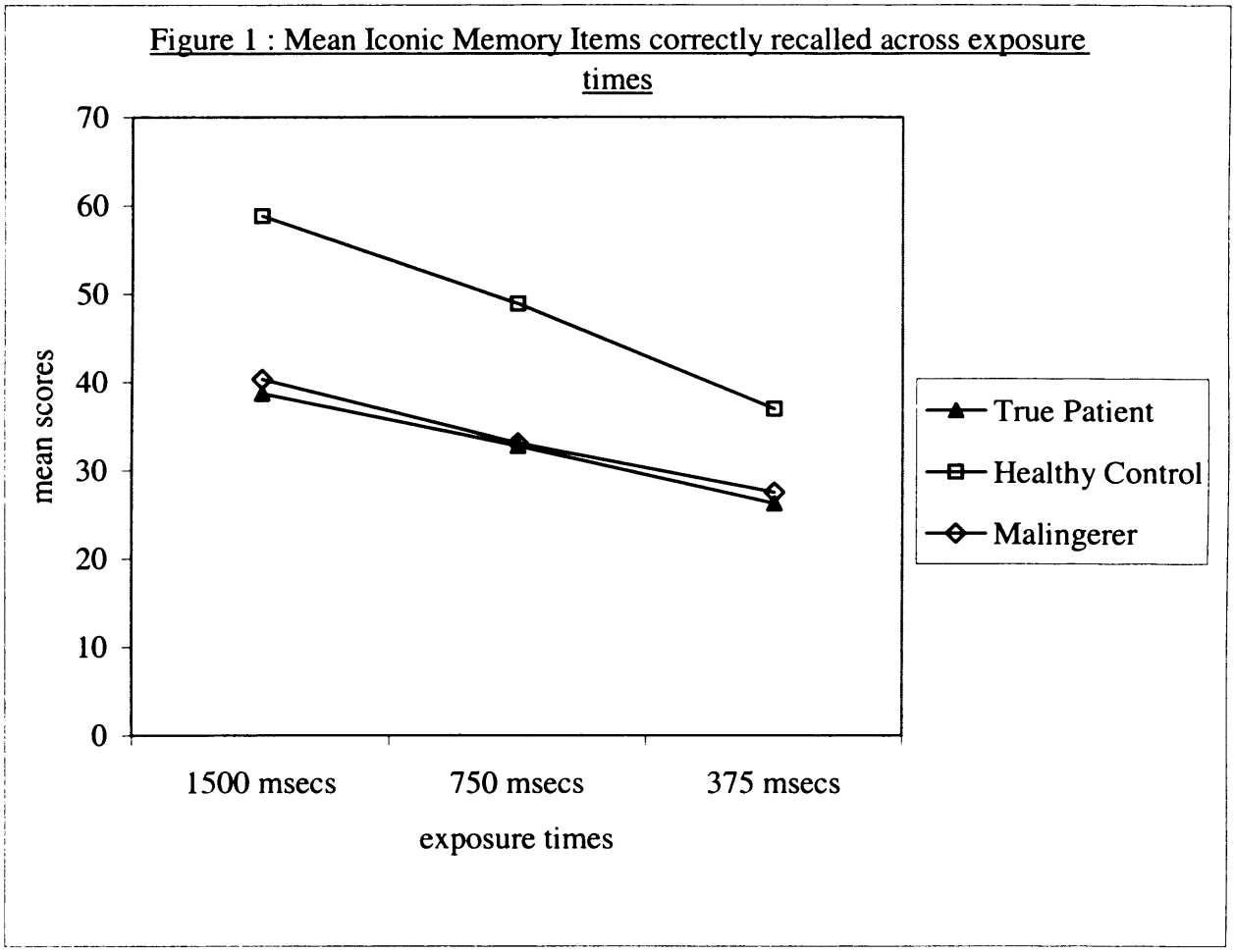
A between (group) and one within (display exposure time) ANOVA analysis was conducted on scores for the number of items correctly recalled, and for the number of false positive letters errors made by participants.

Items correctly recalled

Figure 1 shows the mean iconic memory items correctly recalled by each participant group across the 3 exposure times. There was a significant main effect of group ($F_{2,102}$ = 15.8, p<0.001) and of display exposure time ($F_{2,204}$ = 123.7, p<0.001). The interaction between group and display exposure time was also significant ($F_{2,102}$ = 7.94, p <0.001).

Planned comparisons found a significant difference between recall scores for the 1500msec display time and the 375msec display time condition ($p<0.001$), but a non-significant difference between the 750 and 375msec display time condition. Post-hoc tests found that recall scores for the healthy controls differed significantly to those of true patients ($p<0.001$), and also to those of malingerers ($p <0.001$). There were no other significant differences.

Figure 1 : Mean Iconic Memory Items correctly recalled across exposure times

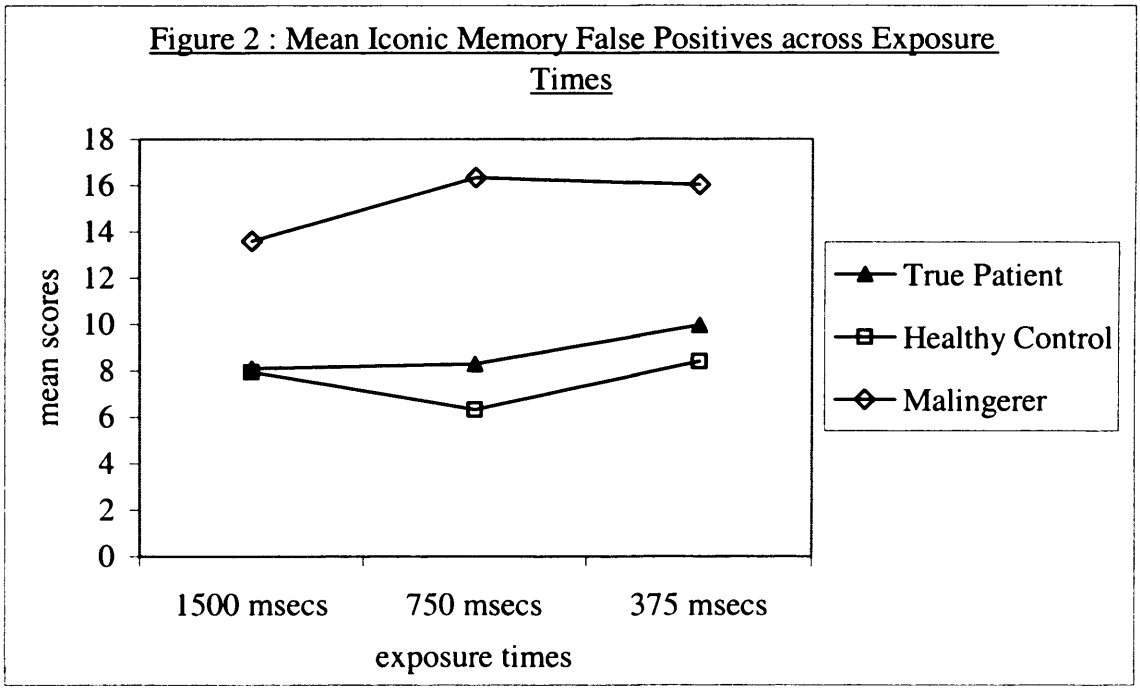



False positives

Figure 2 shows the mean iconic memory false positive scores across the 3 exposure times for patients, healthy controls and simulating malingerers. There was a significant main effect of group ($F_{2,102} = 4.9$, $p < 0.01$). The effect of display exposure

time was marginally significant ($F_{2,204} = 2.9$, $p < 0.06$). The interaction between groups and display exposure time was also marginally significant ($F_{2,102} = 2.2$, $p<0.08$).

Planned comparisons found a significant difference between recall scores for the 1500msec display time and the 375msec display time condition ($p < 0.005$), and a non-significant difference between the 750 and 375msec display time condition ($p = 0.015$). Post-hoc analyses revealed a significant difference between false positive scores for malingerers and true patients ($p = 0.02$), and between malingerers and healthy controls ($p<0.005$). Differences between healthy control and true patient scores were not significant.




### (4) Pop-out Task Scores

Analysis before the use of multivariate statistical testing revealed that error scores on the pop-out tasks were not suitable for multivariate testing even after data transformation (square root, $\log_{10}$). Therefore it was decided to analyse the data with respect to omission ('misses') and commission ('false positives') errors for each of

the Treisman tasks (pop-out and non-popout). [4]Error scores for the 12 and 18 distractor conditions were added together for each condition, to derive a single score.

Table 6 shows a summary of the data from nonparametric analyses of two types of error scores for each group across the 2 (pop-out/non-pop-out) tasks. In all conditions mean scores for the malingerers are significantly greater than for healthy controls ($p<0.001$) or true patients ($p<0.001$).

Table 6: Means (SD) and group differences for omission and commission error scores in each pop-out and non-popout task condition

| Test Condition | Healthy Controls | True Patients | Simulating Malingerers | Sig. | Group differences |
|---|---|---|---|---|---|
| Pop-out Omissions | 2.8 (2.7) | 5.8 (4.2) | 13.9 (8.7) | $\chi^2(2) =$ 36.2 *** | SM > HC***; SM > TP***; TP > HC*** |
| Pop-out Commissions | 0.3 (0.6) | 1.4 (2.3) | 11.3 (8.8) | $\chi^2(2) =$ 56.6 *** | SM > HC***; SM > TP***; TP > HC** |
| Non-popout Omissions | 4.4 (4.1) | 6.6 (5.4) | 15.3 (7.0) | $\chi^2(2) =$ 41.4 *** | SM >HC***; SM > TP*** |

[4] Due to a computer error response latencies (intended to explore any differences between malingered and true patient response time ratios between 12 and 18 stimuli conditions), were not recorded. Therefore there was no merit in distinguishing between these two conditions, and error rates on each were conflated to derive a single error score for each pop-out/ non-popout condition.

| | | | | | |
|---|---|---|---|---|---|
| Non-popout Commissions | 1.2 (2.2) | 2.2 (3.4) | 11.4 (8.0) | $\chi^2(2)$ = 42.5 *** | SM >HC***; SM > TP*** |
| Total Omissions | 7.2 (6.3) | 12.5 (8.5) | 29.2 (14.4) | $\chi^2(2)$ = 42.9 *** | SM >HC***; SM > TP*** |
| Total Commissions | 1.4 (2.3) | 3.6 (4.6) | 22.6 (15.9) | $\chi^2(2)$ = 53.2 *** | SM >HC***; SM > TP***; TP>HC* |

*p < 0.05; ** p < 0.01; *** p < 0.001

As can be seen in Table 6, group means for omission error are greater than group means for commission errors. The Wilcoxon Signed Ranks procedure found that the difference between total omission and total commission error scores was highly significant (z = -6.884, p=<0.001).

### (5) Rey Memory Test (RMT) Scores

Mean scores for the recall and recognition memory tasks for the three groups are presented in Figure 3.

Recall Scores

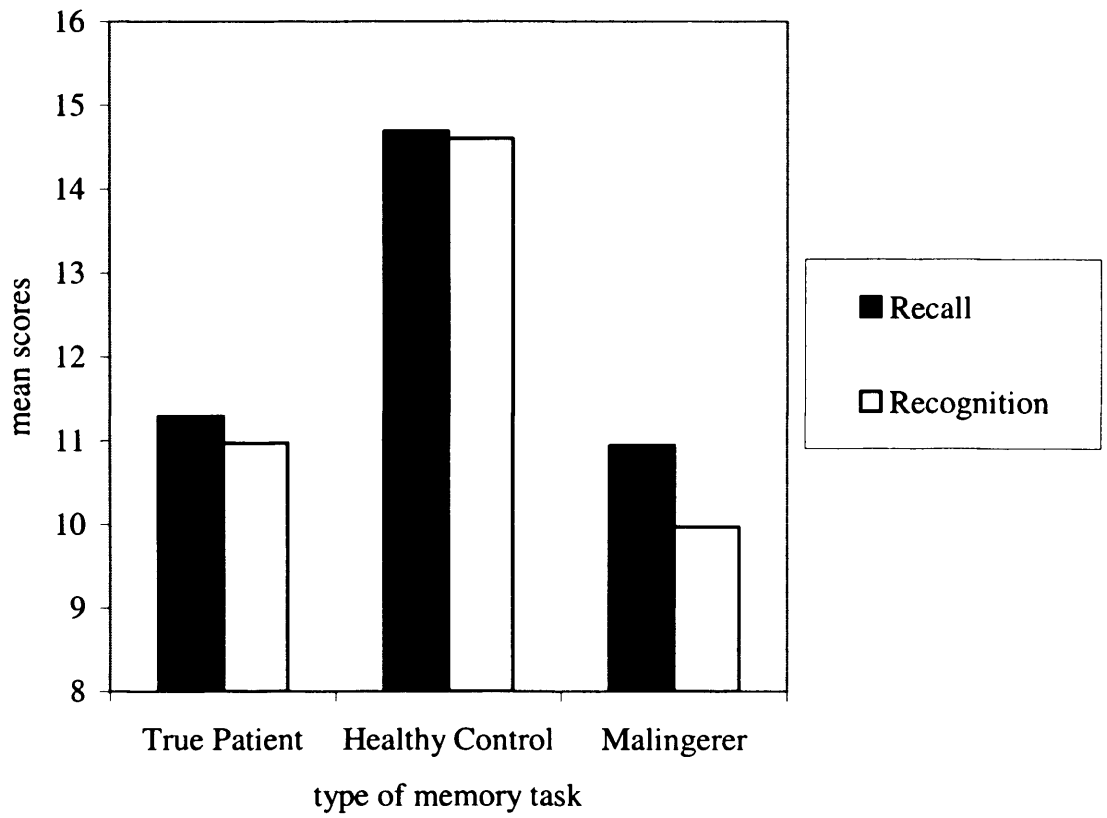
Significant group differences in recall scores were found using ANOVA ($F_{2,102}$ = 14.74, p<0.001). The Levene statistic was significant so a Kruskal-Wallis test was also performed ($\chi^2(2)$ =30.516, p=<0.001). As predicted a priori tests (unequal variances assumed) found that healthy controls recalled significantly more items than

true patients ($p<0.001$) and simulating malingerers ($p<0.001$). Contrary to prediction a priori tests found no significant differences between the amount of items recalled by true patients and simulating malingerers.

Recognition Scores

Significant group differences in recognition scores were found using ANOVA ($F_{2,102} = 18.9$, $p<0.001$). The Levene statistic was significant so a Kruskal-Wallis test was also performed ($\chi^2(2) = 37.305$, $p=<0.001$). As predicted a priori tests (unequal variances assumed) found that healthy controls correctly recognised significantly more items than simulating malingerers ($p<0.001$). A priori tests also found that healthy controls recognised significantly more symbols than true patients ($p<0.001$). Contrary to prediction a priori tests found no significant differences between the amount of items recognised by true patients and simulating malingerers.

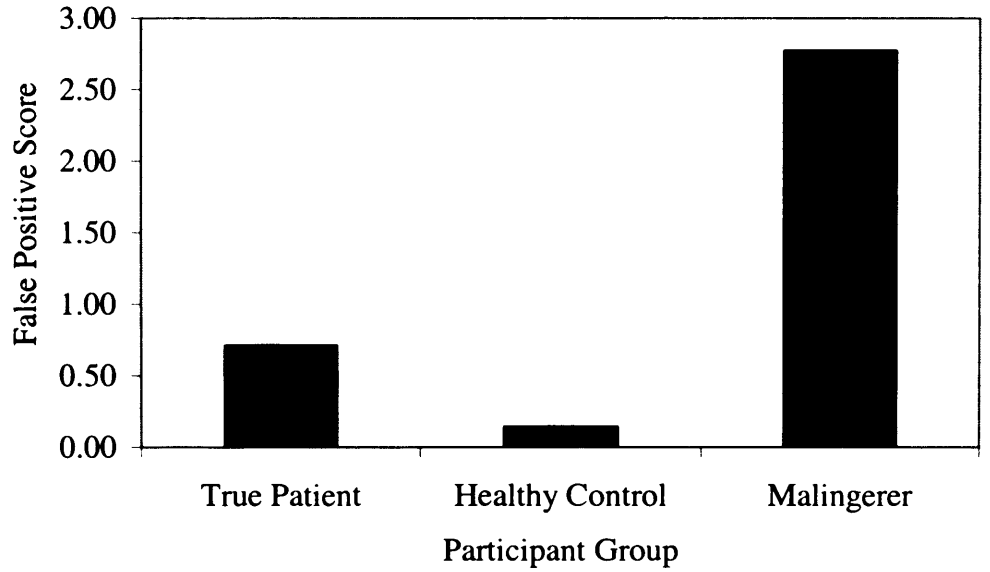
Figure 3 : Mean Recall and Recognition Scores for Rey Memory Test




**False Positive Scores**

Mean false positives errors on the recognition task of the RMT are shown in figure 4. False positive scores were found to differ significantly between groups using the Kruskal-Wallis procedure ($\chi^2$, *2d.f.* = 27.3, p= < 0.001). As predicted, a priori tests (unequal variances assumed) found that simulating malingerers committed significantly more false positive errors than did the true patients (p=0.001) and healthy controls (p<0.001). True patients committed significantly more false positive errors than healthy controls (p=0.02).

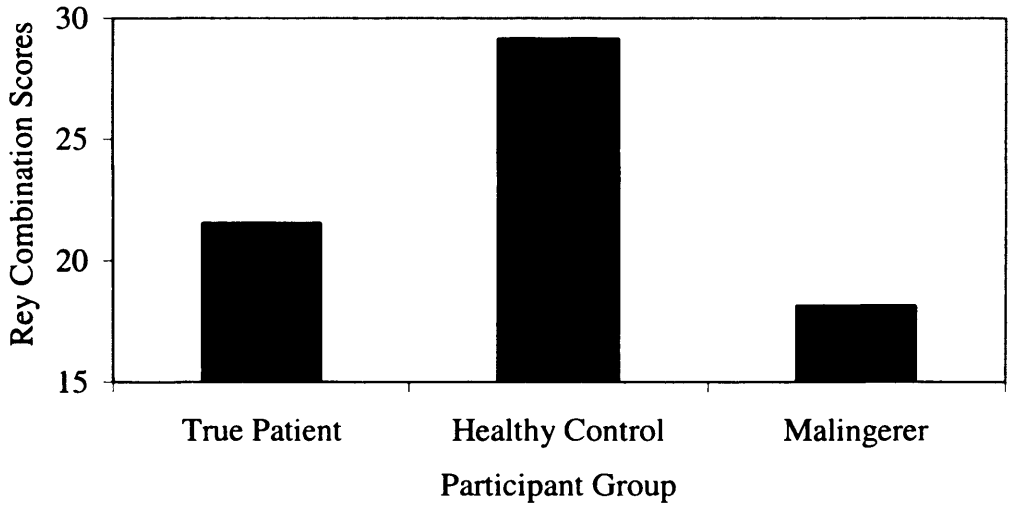
Figure 4 : Mean False Positives for Rey Memory Test (Recognition)




**Rey Combination Scores**

Mean Combination scores for the RMT for the three groups are presented in Figure 5. An overall significant difference in Rey Combination scores was found between groups ($F_{2,102} = 25.62$, $p = <0.001$). Homogeneity of variance differed significantly between groups so a Kruskal-Wallis test was performed and found to be highly significant ($\chi^2(2)= 46.46$, $p = < 0.001$). As predicted, a priori tests of group differences (unequal variances assumed) found that healthy controls scored significantly higher than true patients ($p<0.001$), and than malingerers ($p< 0.001$). Contrary to prediction, differences in scores between true patients and simulating malingerers were not significant ($p=0.08$).

Figure 5 : Mean Recognition/Recall Combination Scores for Rey Memory Test



# RESULTS SECTION (PART II)

In Part II of the results section stanine scores for each component of the MCSTB (n=6) are combined and averaged (mean) in order to generate a single composite score. Receiver Operator Characteristics (ROC) Curve analyses are performed on true patient and simulating malingerer composite scores, in order to generate cut-off scores that maximise specificity and sensitivity of malingering classifications. ROC curve analyses are also performed on true patient and malingerer scores on the established tests of malingering namely the M-FAST and the RMT. Classifications of true patients and malingerers in this sample on the basis of the composite MCSTB scores is presented and compared with classifications according to the M-FAST (using recommended cut-off) scores.

The following scores for each participant were used in generating composite MCSTB scores:

- Treisman total omission error score
- Treisman total commission error score
- Iconic memory total items recalled score
- Iconic memory total false positive score
- Rey Combination score
- CDQ total score

Scores obtained on each of these variables were transformed into stanine scores such that the higher the stanine score, the worse the test performance / more symptom and symptom frequency / distress caused by the symptom reporting. Stanine scores were generated using established criteria by converting individual raw scores (on each

variable) into percentiles and then allocating a stanine score (range 1-9) depending on where in the percentile range individual scores are located as follows:

| Percentile Range | Stanine Score |
|---|---|
| 0 – 4 | 1 |
| 5 – 11 | 2 |
| 12 – 23 | 3 |
| 24 – 40 | 4 |
| 41 – 60 | 5 |
| 61 – 77 | 6 |
| 78 – 89 | 7 |
| 90 – 96 | 8 |
| 97 – 100 | 9 |

Stanine scores for each participant on each index comprising the MCSTB then, were added together and divided by 6 (the number of variables) and rounded. A composite stanine score was thus generated for each participant.

**Composite Scores for MCSTB**

Table 7 summarises the mean (standard deviation) composite scores for the three groups. The MCSTB composite scores differed significantly between the groups ($F_{2,102}$ = 59.39, p< 0.001). The Levene statistic was also significant so a Kruskal-Wallis test was also conducted ($\chi^2(2) = 61.18$, p = <0.001).

Planned comparisons (unequal variances assumed) revealed composite scores were significantly greater for malingerers than for true patients ($p < 0.001$) and healthy controls ($p < 0.001$). The true patient composite scores were significantly greater than those of the healthy controls ($p < 0.001$).

Table 7: Mean (SD) MCSTB composite scores for the 3 groups

| | Healthy Controls | True Patients | Simulating Malingerers | Sig. | Group differences |
|---|---|---|---|---|---|
| MCSTB Composite Scores | 4.2 (0.58) | 4.94 (0.59) | 6.14 (1.0) | $\chi^2(2) = 61.18$ *** | SM > HC***; SM > TP***; TP > HC*** |

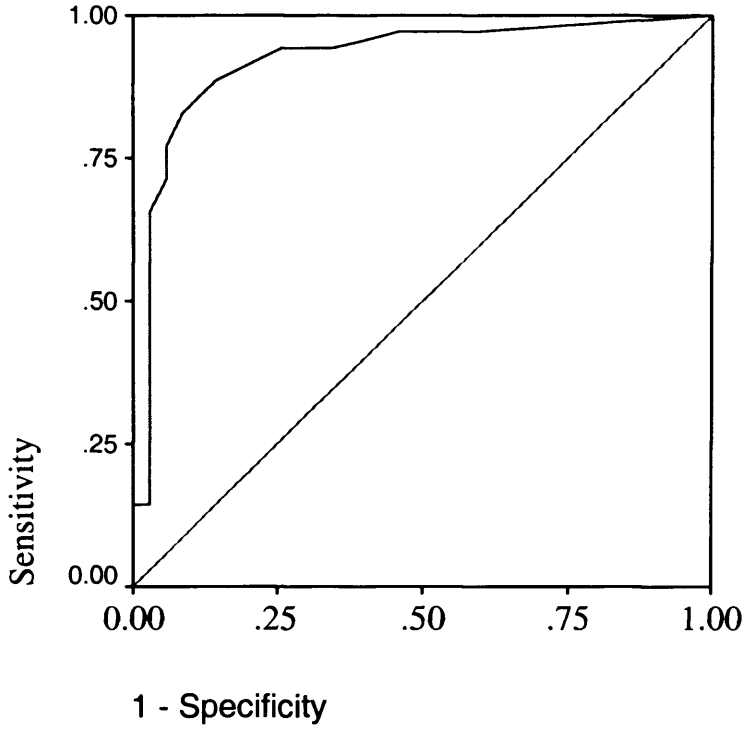
*** $p < 0.001$

## ROC CURVE ANALYSES

### M-FAST Scores

The ROC curve analysis for the M-FAST scores of the true patient and simulating malingering groups is shown in Figure 6. The area under the curve statistic (AUC) was 0.923 (95% CI: 0.854-0.993, p= <0.001). The AUC statistic represents the probability that the M-FAST score for a randomly chosen malingerer will exceed the M-FAST score for a randomly chosen true patient. At the cut-off score of 6 a sensitivity of 0.829, and a specificity of 0.914 were achieved for this sample. These rates were comparable to the sensitivity and specificity rates provided in the M-FAST manual (0.84 and 0.94 respectively).

Figure 6: ROC Curve for M-FAST Scores




Diagonal segments are produced by ties.

**RMT Recall and Combination Scores**

Table 8 shows the results of the ROC curve analyses of true patient and healthy control scores for the Rey Memory Test (recall and Combination scores). Sensitivity and specificity rates are according to the published cut-offs for these scores, which are <9 for the recall score, and ≤ 20 for the combination score.

The AUC statistics for the ROC curve analysis for Rey Recall and Rey Combination scores are not significant. This indicates that the probability that a Rey Recall or Rey Combination score for a randomly true patient would exceed that of a randomly chosen simulating malingerer, is not significant. These scores do not discriminate between the two groups in this sample.

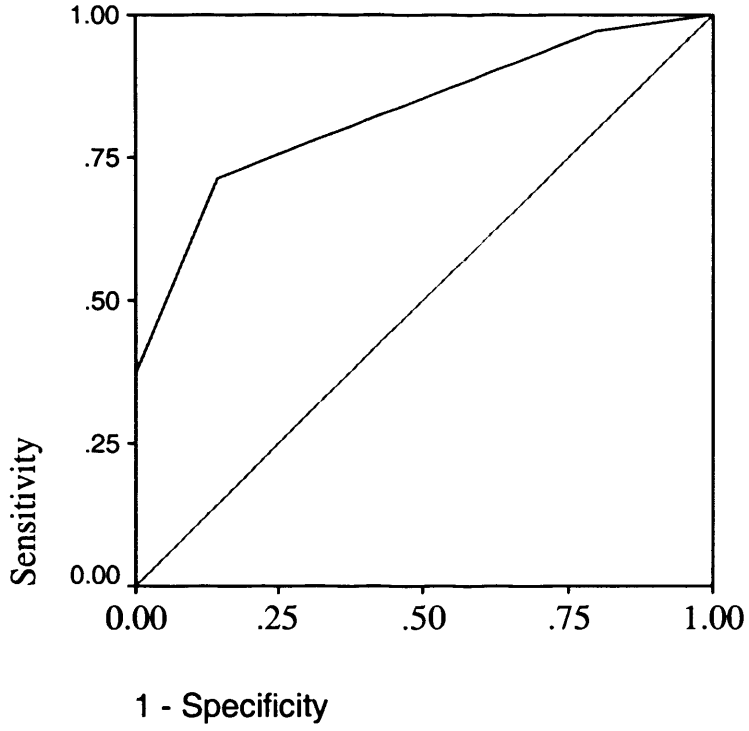
Table 8: Summary of ROC curve analyses for true patient and healthy control RMT scores

| RMT Score | AUC | CI 95% | Sig. | Sensitivity | Specificity |
|---|---|---|---|---|---|
| Recall | 0.507 | 0.49-0.75 | p=0.086 N/S | 0.829 | 0.286 |
| Combination Score | 0.619 | 0.37-0.64 | p=0.920 N/S | 0.686 | 0.486 |

**Composite MCSTB Scores**

The ROC curve analysis of the composite MCSTB scores for the true patient and simulating malingerer groups is presented in figure 7. The AUC statistic was 0.829 (95% CI: 0.731-0.926, p = 0.001), indicating that the composite MCSTB scores discriminate between true patients and malingerers in this sample with a high degree of precision. The ROC curve analysis revealed that the optimum stanine cut-off score was 6 (sensitivity = 0.714, specificity =0.857).

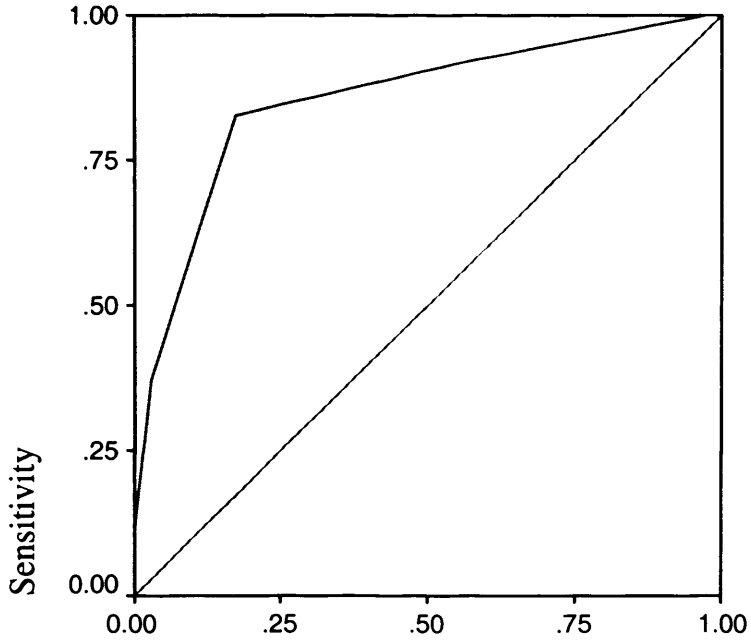
Figure 7 : ROC Curve for MCSTB Stanine Scores




Diagonal segments are produced by ties.

A ROC curve analysis was also performed on mean stanine scores of the 4 indices which showed significant discriminatory power between malingerers and true patients. Iconic memory total recall and RMT combination scores were removed from the original MCSTB computation since they did not discriminate between the two groups in this sample. This analysis is presented in Figure 8. The AUC statistic for the 'reduced' MCSTB score based on 4 indices was 0.855 (CI 95%: 0.763 – 0.947). This analysis revealed that the optimum cut-off score for maximising sensitivity and specificity was 6 (sensitivity 0.829, specificity 0.829). These results illustrate an increase in the ROC curve AUC statistic with the use of the 'reduced' MCSTB compared with the full battery, resulting in a higher rate of sensitivity (positive identification of true malingerers), but also a lower rate of specificity (i.e. increased false classification of true patients).

Figure 8 : ROC Curve for 'reduced' MCSTB Stanine Sores




Diagonal segments are produced by ties.

## CLASSIFICATION OF MALINGERING AND TRUE MENTAL ILLNESS

One individual in the healthy control group was classified as malingering on the MCSTB. Apart from this case all healthy controls were classified as not malingering on the M-FAST and the MCSTB. Data for the healthy control group are not included in this section of the results.

Table 9 summarises the classifications (not malingering/ malingering) of the true patient and malingering participants according to the various instruments (scores) administered.

Table 9: Numbers of true patients and malingerers correctly and incorrectly classified according to the M-FAST, MCSTB and 'reduced' MCSTB scores

| Malingering Instrument/Score | True Patients (True negatives) | Simulating Malingerers (true positives) | False Positives | False Negatives |
|---|---|---|---|---|
| M-FAST | 32 | 29 | 3 | 6 |
| MCSTB | 31 | 25 | 4 | 10 |
| 'Reduced' MCSTB | 29 | 29 | 6 | 6 |

Table 9 illustrates the (near) equivalence of the M-FAST and the MCSTB (6 indices) in specificity (low false positive rate). The MCSTB however, has less sensitivity than the M-FAST, making 4 fewer true positive malingering classifications than the M-FAST in this sample. It also has lower sensitivity making 1 more (true patient) false positive classification than the M-FAST for this sample. Classification on the basis of the 'reduced' MCSTB achieves a sensitivity equal to that of the M-FAST in this sample, but more false positive classifications (lower specificity) of true patients than either the M-FAST or the 6 index MCSTB.

In order to explore incremental validity, coincidence (and independence) of positive malingering classifications across the M-FAST and the MCSTB was explored. Table 10 shows the number of malingerers and true patients who were classified as malingering on one, both or neither of the M-FAST and the MCSTB. For those participants who malingered on only one instrument, frequencies according to which instrument they malingered on, are provided in parentheses.

Table 10: Numbers of participants in the true patient and simulating malingerer groups who were classified as malingering on only one, both or neither of the M-FAST and MCSTB

| | True Patients | Simulating Malingerers | Total (0-70) |
|---|---|---|---|
| Malingered on 0 | 29 | 2 | 31 |
| Malingered on 1 only (i.e. either) | 4 (M-FAST 1, MCSTB 3) | 12 (M-FAST 8, MCSTB 4) | 16 |
| Malingered on 2 (both) (M-FAST & MCSTB) | 2 | 21 | 23 |

Table 10 illustrates that if malingering were deduced *only* in persons who malingered on both instruments, 2 true patients would be misclassified as malingering. Use of the MCSTB (for corroboration of classifications on the basis of the M-FAST) in this sample then, eliminated 1 false positive classification that would have been made on the basis of the M-FAST alone. Use of the two instruments together thus yields a (marginally) higher specificity than using the M-FAST alone. However using the two instruments in combination and classifying malingering only in those persons who malingered on both, yields lower sensitivity in this sample than use of the M-FAST alone, since 8 known simulating malingerers who malingered on the M-FAST, did not malinger on the MCSTB. Also however, 4 known (simulating) malingerers who did not malinger on the M-FAST, *did* malinger on the MCSTB. If then, the MCSTB were used *only* in persons classified as malingerers on the M-FAST, these 4 *known* malingerers, who tested positive on the MCSTB would evade suspicion and detection.

# RESULTS (PART III)

## RELATIONSHIP BETWEEN TRUE PATHOLOGY AND MALINGERING INDICES

Parametric correlations were performed between scores on each BSI index and indices of malingering (M-FAST scores, and composite (and component) MCSTB scores), in order to examine whether true symptoms confounded with malingering on these instruments. **These correlations were performed on the scores of the true patient group scores only.** The Larzelere and Mulaik Test was applied in order to correct for the increased probability of making a Type One error in the event of multiple hypothesis testing. Each BSI index was treated as a separate variable and therefore the correction procedure was applied on 3 (x8) groups of correlations.

Table 11 summarises the size (and significance) of correlations between true pathology and malingering indices in the true patient group. All component scores of the MCSTB are stanine (not raw) scores.

The M-FAST scores for true patients were significantly (positively) correlated with the Global Symptom Index (GSI) and Positive Symptom Index (PSI) scores of the BSI.

Composite MCSTB scores of the true patients **did not correlate significantly with any** index of true symptomatology on the BSI. BSI index scores were also not significantly correlated with any *component* scores comprising the MCSTB.

Table 11: Correlations between (BSI) indices of true pathology and scores on malingering indices for the true patient group

| Score Index | Global Symptom Index (GSI) | Positive Symptom Distress Index (PSDI) | Positive Symptom Total (PST) |
|---|---|---|---|
| Treisman Omission Errors | r = - 0.38 | r = - 0.345 | r = -0.357 |
| Treisman Commission Errors | r = -0.329 | r = - 0.154 | r = - 0.347 |
| Iconic Memory False Positives | r = 0.103 | r = - 0.037 | r = 0.175 |
| Iconic Memory Items Correct | r = - 0.124 | r = - 0.060 | r = - 0.201 |
| CDQ Total Score | r = 0.399 | r = 0.300 | r = 0.377 |
| Rey Combination Score | r = 0.107 | r = - 0.076 | r = 0.092 |
| MCSTB Composite Stanine Score | r = - 0.076 | r = - 0.112 | r = - 0.141 |
| M-FAST Score | r = 0.635 ** | r = 0.349 | r = 0.623 ** |

* p = < 0.05, ** p = < 0.01

## RELATIONSHIP BETWEEN TRUE ABILITY AND MALINGERING INDICES

Correlations were performed between measures of true ability and educational attainment, and indices of malingering for the true patient group. The Larzelere and Mulaik Test was applied in order to correct for the increased probability of making a Type One error in the event of multiple hypothesis testing. The true ability and educational attainment variables were treated individually and therefore the correction procedure was applied on 4 (x8) groups of correlations. This data is presented in Table 12. All component scores of the MCSTB are stanine (not raw) scores.

Table 12: Correlations between indices of true ability and educational attainment and scores on malingering indices for the true patient group

| Score Index | WTAR Raw Scores | Camden Pictorial Memory Test | Reaction Time Task | Educational Level |
|---|---|---|---|---|
| Treisman Omission Errors | r = - 0.150 | r = - 0.225 | r = 0.025 | r = 0.077 |
| Treisman Commission Errors | r = -0.115 | r = - 0.201 | r = 0.114 | r = - 0.179 |
| Iconic Memory False Positives | r = - 0.021 | r = 0.317 | r = - 0.04 | r = 0.340 |
| Iconic Memory Items Correct | r = 0.023 | r = - 0.554 ** | r = 0.266 | r = 0.011 |
| CDQ Total Score | r = - 0.109 | r = - 0.201 | r =0.093 | r = - 0.219 |
| Rey Combination Score | r = - 0.326 | r = - 0.506 * | r = 0.093 | r = 0.019 |

| | | | | |
|---|---|---|---|---|
| MCSTB Composite Stanine Score | r = - 0.231 | r = - 0.490 * | r = 0.235 | r = 0.053 |
| M-FAST Score | r = - 0.109 | r = - 0.206 | r = 0.307 | r = 0.187 |

* p = < 0.05, ** p = < 0.01

Table 12 shows that scores on the CPMT were significantly negatively correlated with Rey combination, iconic items recalled and MCSTB composite stanine scores in the true patient group.

Correlations were also performed between the M-FAST scores and composite MCSTB scores for the true patient and simulating malingering groups. These were found to be not significant in the true patient group ($r = 0.226$, $p = 0.19$), or in the malingering group ($r = 0.028$, $p = 0.873$).

Correlation between M-FAST and CDQ (total) stanine scores were performed, and these were found to be highly significant in the true patient group ($r = 0.599$, $p < 0.001$), and also in the malingering group ($r= 0.367$, $p= 0.03$).

# DISCUSSION

The principal aim of the present study was to test the ability of the Malingered Cognitive Symptoms Test Battery (MCSTB) to discriminate between true patients and healthy controls instructed to malinger mental illness. Each participant's true pathology was measured using the BSI in order that true symptomatology could be quantified and evidenced in the true patient group, and eliminated in the malingering group. True patient BSI scores were also used to explore the confound of true mental illness with the investigated index of malingering (MCSTB). All participants completed standard tests of cognitive ability including the CPMT and the WTAR (prior to instructions to malinger for the malingering group), in order that any relevant group differences on these dimensions could be discussed in relation to MCSTB scores obtained.

The MCSTB comprises computerised tasks based on Sperling's (1960) iconic memory paradigm, and Treisman and Souther's (1985) pop-out paradigm. An interview of malingered cognitive symptoms developed prior to this study (CDQ) was also included in the MCSTB. The M-FAST and RMT (with recognition component) were administered in order that classification accuracy for this sample using the MCSTB could be compared with classifications according to these established malingering assessment tools. M-FAST scores also provided external validation that the malingering group did indeed malinger (according to instructions). Furthermore, obtaining M-FAST scores potentiated the examination of the utility of the MCSTB in providing corroborative evidence of malingering, for classifications made on the basis of this 'gold standard' screening tool.

Group differences in demographics, true ability and true pathology for the three groups are discussed, followed by a discussion of results obtained on the tests comprising the MCSTB. Accuracy of malingering classification, based on the M-FAST, RMT and composite MCSTB scores will be discussed at the close of this section.

**Demographics, true ability and true pathology**

WTAR raw scores were lower for patients compared with non-patients. This is likely to be attributable to the lower educational status also observed in the true-patient group. WTAR scores in the sample were not adjusted for educational status as this index was intended to be a rudimentary measure of predicted IQ. WTAR raw scores did not correlate significantly with any measure of malingering in this study. Reaction time scores were slower in the true patient group, which could be attributable to psychiatric symptomatology, including motor retardation, which was evident in some patients during testing. Although memory scores on the CPMT were lower in the true patient than the healthy control group, they were not indicative of significant memory impairment. Analyses of the performance of white and non-white patients on tests of true ability and pathology did not evidence any significant group differences.

**Components of the MCSTB Scores**

Iconic memory task scores

Scores for correctly recalled items on the iconic memory task did not discriminate between true patients and simulating malingerers. Patients *and* healthy controls performed more poorly than expected on this task, indicating that the task of recalling correct items for the exposure times used was more difficult that had been anticipated.

Also, true pathology in the true patient group was not found to correlate significantly with items recalled on the iconic memory task, supporting the suggestion that this task was experienced as more difficult than expected by *all* participants (including malingerers) regardless of true pathology. Malingerers recalled significantly less items than healthy controls, which is indicative of *some* suppression of correct responses, however this is of little application in malingering assessment, since resultant lowered scores did not distinguish malingerers from true patients. A number of participants in the malingering group also commented that the speed with which they were required to produce answers on the iconic memory task made it difficult for them to suppress correct responses. These observations are useful in understanding why total items recalled scores on the iconic memory task failed to discriminate between true patients and malingerers, and should be considered in further research into this paradigm.

Participants across all groups systematically evidenced incredulity at the short duration of the stimuli on the screen in the iconic memory task, and also appeared surprised when they were able to remember *any* letters that had been displayed. This was particularly relevant in the true patient and healthy control group where participants were presumably not attempting to distort responses, and hence provides evidence of the face validity of this paradigm as a test of malingering.

Based on the present findings, rather than using the iconic memory paradigm to create the illusion of increasing task difficulty (i.e. as exposure duration decreases), and thereby face validity as a test of malingering, it would be recommended to conduct the true iconic memory task using exposure (50 - 250 msecs) times for optimal correct responding provided by Sperling (1960). In this way, true iconic memory scores for

true patients and simulating malingerers could be compared, providing more useful information about both malingerers' estimation of task difficulty, and the possible confound between symptoms of mental illness and this type of rapid cognitive processing (i.e. sensory memory). Correctly recalled item (stanine) scores for the true patient group were significantly negatively correlated with scores on the CPMT, indicating that higher scores on one memory task were related to lower ones on the other. This is a paradoxical finding, particularly since the iconic memory task presented here is not likely to measure sensory memory as the duration periods are too long, and is more likely in fact to be a measure of short-term memory in common with the CPMT.

The total false positive error score on the iconic memory task discriminated between true patients and malingerers with a high degree of accuracy. Malingerers produced significantly greater numbers of false positive errors, which had a very low base rate among true patients. Similar findings using paradigms that potentiate false positive responding, have been noted in malingering participants in previous research (The b Test: Boone et al., 2002). Healthy control rates of false positive errors on the iconic memory task were comparable with those of true patients. Generation of letters that are not present is emblematic of sophistication and cognitive flexibility (i.e. malingering), rather than cognitive slowing or inattention that might be associated with true mental illness. False positive errors on the icon task are indicative then, not of suppression of correct responses but of *intentional invention*. This represents a potentially important 'opportunity' in the 'diagnosis' of malingering, since the DSM-IV (APA, 1994) stipulates that evidence of intentionality in feigning symptoms is required in distinguishing malingering from differential diagnoses such as factitious and conversion disorders.

The ubiquity of the false positive responding pattern among malingerers may be attributable to misconceived ideas about mental illness, such as that delusions and hallucinations might cause patients to, not fail to see something, but to *see something in a distorted way*, or even *see something that is not there.* False positive (stanine) scores on the iconic memory task were not found to correlate significantly with true pathology (BSI indices) in true patients, which further augments their utility in the assessment of malingered mental illness, since regardless of how unwell a true patient is, they do not on the whole generate these false positive errors.

Pop-out task scores

Total commission and total omission error scores on the pop-out (and non-popout) tasks powerfully discriminated between true patients and malingerers. Simulating malingerers made significantly more of each error type on both tasks than true patients. Omission errors were made at a higher rate than commission errors for all three participant groups. This might be explained by the fact that commission errors are potentiated when a pattern of identical (complete or incomplete) circles is presented. In this context, a commission error constitutes 'seeing' a target (i.e. different) stimuli that is not in fact present. When a pattern of circles is presented with the target present (i.e. one is different) only an omission (i.e. not seeing it) error is possible. In this way a commission error occurs less easily than an omission error, since it requires *seeing something that is not there*, rather than missing a target that is present among distractors. Results obtained then, suggest that commission errors are indicative of a higher likelihood of *intentional distortion* (and suppression of correct responses), than are omission errors, since they are committed at an almost negligible rate by both true patients and healthy controls. As with the false positive errors on the iconic memory task, perhaps the ubiquity of the high commission error rate

'performed' by malingerers is illustrative of a misconception that people with mental illness see things that are not present, more than they miss things that are present. Comparing the responses on these tasks of individuals simulating mental illness and those simulating TBI might contribute to our understanding of malingerers' misconceptions about the cognitive sequelae of severe mental illness.

Both omission and commission errors were performed at a higher rate by true patients than healthy controls, which might indicate a deficit in this type of preattentive processing in patients with mental illness. However, true pathology was found to have a significant negative correlation with omission and commission stanine scores, which would indicate that higher levels of pathology are related to less omission and commission errors. One explanation for this finding might be that patients with cognitive and motor slowing, perform tasks in a more laboured way, and hence scan displays more thoroughly. Participants across all groups frequently showed an awareness of having committed an error (of either type) immediately after committing it. If participants had not been asked to respond as quickly and as accurately as possible, error rates for all groups would possibly be lower. None the less, low base rates among true patients for both error types support the utility of this paradigm in the detection of malingering. These findings also support those of previous research evidencing distinct types of errors and higher error rates in malingerers on cognitive tasks (The b Test: Boone et al., 2002).

Whilst commission error scores are a significantly more powerful discriminator between true patients and simulating malingerers, the forced-choice format of the pop-out tasks used here, and the random rotation of correct response-types (i.e.

present or absent target) augment the face validity of these tests for use in the assessment of malingering.

In this study it was intended that response latencies be recorded on these pop-out tasks. It was hypothesised that malingerers' response latencies would be larger than those of true patients. It was also hypothesised that malingerers might intentionally adjust their response times linearly according to the number of distractor items present in a display, in contrast to healthy controls' (and possibly true patients') anticipated patterns of performance on these tasks. Whilst a computer error precluded the possibility of obtaining this data in the present study, the pop-out paradigm shows promise for use in further research into malingered response latency scores.

Cognitive Dysfunctions Questionnaire (CDQ)

Scores on the CDQ significantly discriminated between true patients and simulating malingerers. This indicates that simulating malingerers endorse (malingered) cognitive symptoms, as well as the (malingered) psychiatric symptoms assessed by the 'gold standard' screening tools of malingered mental illness (the SIRS and the M-FAST). CDQ (total) stanine scores were highly correlated with M-FAST scores in the simulating malingering group. This suggests that simulating malingerers might arbitrarily endorse symptoms (and associated levels of distress and frequency, in the case of the CDQ) whether are cognitive or psychiatric in nature. This finding is interesting and is worthy of further investigation, since current assessment of malingered mental illness focuses predominantly on the endorsement of psychiatric symptoms. Use of a cognitive symptom focused self-reported symptoms measure might augment the validity of malingering classifications on the basis of psychiatric symptom based instruments alone.

CDQ scores were not significantly correlated with true pathology in the true patient group. This indicates that patients with higher levels of true symptomatology, do not obtain significantly higher scores on the CDQ than patients who are 'more well'. This absence of confound of true mental illness with malingering on the CDQ gives it an advantage over the M-FAST, as the latter was significantly correlated with true patient pathology in this sample.

Despite these positive results, true patients do achieve significantly higher scores on the CDQ than healthy controls. The reasons for this warrants some thought since many of the items of the CDQ relate to non-existent phenomena. It may be that the format of the CDQ (i.e. oral presentation of symptoms that are endorsed or refuted) combined with true patient pathology, is instrumental in leading true patients to acquiesce and endorse (non-existent) symptoms. The opening statement of the CDQ may increase suggestibility in all participant groups, since it indicates that mental illness *might be* associated with unusual and possibly distressing experiences. It would be interesting then, to see what (possibly differential) effect on true and malingered responding the inclusion/exclusion of this statement might have. If for instance true patients are more suggestible than malingerers, the removal of this 'suggestion' might be advocated. Also in consideration of the future development of this promising instrument, data might be analysed to provide scoring systems that would maximise discrimination between responses of true patients and those of malingerers. For example, more powerfully discriminating items that are consistently endorsed by malingerers but *extremely* rarely by true patients, could be weighted so that higher scores would be obtained in the event of their endorsement. An example of such an item in the CDQ was "Not being able to remember the first name of one of your parents". Score on this item suggest that its endorsement is highly indicative of

frank malingering, since 11 simulating malingerers, but only 1 true patient endorsed it. An item whose endorsement might warrant a higher score might be for example, "Getting confused between up and down", which was endorsed in this sample by 7 malingerers and 2 true patients". Inclusion of items "strongly" and "less strongly" indicative of malingering lends face validity to the CDQ, since items must be subtly "fake" in order that malingerers *believe* that true patients might endorse them. Whilst it is interesting that true patients endorse symptoms that are non-existent or that they appear not to evidence, the veracity of their endorsement is irrelevant in this context since, in the development of malingering sensitive tools, the clinician requires knowledge of whether patients *endorse* items, and not whether they *actually* experience them. Items of the CDQ might also usefully be differentially weighted (i.e. scored) according to frequency and associated distress indices, since these were found to discriminate between true patients and malingerers independently of the numbers of symptoms endorsed.

**Scores on established tests of malingering**

M-FAST scores

The well-established ability of the M-FAST to discriminate between true patients and simulating malingerers was replicated in this study. The size and significance of the AUC statistic for the M-FAST scores in this study provides evidence that the simulating malingerers *did* actually malinger in accordance with instructions. The finding that the M-FAST scores for the malingering group did not correlate with indices of their true pathology further augments this external validation of simulation. Interestingly however, the mean scores for the malingering group (9.94) in this study were notably lower than the simulator validation norms (16.0) in the M-FAST manual, and more comparable with the norms derived from known groups validation

studies (9.69 – 11.5). This suggests that while the M-FAST correctly classified the majority of simulating malingerers, these malingerers do not appear to have feigned on the M-FAST to as high a degree as simulating participants in the validation studies. This may suggest that the malingerers in our sample also malingered less overtly on the MCSTB. It would be interesting through replication to investigate the relationship between malingering on these distinct tools within individuals. M-FAST scores for simulators (and true patients) in this study did not correlate with MCSTB scores, yet these instruments each demonstrated significant discriminatory power between groups. This may suggest that these instruments measure distinct dimensions of malingered mental illness (i.e. cognitive and psychiatric). Indeed if this is the case, the use of both instruments in malingering assessment would be advocated, particularly in light of the evidence that 12 simulators malingered on one instrument (8 on the M-FAST, 4 on the MCSTB) and not the other.

RMT

Neither recall nor formula scores of the RMT discriminated between true patients and malingerers in this study. True patients recalled less items than expected, and whilst their scores were higher that those of malingerers, this difference was not significant. Recognition scores on the RMT were lower across all groups (including healthy controls) than recall scores, which is a highly unusual finding, since the advantage of recognition over recall memory is well documented (Boone, Salazar, Lu, Warner-Chacon & Razani, 2002). Malingerers committed significantly more false positive errors on the recognition part of the RMT, supporting the evidence that when given the opportunity to commit false positive (commission) errors on performance tasks, persons simulating malingered mental illness will do so. However RMT combination

scores did not discriminate between true patients and malingerers in this sample, on account of the poverty of recall and recognition scores in the true patient group.

Whilst these findings support the literature that individuals with severe mental illness do not score below the cut off point on the RMT (recall only), this instrument was insensitive to true malingering in this sample, since malingerers did not score below this cut off point either. The insensitivity of the RMT (recall only) has been documented in previous literature (Back et al, 1996). Results on the recall component of the RMT in the present study support evidence of its inadequate sensitivity in discrimination between true and feigned complaints (in the context of psychiatric illness). However, further investigation into the performance of healthy controls, malingerers and true patients on the recognition component of the RMT might be recommended since our findings have not supported those cited in the literature (Boone, Salazar, Lu, Warner-Chacon & Razani, 2002).

**Composite MCSTB scores**

Composite MCSTB scores were derived from the mean stanine scores of 6 indices. These were: (1) iconic memory total correct recall; (2) iconic memory false positive error; (3) pop-out commission error; (4) pop-out omission error; (5) CDQ total score and (6) Rey formula score. Composite MCSTB scores based on performance on these 6 indices, discriminated significantly between true patients and simulating malingerers. These 6 indices were *all* included in order to derive the MCSTB composite score since it was hypothesised at the commencement of this study that they would *all* discriminate between true patients and malingerers. However, exclusion of the two indices (iconic memory total recall and Rey formula score) that were shown not to discriminate between the two groups (as discussed above) resulted

in increased sensitivity of malingering classifications (correct identification of malingerers), but also decreased specificity (i.e. false positive identification of true patients). It may be recommended that this study be replicated using the curtailed MCSTB in order to achieve robust results regarding *its* utility, for respondents' behaviour and performance might differ, rendering the above post-hoc analysis inapplicable to *true* use of the shortened battery.

The heterogeneity of malingering styles has been well documented in the literature, and can be accounted for not only with reference to Roger's Adaptational Model (Rogers, 1990a) and the idiosyncrasy of each malingering context, but also in consideration of the variation in beliefs, knowledge and preparation available to each potential malingerer. In this study, like in the majority of malingering studies, the standard deviations for scores into the malingering group were much larger than those in the true patient and healthy control groups. This may be due to simulating malingerers responding in a pseudorandom way that they believe to be characteristic of persons with mental illness. This study has reinforced the potential for cognitive tests to be used in this endeavour, and also reinforced the power of the false positive error (commission) as a discriminator between true patients and their malingered counterparts. Further research might benefit from capitalising on the false positive error's unique association with likely intentionality of response distortion. In order to add objective credence to subjective (and inevitably inferential) judgements about malingering, and the requisite consciousness of external motivation to deceive, the intentionality of false positive responding might best be explored through cognitive, objective modalities, as has been the case in this study. This argument is particularly strengthened by the evidence in this study that measures of cognitive malingering

have not confounded with true (quantified) symptomatology, in the way that measures of endorsed malingered psychiatric symptoms have.

**Composite Score Methodology**

In the present sample, the M-FAST did not classify all 'known' malingerers, and some of these false negative cases were classified by the MCSTB. This evidences that not only are malingered responses heterogeneous within instruments as discussed above, but also across instruments. Derivation of a composite stanine score from performance on several tests offers a way of potentially reducing the inevitable problems with classification in the (quite usual) event of individuals malingering on one established instruments but not on another. Whilst the M-FAST manual for example, stresses the necessity of using corroborative evidence to support (or negate), any positive malingering classification, understanding how to go about combining scores and classifications across distinct malingering tests is far from understood. Yet combination instruments and indices of malingering, (including collateral evidence and behavioural inconsistencies) are dictated by classification models (Rogers, 1997). It would seem however that the derivation of composite scores from the standardisation of scores on several individual tests of malingering, might be useful in this endeavour, since individuals do not have to produce malingering indicative scores on *every* component of a battery to be classified. Composite scores of this kind might potentially also provide a methodology that minimises false positive classification of patients, since scores in the malingering range on one test component might potentially be 'diluted' in terms of the mean composite score, by cognitive based malingering tests (e.g. potentiating false positive responding) on which patient response patterns are known to qualitatively differ from those of malingerers.

**Conclusion**

This study has demonstrated the utility of the MCSTB in the detection of malingered mental illness in a "fully controlled" (Schretlen, 1988) simulation design. The differential utility of each of its multi-method (self-report and performance-based) components has also been evidenced. Principally then, this study reinforces previous evidence that malingerers of mental illness produce associated malingered *cognitive* profiles *if presented with cognitive paradigms* (e.g. Clark, 1988). Furthermore, despite the superior sensitivity and specificity of the M-FAST in classifying malingerers in this study, a number of 'known' malingerers who were *not* classified by the M-FAST, *were* classified by the MCSTB. This suggests that despite the predominance of the milieu of reported psychiatric symptomatology in the assessment of malingered mental illness, some malingerers malinger on cognitive tests potentially more detectably than in the psychiatric interviews. This evidences the importance of developing robust methods of assessment for malingered cognitive symptoms in severe mental illness.

It would be interesting to examine the external validity of the results obtained in this simulation paradigm using 'at risk' groups, and certainly this would be a prerequisite of application of these results to the clinical assessment of suspected malingerers. Further exploratory research examining the utility of the shortened MCSTB would also be recommended, and the simulation paradigm is uniquely placed in its amenability to such applied malingering research. Comparing the responses of participants simulating mental illness and those simulating TBI would be recommended for example, in order to provide information about whether the MCSTB is useful across malingering contexts. Also, this would provide information about differential strategies used by malingerers in cognitive test performance

according to context, which might inform the development of useful context-relevant test paradigms.

# REFERENCES


Andreasen, N.C., Arndt, S., Alliger, R., Miller, D., & Flaum, M. (1995) Symptoms of schizophrenia: methods, meanings and mechanisms. Archives of General Psychiatry, 52, 341-351.

Anscombe, R. (1987). The disorder of consciousness in schizophrenia. *Schizophrenia Bulletin, 12,* 241-260.

Back, C., Boone, K.B., Edwards, C., Parks, C., Burgoyne, B., & Silver, B. (1996). The performance of schizophrenics on three cognitive tests of malingering: Rey 15-Item Memory Test, Rey Dot-Counting and Hiscock Forced-Choice Method. *Assessment,* **3**, 449-457.

Baeber, R.J., Marston, A., Michelli, J. & Mills, M.J. (1985) A brief test for measuring malingering in schizophrenic individuals. *American Journal of Psychiatry, 142,* 1478-1481.

Ben-Porath, Y., Graham, J., Hall, G., Hirschman, R., Zaragoza, M. (Eds) (1995). *Forensic Applications of the MMPI-2*, Sage Publications Inc.

Boone, K.B., Lu, P., Back, C., King, C., Lee, A., Philpott, L., Shameih, E., & Warner-Chacon, K. (2002). Sensitivity and specificity of the Rey Dot Counting Test in patients with suspect effort and various clinical samples. *Archives of Clinical Neuropsychology, 17,*625-642.

Boone, K.B., Lu, P., Sherman, D., Palmer, B., Black, C., Shameih, E., Warner-Chacon, K., & Sherman., N.G. (2000). Validation of a new technique to detect malingering of cognitive symptoms: The b Test. *Archives of Clinical Neuropsychology, 15,* 227-241.

Boone, K.B., Salazar, X., Lu, P., Warner-Chacon, K. & Razani, J. (2002). The Rey 15-Item Recognition Trial: A technique to enhance sensitivity of the Rey-15 Item Memorization Test. Journal of Clinical and Experimental Neuropsychology, 24(5), *561-573.*

Clark, (1988) Sociopathy, malingering and defensiveness. In R.Rogers (ed.), *Clinical assessment of malingering and deception* (1st ed., pp. 54-64). New York: Guilford Press.

Cornell, D.G. & Hawk, G.L. (1989). Clinical presentations of malingerers diagnosed by experienced forensic psychologists. Law and Human Behaviour, 13(4), 375-383.

Derogatis, L.R. (1993). The Brief Symptoms Inventory. Taylor & Francis.

Garety, P.A & Freeman, D. (1999). Cognitive approaches to delusions: A critical review of theories and evidence. British Journal of Clinical Psychology, 38, 113-154.

Gillis, J.R. Rogers, R., & Bagby, M. (1991)Validity of the M-Test: Simulation design and natural group approaches. Journal of Personality Assessment, 57 (1), 130-140.

Halligan, P.W., Bass, C. & Oakley, D.A. (2003). *Malingering and Illness Deception* Oxford University Press.

Hogarty, G.E. & Flesher, S. (1992) Cognitive remediation in schizophrenia: proceed...with caution!. Schizophrenia Bulletin, 18(1), 51-57.

Lubow, R.E., Kaplan, O., Abramovich, P. & Laor, N. (2000). Visual search in schizophrenia: latent inhibition and novel pop-out effects, Schizophrenia Research, 45, 145-156.

Miller, H. (2001). *Miller Forensic Assessment of Symptoms Test: Professional manual.* Odessa, FL: Psychological Assessment Resources.

Pankratz, L. & Binder, L.M. (1997). Malingering on intellectual and neuropsychological measures. In R.Rogers (ed.), *Clinical assessment of malingering and deception* (2nd ed., pp. 223-236). New York: Guilford Press.

Popper, K. (1959). The Logic of Scientific Discovery. Routledge Ltd.

Resnick, P.J. (1988). Malingered Psychosis. In R.Rogers (ed.), *Clinical assessment of malingering and deception* (1st ed., pp.34-53). New York: Guilford Press.

Rogers, R. (1990a). Development of a new classificatory model of malingering. *Bulletin of the American Academy of Psychiatry and Law*, 18, 323-33.

Rogers, R. (1990b). Models of feigned mental illness. *Professional Psychology: Research and Practice*, 21, 182-8.

Rogers, R. (1997) Clinical Assessment of Malingering and Deception, 2nd Edition. Guilford Press : New York, London.

Rogers, R., Bagby, R.M., & Dickens, S.E. (1992). *Structured Interview of Reported Symptoms (SIRS) professional manual.* Odessa, FL: Psychological Assessment Resources.

Rogers, R. & Cruise, K.R. (2000). Malingering and deception among psychopaths. In C.Gacono (Ed.) *The clinical and forensic assessment of psychopathy: A practitioner's guide* (pp. 269-284). New York: Lawrence Erlbaum.

Schretlen, D. (1988). The use of psychological tests to identify malingered symptoms if mental disorder. *Clinical Psychology Review, 8,* 451-476.

Schretlen, D., Wilkind, S.S., Van Gorp, W.G. Bobholtz, J.H. (1992) Cross- validation of a psychological test battery to detect faked insanity. *Psychological Assessment, 4,* 77-83.

Schwartz, B.D. & Winstead, D.K. (1985) Biological Psychiatry, 1985, 20(9), 1015-1018.

Sperling, G. (1960). The information available in brief visual presentations. *Psychological Monographs, 74,* 1-29.

Tombaugh, T.N. (1996). *Test of Memory Malingering.* New YorkMulti Health Systems.

Treisman, A. & Gormican, S. (1988). Feature analysis in early vision: evidence from search asymmetries. *Psychological Review, 95(1),* 15-48.

Treisman, A. & Souther, J. (1985) Search asymmetry: A diagnostic for preattentive processing of separable features. Journal of Experimental Psychology General, 114, 285-310.

Warrington, E.K. (1988). The Camden Memory Tests Manual. Psychology Press: Erlbaum (UK) Taylor & Francis.

Weinborn, M., Orr, T., Woods, S.P., Conover, E. & Feix, J. (2003). A validation of the Test of Memory Malingering in a forensic psychiatric setting. *Journal of Clinical and Experimental Neuropsychology,* **25 (7)**, 979-990.

Weschler, D. (2001). Weschler Test of Adult Reading. The Psychological Corporation.

Ziskin, J. (1984). Malingering of psychological disorders. *Behavioural Sciences and the Law, 2,* 39-50.

# PART III: CRITICAL REVIEW

On account of the discussion concluding the Empirical Paper section of this thesis being fairly extensive, this critical review will predominantly comprise qualitative information about the process of completing this study. It will include observations made during interviews, and ideas about how this information (which was not recorded and analysed quantitatively), might be used in thinking about future research. I will end this section with a short summary of research directions that might usefully pursue the findings of this study.

This study entailed the recruitment and interviewing of 35 psychiatric inpatients from a single site, and a further 70 healthy controls, 35 of whom were randomly assigned to a simulating malingering group. I will commence by discussing observations and issues pertaining to patient sampling, recruitment and participation. Malingered participation will then be critiqued in the same way. Participation of the healthy control group will not be specifically discussed, since this was comparatively straightforward, and did not prompt consideration relevant to the development of malingering research.

## PATIENTS

Particular emphasis was required in the ethical application to the relevant NHS Trust for the recruitment of patients that, although this study was about malingering, I was not seeking to assess and identify malingerers among the *true* patient sample. Due to potential issues among the patient group about ability to consent (on account of being acutely psychiatrically unwell), I included in the ethical application that consent to approach individual patients would be gained initially from Responsible Medical Officers (RMOs: i.e. consultant psychiatrists). In this stipulation, difficulties with the turnover rate of patients on the ward were not anticipated, and it was very difficult in

practice to contact RMOs to find out whether specific (new) patients might be suitable to be approached to take part in this study. In fact, RMOs generally consented to me approaching *any* patients under their care, (whom Ward Managers deemed appropriate to take part), and did not have time to be consulted about patients on an individual basis. Whilst ethical approval for this study was obtained without difficulty, stipulations about how patients would be recruited (i.e. principally through RMOs) were difficult to uphold in practice. It would have been more practicable to gain *overall* consent from RMOs and then consult with Ward Managers on the suitability of *individual* patients.

In recruiting the patient sample, I found that patients on the wards whom consultant psychiatrists had consented could be approached, were either keen to participate, or clear that they did not want to. With a number of patients who wanted to take part, they were clear that they did not want to sign anything, including the requisite consent form. These patients were not able to take part. Many patients had participated in previous research and appeared to understand that research participation was not related in any way to their treatment on the ward. Some patients appeared to be particularly keen to take part on account that they would be able to work on a computer, whilst others were clear that they would not take part precisely for this reason. The latter appeared to decline sometimes because they thought they that they might not be able to operate a computer as they had never used one before, and sometimes because they felt concerned and what appeared to be paranoid (in the context of their mental illness) about computers, information broadcast etc.

I observed a significant qualitative variation in psychiatric symptomatology in the patients that took part. Whilst this was quantified by administration of the Brief

Symptom Inventory, it may have been useful to have a system to qualitatively document patients' symptoms. Some patients evidenced positive psychotic symptoms during testing, while others appeared to have motor retardation, either on account of possible medication side effects or their particular illness process. Some patients' ability to concentrate and stay on task during assessment (particularly during computer tasks) appeared to be in contrast with the negative or positive symptoms that they were observed to display when unengaged on the ward. For example, a number of patients who appeared very inactive when observed prior to participation, participated with task demands with tenacity, and appeared able to concentrate beyond what might have been expected. Other patients appeared to be stimulated by task demands (e.g. stimuli on the screen) and questions in a different way, resulting in tangential interpretations and conversations leading to distraction from task demands. For example in the pop-out task some patients talked in an interpretive way about what they understood the circles to 'mean', and appeared to respond in accordance with this "meaning system", rather than in pursuit of the rules of the task. Similarly in the iconic memory task, displays of letters flashing for a short duration appeared to stimulate some patients into tangential conversation about what they had seen and what it "meant". This, on numerous occasions lead patients to miss the next letter display, and prompted verbal input on my part to stay on task. Input to reduce distractibility and to encourage attention to, and persistence with, task-focused demands was not quantified and can only be described qualitatively. However, this may have influenced patient performance on tasks, and affected standardisation of instructions.

The above comments on participation process, I believe are useful in informing choices about task-format and instructions that might be useful in future research into

tools for the detection of malingering. However, what is crucially important, in terms of interpretation of the results obtained in this study, is that despite patients being evidently acutely unwell and behaving accordingly, they performed significantly better than simulating malingerers on the majority of administered tasks, and also reported significantly less malingered cognitive and psychiatric symptoms.

Non-cognitive symptoms interfered with some patients' ability to complete the tasks yet, since these had not been noted in the exclusion criteria and were related to psychopathology, patients who evidenced these symptoms were included in the study, and were encouraged to continue participation where possible. Most notably a number of patients had extremely shaky hands, and pressing appropriate buttons was difficult, which appeared to delay response latencies and influence error rates on some tasks.

On the whole, whilst a fairly lengthy test battery was administered in this study, taking patients about an hour to complete, most appeared to enjoy taking part, and were keen to get feedback on how they had performed. This fact eased the sense of imposition sometimes felt in approaching acutely unwell people to help with research.

## SIMULATING MALINGERERS

Opportunity sampling was used to recruit simulating malingering participants. On the whole people approached were keen to take part. Following the assessment of true pathology and ability, and the administration of instructions to malinger, participants generally appeared to enjoy "getting into role", and producing performances that they associated with severe mental illness. Instructions generally required further explication beyond the instruction sheet given, as many participants appeared to

attempt to malinger behaviourally, for example by not answering questions or answering questions irrelevantly (i.e. not according to response options), or attempting to leave the room.

The above observation raises interesting questions about the external validity of simulating studies, since simulators are normally required to answer questions and to be compliant with the research process, whereas clinical malingerers may seek to interrupt the interview or assessment process. Certainly, a number of simulating malingerers attempted to be obstructive in answering questions. Non-compliance with assessment is one of the DSM 'diagnostic' criteria for malingering. However, a number of researchers have disputed this criterion (Rogers, 1997) suggesting contrarily that malingerers are compliant and keen to engage in assessment, and in this way to 'advertise' their feigned symptoms in order that they are noted by clinicians. It would appear that there is a qualitative distinction between inviting and engaging in the assessment process (i.e. being compliant), and in not complying with individual task demands apparently on account of being too unwell and therefore distractible, not understanding the questions etc. These observations are particularly interesting since some true patients needed encouragement to stay on task and to comply with task demands, and were distractible in this way, affecting their performance on these tasks. Yet this possibly 'valid' behaviour was not 'allowed' in malingerers. This inevitably raises issues in applied malingering research, about the comparison of true patient and malingered performances, since criteria for compliance might differ in this way according to group membership. In this study, malingerers and true patients alike were encouraged to answer questions and to perform on tasks within the required parameters in order to assure the validity of results obtained.

However, these methodological observations might nevertheless usefully be the subject of further investigation.

As with the patient group, people in the simulating group appeared to enjoy taking part, and many expressed an interest in how realistic their performance had been. Many simulators, after they had completed the test battery, commented that they were unsure of how to portray their role, with some saying that they adopted particular strategies rather than responding randomly. Amongst the strategies volunteered were "not getting too many wrong", "not going for the obvious ones", "not looking at the screen properly" and "doing it backwards" (iconic memory). Simulators also offered information about their perceptions regarding what effect mental illness might have on their abilities to perform the tasks. For example, some malingerers fed-back that they thought that their ability to recognise stimuli in the pop-out tasks and to recall letters flashed for short periods might be enhanced in patients with mental illness, which appeared to be analogous with notions of the 'idiot savant'. Other simulators thought that there was "no way' that a person with mental illness could perform these tasks successfully, while others still thought that their faculties with regard to doing these tasks would not be affected in any way by mental illness.

Malingering participants spontaneously debriefed more in relation to performance tasks, than to items on the M-FAST or CDQ, which were in fact rarely mentioned. This may have been due to a recency effect, since the cognitive performance items were the last to be administered. It may also have been because they felt less confident in their knowledge of how mental illness might influence their abilities to perform on these tests. Indeed this latter explanation might be supported by the fact that CDQ and M-FAST items appeared to be responded to in a way that conveyed

surety, though interestingly malingerers were regularly observed to laugh at the mention of certain items, as though at their preposterousness, and then go on to endorse them. Further research on understanding why simulating malingerers respond in the ways in which they do on tests, is undoubtedly very useful in informing the development of malingering tests.

Feedback from malingering participants should be incorporated into the development of malingering tests, since understanding how malingerers interpret and experience the testing process allows us to predict how they might behave. In this way we might capitalise on common misconceptions about genuine mental illness, in designing tools that will maximally discriminate between their performances and those of their true counterparts. Also since the possibility of obtaining feedback is unique to the simulation paradigm (i.e. 'known-groups' do not admit to malingering), it ought to be taken advantage of. The additional component of a short feedback form for simulating malingerers in malingering research does not unduly lengthen the size of a test battery and provides invaluable information. Themes contained in feedback from previous studies might be used to design structured feedback tools, facilitating quantitative analysis of malingering styles and perceptions.

## FUTURE RESEARCH

This study demonstrated that simulating malingerers of mental illness malingered cognitive tasks when invited to do so, and also that they had perceptions about how the process of severe mental illness might affect patient's abilities to perform the cognitive tasks presented. Since the field of developing tools for the cognitive assessment of malingered mental illness is fairly new, feedback from simulating

malingerers in such studies is of significant importance in this research, as it tells us how malingerers interpret task demands in relation to the profile that they are trying to malinger. In future simulation studies in malingered cognitive symptoms in mental illness, use of feedback and debriefing forms for malingerers would therefore be highly recommended.

# APPENDICES

**APPENDIX 1**

**The Graduate School**
University College London

Head of the Graduate School

7 July 2004

Sub-Department of Clinical and Health Psychology
University College London

**Re: Notification of Ethical Approval**

**Project ID: 0219/001: Malingered Cognitive Deficits in Severe Mental Illness**

Following the meeting of the UCL Committee for the Ethics of Non-NHS Human Research on 1 July 2004, I am pleased to inform you that the above research has been granted ethics approval for the duration of the project subject to the following conditions:

1. You must seek Chair's approval for proposed amendments to the research for which this approval has been given. Ethical approval is specific to this project and must not be treated as applicable to research of a similar nature. Each research project is reviewed separately and if there are significant changes to the research protocol you should seek confirmation of continued ethical approval by completing the 'Amendment Approval Request Form'.

The form identified above can be accessed by logging on to the ethics website homepage: http://zzz.grad.ucl.ac.uk/ethics/ and clicking on the button marked 'Key Responsibilities of the Researcher Following Approval'.

2. It is your responsibility to report to the Committee any unanticipated problems or adverse events involving risks to participants or others. Both non-serious and serious adverse events must be reported.

   **Reporting Non-Serious Adverse Events.**
   For non-serious adverse events you will need to inform , Ethics Committee Administrator ), within ten days of an adverse incident occurring and provide a full written report that should include any amendments to the participant information sheet and study protocol. The Chair or Vice-Chair of the Ethics Committee will confirm that the incident is non-serious and report to the Committee at the next meeting. The final view of the Committee will be communicated to you.

**APPENDIX 1 CONTINUED**

**Reporting Serious Adverse Events**
The Ethics Committee should be notified of all serious adverse events via the Ethics Committee Administrator immediately the incident occurs. Where the adverse incident is unexpected and serious, the Chair or Vice-Chair will decide whether the study should be terminated pending the opinion of an independent expert. The adverse event will be considered at the next Committee meeting and a decision will be made on the need to change the information leaflet and/or study protocol.

3. On completion of the research you MUST submit a brief report (maximum of two sides of A4) of your findings to the Committee. Please comment in particular on any ethical issues you might wish to draw to the attention of the Committee. We are particularly interested in comments that may help to inform the ethics of future similar research.

Yours sincerely

**Chair of the UCL Committee for the Ethics of Non-NHS Human Research**

Cc: Jelena McMennemin

# APPENDIX 2

## INFORMATION SHEET

**(Version 2 – Dated 22.09.2004)**

You are being asked to participate in a research project. The statement below explains in ordinary language what will happen to you if you agree to take part; it describes any risks or discomfort you may experience, and it also explains what we hope to learn as a result of your taking part. You should not take part if you do not wish to do so. Declining to take part will not affect you in any way.

***LREC Registration Number -04/Q0410/9***

***Brief Title of Project***

Assessment of Cognitive Symptoms in Mental Illness

***Explanation***

This sheet is designed to help you to decide whether you would like to take part in a research project. Please feel free to ask questions before you make your decision about taking part - the researcher will be happy to explain anything that you are not sure about. You may withdraw your agreement to take part at any time.

***What is the research about?***

The research is designed to help us to understand more about the range of difficulties that people can report experiencing and their performance on short psychological tests.

***What is involved?***

If you take part you will be asked a number of questions about a number of symptoms which you may or may not experience. You will also be asked to complete some short psychological tests. **We would like you to be as honest as possible when answering the questions and to perform to the best of your abilities on the tests.** In total, this should take approximately 60 minutes. We have no reason to believe that you will experience any adverse effects from taking part in this study. You should decline to take part in this study if:

- You have a history of severe mental illness (e.g. schizophrenia, bipolar disorder)
- You have a history of neurological disorders (e.g. Parkinson's, epilepsy)
- You have ever had a head injury resulting in being unconscious for more than 10 minutes
- You have a serious reading difficulty

You will not be asked to give a reason for declining to take part. We hope that this research will enable us to improve the efficiency with which we diagnose the presence of mental illness in people who report symptoms of mental illness.

**This research is anonymous and confidential. If you are an employee of the Trust you should know that we will make NO record of your participation in your employment records.**

# APPENDIX 2 CONTINUED

**Remember that taking part in research is completely voluntary and that you can choose to withdraw your consent at any time**

This study will be reviewed and approved by the Ealing Local Research Ethics Committee and the UCL Committee for the Ethics of Non-NHS Human Research.

# APPENDIX 3

Participant Identification Number for this trial:

## CONSENT FORM

Title of Project: **Assessment of Cognitive Symptoms in Mental Illness**

Name of Researcher: **Jelena McMennemin**

**PLEASE SIGN BELOW AFTER READING THOROUGHLY**

1. I confirm that I have read and understand the information sheet for the above study and have had the opportunity to ask questions.

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.

| Name of Participant | Date | Signature |
|---|---|---|
| Researcher | Date | Signature |

# APPENDIX 4

## INFORMATION SHEET FOR HEALTHY CONTROLS

**(version 1 – Dated 22.9.2004)**

You are being asked to participate in a research project. The statement below explains in ordinary language what will happen to you if you agree to take part; it describes any risks or discomfort you may experience, and it also explains what we hope to learn as a result of your taking part. You should not take part if you do not wish to do so. Declining to take part will not affect you in any way.

***Brief Title of Project*** ***LREC Registration Number - 04/Q0410/9***

Assessment of Cognitive Symptoms in Mental Illness

***Explanation***

This sheet is designed to help you to decide whether you would like to take part in a research project. Please feel free to ask questions before you make your decision about taking part - the researcher will be happy to explain anything that you are not sure about. You may withdraw your agreement to take part at any time.

***What is the research about?***

The research is designed to help us to understand more about the range of difficulties that people can report experiencing and their performance on short psychological tests.

***What is involved?***

If you take part you will be asked a number of questions about a number of symptoms which you may or may not experience. You will also be asked to complete some short psychological tests. **We would like you to be as honest as possible when answering the questions and to perform to the best of your abilities on the tests.** In total, this should take approximately 60 minutes. About 15 minutes into these tasks you will be instructed to answer the questions in a particular way. You will not be told the details of this yet, as it is important that you answer questions at the beginning without being aware of the instructions that you will be given later.

We have no reason to believe that you will experience any adverse effects from taking part in this study. You should decline to take part in this study if:

- You have a history of severe mental illness (e.g. schizophrenia, bipolar disorder)
- You have a history of neurological disorders (e.g. Parkinson's, epilepsy)
- You have ever had a head injury resulting in being unconscious for more than 10 minutes
- You have a serious reading difficulty

## APPENDIX 4 CONTINUED

You will not be asked to give a reason for declining to take part. We hope that this research will enable us to improve the efficiency with which we diagnose the presence of mental illness in people who report symptoms of mental illness.

**This research is anonymous and confidential. Remember that taking part in research is completely voluntary and that you can choose to withdraw your consent at any time**

This study will be reviewed and approved by the Ealing Local Research Ethics Committee and the UCL Committee for the Ethics of Non-NHS Human Research.

**APPENDIX 5**

Ealing Local Research Ethics Committee

NHS

30 June 2004

Ms Jelena McMennemin
Trainee Clinical Psychologist
Sub Dept. of Clinical and Health Psychology
University College London

Dear Ms McMennemin,

***Full title of study: Malingered Cognitive Deficits in Severe Mental Illness***
***REC reference number: 04/Q0410/9***
***Protocol number: 4***

The Research Ethics Committee reviewed the above application at the meeting held on 14 June 2004.

**Ethical opinion**

On the information sheet for malingering healthy controls, there is some information witheld at the point of consent, this could perhaps be explained a little fuller. It is not stated anywhere that the participant can withdraw at any time.

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

*The favourable opinion applies to the following research site:*

Site: West London Mental Health NHS Trust
Principal Investigator: Ms Jelena McMennemin

**Conditions of approval**

The favourable opinion is given provided that you comply with the conditions set out in the attached document. You are advised to study the conditions carefully.

**Approved documents**

The documents reviewed and approved at the meeting were:

Document Type: Application
Version: 1
Dated: 25/05/2004
Date Received: 25/05/2004

**Management approval**

The study may not commence until final management approval has been confirmed by the organisation hosting the research.

All researchers and research collaborators who will be participating in the research must obtain management approval from the relevant host organisation before commencing any research procedures. Where a substantive contract is not held with the host organisation, it may be necessary for an honorary contract to be issued before approval for the research can be given.

**Membership of the Committee**

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

**Notification of other bodies**

We shall notify the research sponsor, West London Mental Health NHS Trust and the Medicines and Health-Care Products Regulatory Agency that the study has a favourable ethical opinion.

**Statement of compliance *(from 1 May 2004)***

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

| **REC reference number:** | **Please quote this number on all correspondence** |
|---|---|

Yours sincerely,

**Chairman**

*Enclosures* *List of names and professions of members who were present at the meeting and those who submitted written comments*

*Standard approval conditions [SL-AC1 or SL-AC2]*

RESEARCH
DEVELOPMENT

WEST LONDON MENTAL HEALTH

25 October 2004

Dear Ms McMennemin

**Re: Malingered cognitive deficits in severe mental illness**

I am pleased to confirm that the above project has received Trust R&D approval, and you may now commence your research.

May I take the opportunity to remind you that during the course of your research you will be expected to ensure the following:

- **Patient contact:** only trained or supervised researchers who hold a Trust/NHS contract (honorary or full) are allowed contact with Trust patients. If you do not hold a contract please contact the R&D Office as soon as possible.
- **Informed consent:** original signed consent forms must be kept on file. A copy of the consent form must also be placed in the patient's notes. Research projects are subject to random audit by a member of the R&D Office who will ask to see all original signed consent forms.
- **Data protection:** measures must be taken to ensure that patient data is kept confidential in accordance with the Data Protection Act.
- **Health & safety:** all local health & safety regulations where the research is being conducted must be adhered to.
- **Adverse events:** adverse events or suspected misconduct should be reported to the R&D Office and the Ethics Committee.
- **Project update:** you will be sent a project update form at regular intervals. Please complete the form and return it to the R&D Office.
- **Publications:** it is essential that you inform the R&D Office about any publications which result from your research.

We would like to wish you every success with your project.

Regards

**Research Governance Co-ordinator**

# APPENDIX 6

## INFORMATION SHEET FOR PATIENTS

**(version 2 – dated 22.9.2004)**

You are being asked to participate in a research project. The statement below explains in ordinary language what will happen to you if you agree to take part; it describes any risks or discomfort you may experience, and it also explains what we hope to learn as a result of your taking part. You should not take part if you do not wish to do so. If you decide not to take part and you are a patient, your treatment will not be affected by your decision. You are free to withdraw if you are a patient without affecting your subsequent treatment.

**YOU WILL BE GIVEN A COPY OF THIS SHEET**

***LREC Registration Number: 04/Q0410/9***

***Brief Title of Project*** Assessment of Cognitive Symptoms in Mental Illness.

***Explanation***

This sheet is designed to help you to decide whether you would like to take part in a research project. Please feel free to ask questions before you make your decision about taking part - the researcher will be happy to explain anything that you are not sure about. You may withdraw your agreement to take part at any time.

***What is the research about?***

The research is designed to help us to understand more about the range of difficulties that people can report experiencing and their performance on short psychological tests.

***What is involved?***

If you take part you will be asked a number of questions about a number of symptoms. You will also be asked to complete some short psychological tests. **We would like you to be as honest as possible when answering the questions and to perform to the best of your abilities on the tests**. In total, this should take approximately 60 minutes. We have no reason to believe that you will experience any adverse effects from taking part in this study.

This research does NOT involve any physical examinations or the giving of any medication. Taking part – or not taking part – in the research will not affect the care you receive in any way. Your participation will not be recorded in your notes.

**Remember that taking part in research is completely voluntary and that you can choose to withdraw your consent at any time.**

This study will be reviewed and approved by the Ealing Local Research Ethics Committee and UCL Committee for the Ethics of Non-NHS Human Research.

# APPENDIX 7

Participant Identification Number for this trial:

## CONSENT FORM

Title of Project: **Assessment of Cognitive Symptoms in Mental Illness**

Name of Researcher: **Jelena McMennemin**

**PLEASE SIGN BELOW AFTER READING THOROUGHLY**

I confirm that I have read and understand the information sheet dated 22.09.2004 (Version 1) for the above study and have had the opportunity to ask questions.

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 or legal rights being affected.

I understand that sections of any of my medical notes may be looked at by responsible individuals from West London Mental Health NHS Trust or from regulatory authorities where it is relevant to my taking part in research. I give permission for these individuals to have access to my records.

I agree to take part in the above study.

I understand that if I reveal anything to the researcher that indicates a risk of harm to myself or others or an intention to leave the hospital without permission the researcher will inform nursing staff about this.

Name of Participant Date Signature

Researcher Date Signature

**YOU MAY WITHDRAW FROM THIS RESEARCH AT ANY TIME WITHOUT CONSEQUENCE**

# APPENDIX 8

**VERSION 1:24.05.2004**

## CDQ

Mental disorders are associated with a wide range of difficulties and unusual experiences. Some of these experiences can be very distressing. This questionnaire is designed to help us to understand the difficulties and unusual experiences that some people report having and how distressing they find them. I will be asking you about **70 different types of problems**. Please say yes if you have had any of these problems **within the last three months**, otherwise say no. You may not be sure if you have had any of these things. If you are not sure that you have had these things just say that you are not sure.

### Gustatory

1) Your sense of taste being much stronger than usual

2) Feeling flooded by tastes

3) Not being able to taste one thing because of being flooded by different tastes

4) Often getting a vinegar-like taste in your mouth for no obvious reason

5) Not being able to taste things on one side of your tongue.

### Olfactory

6) Your sense of smell being much more powerful than usual

7) Feeling flooded by smells

8) Not being able to smell one thing because of being flooded by different smells

9) Often being able to smell something like burning rubber for no reason

10) Getting the taste or smell of something just by touching it (for example touching an apple and tasting it in your mouth before you eat it).

### Tactile/somatic

11) Reaching for something but your hand missing it by more than a couple of inches

12) A muscle or muscles jumping or twitching

13) Loss of the ability to write down words on paper

14) Your handwriting having changed a great deal

# APPENDIX 8 CONTINUED

15) The impression that you have lost the ability to control your left hand at times and it seeming to have a "mind of it's own".

16) Finding it very difficult to judge how heavy things are when you pick them up with your hand

17) Finding it very hard to tell if things are hot or cold when you are touching them.

18) Finding it very hard to tell if things are rough or smooth when you are touching them.

19) Finding it very hard to tell how big things are when you are touching them

20) Finding it very hard to tell what shape things are when you are touching them.

21) Loss of the ability to feel sensations down one side of your body.

22) The feeling that a part of your body has got much larger.

23) Loss of the ability to feel things on your face

24) Having great trouble keeping your balance when walking

25) Your hands trembling when you start writing

26) Not being able to control your arms or hands like you used to.

27) Not being able to do things like tying up shoelaces or doing up buttons any more

28) Things that you are holding seeming much bigger or smaller than they usually do.

29) The feeling that a part of your body has got much smaller

30) Not being able to do simple things like drawing simple shapes

**Auditory / verbal**

31) Sounds being louder or more intense

32) Feeling flooded by sound

33) Not being able to concentrate on one particular sound because of feeling flooded by other sounds

34) Not being able to say words that you used to be able to say

35) Everyday sounds sounding somehow different to before

## APPENDIX 8 CONTINUED

36) Repeating things that other people say even though you do not mean to do so

37) Repeating yourself a lot

38) Buzzing followed by ringing in the ears

39) Hearing the things that people say to you repeated over and over in your head.

40) Not being able to repeat something that somebody has said.

41) Starting to say something and then forgetting what you meant to say

42) Thinking that people talking in your language are talking in a different language

43) Not being able to remember the names of things

44) Jumbling your words when you speak

**Visual things**

45) Your vision being much more powerful than usual

46) Feeling flooded by visual images

47) Not being able to concentrate on one visual image because of feeling flooded by lots of visual images

48) Things just not seeming to have any colour when you look at them.

49) Not being able to recognise things properly when you are looking at them.

50) Double vision

51) Things seeming to change colour when you look at them for more than a couple of seconds

52) Not being able to tell the difference between colours like you could before.

53) Things that you look at having a greenish colour to them

54) Not being able to recognise the faces of people that you know.

55) Things looking much smaller than they used to.

56) Things seeming to look much closer than they did before

# APPENDIX 8 CONTINUED

57) Things looking much bigger than they used to.

58) Visual things being repeated. For example, a person will walk past you, and then a few minutes later you will get the impression of seeing them walk past you again.

59) Things that you look at having a reddish colour to them

**Confusion / cognitive**

60) Not being sure if you are right or left handed

61) Not understanding how to do even simple maths like adding up or taking away any more
62) Not being able to remember what you had for breakfast

63) Not being able to remember the first name of one of your parents

64) Not being able to remember your date of birth

65) Not being able to remember what happened yesterday

66) Not being able to remember anything for a reasonably long period of your life (for example not remembering anything from secondary school)

67) Getting confused between up and down

68) Getting confused between left and right

79) Loss of the ability to tell the time when you look at a clock

# APPENDIX 9

ICONIC MEMORY TASK INSTRUCTIONS
**(Version 1 –dated 27.09.2004)**

Now I am going to ask you to do something on the computer again.

This is a test of the speed and accuracy of mental processing. During this task many displays of 8 letters will appear on the screen like this (show sample on computer). During each display the letters will be different but they will always be presented in 2 rows of 4.

The letters will be flashed on the screen for a very short time period so it is important that you keep paying attention to and looking at the screen at all times.

After each set of letters flashes up I will say either "top" or "bottom".

If I say "top" it is your task to tell me in the right order what the letters in the top row of the grid were.

If I say "bottom" it is your task to tell me in the right order what the letters in the bottom row of the grid were.

Shall we take a look at a couple of examples?

Here is the first example (show letters – and say 1 when they disappear from the screen). Wait for respondent's answer. If correct say "yes that's right when I say "1" you report the letters on the top row. If the participant does not appear to understand, repeat above instructions and further demonstrations of reporting the top row.

Now let's run through some examples of reporting the bottom row, which you need to do after I say "2" following a display of letters. Are you ready to try this out? (Show bottom row demo, say "2" after letters have disappeared and wait for respondent's answer).

Repeat as above with as many demonstration trials as necessary until the respondent comprehends these instructions. Note respondent does not need to respond correctly to sample trials in order to commence real trials, but he does need to comprehend instructions.

Have you got any questions before we begin?

This task is split into 3 sections and the time for which you see the display of letters gets MUCH shorter and shorter. In the second section the letters appear for HALF the time they first appeared for. In the third section the letters appear for half the time they appeared for in the second section – so the task gets MORE DIFFICULT as you go from section to section. Remember to keep your eyes on the letters at all times, so as not to miss them, and also to do your best. Remember to report the letters from left to right.

# APPENDIX 10

## POP OUT TASK INSTRUCTIONS

**(Version 1 –dated 27.09.2004)**

We are now going to do something else on the computer. This task is designed to test the speed and accuracy of your mental processing. Again it is important that you try to complete the task as quickly and as accurately as possible. First I will explain what I would like you to do.

- PART 1 (POP)

During this task you will see a number of different patterns of circles come up on the screen. In some of the patterns the circles will all be the same. In others there will be one "odd circle out" which has a piece missing from it.

(Indicate Sample 1)
Do you see these circles on the screen?
Can you see that one of them is different from the rest? (Indicate incomplete circle)
When you see that the circles are not all the same and there is one with a piece missing like this, I want you to press this button here (1). I have marked it "D" for different to help you to remember.

Now look at his group of circles. (Indicate Sample 2).
Can you see that they are all the same? There is not a circle with a piece missing out if it like there was last time. When you see a pattern like this, where all circles are the same, I would like you to press this button here (+/_). I have marked it "S" for same, to help you to remember.

Do you understand what you need to do?
So, press D when you see one different circle in the group, and S when they are all the same. Do not worry if you make a mistake just move onto the next answer.

Do you have any questions?

Remember your job is to press the buttons as quickly and as accurately as possible. You can keep your fingers over the buttons throughout the task to help you answer more quickly if you wish to.

The task is ended when no more circles appear on the screen.

Are you ready to begin?

- PART 2 (NONCIRC)

Thank for doing those.

Now I am going to ask to you to do a very similar task on the computer, except that this time the rules are a bit different.
Again there are patterns of circles that come up on the screen, and I want you to press "D" for different if there is an odd one out, or "S" for same if all the circles are the same.

## APPENDIX 10 CONTINUED

I will show you how this task is different from the last.

In this example, can you see that the odd one out is the full circle and that the other circles each have a piece missing. For this display you would press "D" for different because they are not all the same.

Then, in this example, you can see that the circles are all the same, and they all have a piece missing. For this one you would need to press the "S" button, because they are all the same.

Do you understand what you need to do?
Do you have any questions?

Remember that you should answer as quickly and as accurately as possible.

Are you ready to begin?

**THANK YOU VERY MUCH FOR COMPLETING THESE TASKS.**