D. CLIN. PSYCHOL.
UNIVERSITY OF EDINBURGH/NHS (SCOTLAND)
TRAINING COURSE

Psychotic and non psychotic interpretations of physiological sensations in delusional, panic, and healthy populations.

Wendy Prentice

Submitted in part fulfilment of the degree of doctorate in Clinical Psychology at the University of Edinburgh on 1st August 2008

ABSTRACT

Aims

Traditionally, psychoses and neuroses have been thought of as being very different in nature. More recently it has been recognised that there may be similarities between these groups in terms of their symptoms in the context of the continuum model. It has been suggested that people with psychosis as well as people with panic disorder experience similar internal experiences (thoughts, emotions, body state information) but interpret them in different ways. This study seeks to explore the extent to which individuals who experience delusions and those who experience panic are similar in terms of their interpretations of common somatic symptoms and to explore other factors which have been implicated in causing and maintaining delusions. This has implications for the further understanding and treatment of delusions.

Design

This study used a between groups design and was based on an opportunity sample of inpatients in a psychiatric ward and out patients attending clinical psychology and psychiatry departments.

Methods

Three groups of participants were recruited for this study which included 16 people who were experiencing delusions, 11 people who were experiencing panic disorder, and 15 healthy individuals who have no previous history of mental health problems. The participants filled in self report questionnaires measuring somatic attributions;

metacognitions; experiential avoidance; state/trait anxiety; delusion proneness; self-esteem and emotionality.

Results

Significant differences were found between the clinical groups and the healthy control group on scores for all 7 measures, supporting the hypotheses regarding the similarities between delusional and panic disordered patients compared with healthy controls. Remarkably, there were no significant differences between the clinical groups, although there is partial support for the idea that the clinical groups interpreted somatic symptoms differently, however, this is tentative.

Discussion

Overall, the results provide support for the continuum model of psychosis and Morrison's theory that people who experience panic and those who experience delusions process internal events in a similar way. These results also inadvertently suggest that anomalous internal experiences may be necessary in order for delusional beliefs to occur. However, further research is needed for validation of these results.

DClinPsychol Declaration of own work

This sheet must be filled in (each box ticked to show that the condition has been met), signed and dated, and included with all assessments - work will not be marked unless this is done

This sheet will be removed from the assessment before marking

Name: Wendy Prentice

Assessed work CS SSR Professional Issues (Thesis)

(please circle)

Title of work:

I confirm that all this work is my own except where indicated, and that I have:

- Composed and undertaken the work myself ☑
- Clearly referenced/listed all sources as appropriate ☑
- Referenced and put in inverted commas any quoted text of more than three words (from books, web, etc) ☑
- Given the sources of all pictures, data etc. that are not my own ☑
- Not made undue use of essay(s) of any other student(s) either past or present (or where used, this has been referenced appropriately) ☑
- Not sought or used the help of any external professional agencies for the work (or where used, this has been referenced appropriately) ☑
- Not submitted the work for any other degree or professional qualification except as specified ☑
- Acknowledged in appropriate places any help that I have received from others (e.g. fellow students, technicians, statisticians, external sources) ☑

I understand that any false claim for this work will be penalised in accordance with the University regulations ☑

Signature ..

Date ..01/08/08.....

Please note:

a) If you need further guidance on plagiarism, you can:

i/ Speak to your director of studies or supervisor

ii/ View university regulations at http://www.aaps.ed.ac.uk/regulations/Plagiarism/Intro.htm

b) Referencing for all assessed work should be in the format of the BPS style guide, which is freely available from the BPS web site

Acknowledgements

First of all, thank you to staff and patients of Lanarkshire NHS trust who took part in the study. Thanks also go to all clinicians who helped with the recruitment of participants for this study including my clinical supervisor James Dickinson for his positive influence when recruitment was stressful. Another big thank you goes to David Gillanders for his continued support and guidance, and for looking over draft copies of thesis sections for me. Furthermore, thanks to Dave Peck for his advice on statistics. And finally, special thanks go to my husband Alan for his technical expertise, and my daughter Lee, who have both been my greatest sources of support.

CONTENTS

Chapter 1: Introduction

1.1: Overview

Morrison (2001) has suggested that people with psychosis as well as people with panic disorder interpret internal experiences (thoughts, emotions, body state information) in a similar way. He suggests that people who experience panic interpret symptoms in a catastrophic but understandable way, e.g. heart attack, fainting etc. and that people who experience psychosis attribute symptoms to delusional explanations that are unlikely given the evidence, e.g. poisoning, alien control, spirit attack etc. On the surface it appears that these interpretations are very different, however, they share similarities such as both are based on similar stimuli, both are misinterpretations of internal experiences, both have undesirable consequences, and both have the potential to play a role in the development and maintenance of the problem.

Recent research has suggested that there are a number of similarities between panic and delusional groups. However, historically, the wider categories of neuroses including panic, and psychoses including delusions, have been classified in different diagnostic categories which have contributed to their separate study and treatment (Freeman & Garety, 2003). Yet, if you look closely at both groups' interpretations of their experiences they are very similar. For example, someone experiencing persecutory delusions may interpret anxiety symptoms as proof that the FBI are following them, and someone experiencing panic interprets their anxiety symptoms as proof that they may die of a heart attack. In these examples both interpretations are unlikely to be true, both are misinterpretations of anxiety related symptoms, and both implicate that something bad is going to happen to them. Morrison (2001) argues that

the difference between these interpretations is that the delusional interpretation is culturally unacceptable whereas the panic interpretation is more culturally acceptable.

This study seeks to illustrate the extent to which these two groups are similar in terms of their experience of physiological arousal and to determine what leads one group of people to make one interpretation and the other group another interpretation. This has implications for the further understanding and treatment of delusions.

1.2: History of Psychosis v's Neurosis

It is widely known that throughout the twentieth century, neuroses, which include anxiety related disorders such as panic, have been categorised and classified very differently from psychoses such as schizophrenia spectrum disorders. It is interesting to note, however, that this was not always the case. In the late eighteenth century and throughout the nineteenth century, psychosis was understood as a sub category of neurosis, and the wider category of neuroses was understood as having a physical cause (Beer, 1996).

William Cullen (1710-1790), a physiologist based at the University of Edinburgh published a four volume textbook classifying all of the known mental diseases in 1777. Within this four volume textbook Cullen had used the term neurosis to describe any disease or disorder characterised by abnormal nervous or mental function, physically located within the nervous system (Neve, 2004), which included 'hypochondriasis or hypochondria affection commonly called vapours or low spirits' (Cullen, 1808).

However the meaning of neurosis changed during the 19th century to mean a fairly mildly disordered mental state in which there was no loss of contact with reality but instead various forms of defensive exaggeration present (Neve, 2004). Acute anxiety, obsession, compulsion, and phobias were now classed as neuroses, with psychological rather than organic causes (Neve, 2004).

According to Beer (1996), these views had spread by the turn of the twentieth century. He stated that at this time most psychiatrists believed that psychoses had an organic aetiology, whereas the neuroses were believed to be of psychological origin. Jaspers (1963) also made a distinction between the neuroses and psychoses. He suggested that neuroses were "meaningful and allowed empathy" whereas psychoses were "ununderstandable" and "mad in the literal sense" (Freeman & Garety, 2003).

These views have remained until the present day but are now largely being questioned once again, and although the classification system has separated these categories of mental health difficulties, people have recognised that delusional beliefs may be similar to non-delusional beliefs as far back as 1960 (Freeman, 2007).

1.3: Present Day Definitions

Presently, the term neurosis is rarely used in the diagnostic manuals that are frequently used; ICD–10 (World Health Organization (WHO), 1992) and DSM–IV (American Psychiatric Association (APA), 1994). Conditions, including Panic disorder, which were attributed to neuroses are now included in the group 'neurotic, stress-related and somatoform disorders' in the ICD-10 and categorised as 'anxiety disorders' in DSM-

IV. Psychosis is referred to under the category of 'psychotic disorders' in DSM-IV and under the 'Schizophrenia, schizotypal and delusional disorders' group in ICD-10.

1.3.1: Defining schizophrenia and persecutory delusions

Psychosis is an umbrella term for the schizophrenic spectrum disorders which are categorised within the diagnostic manuals. The present study involved recruiting individuals who experience persecutory delusions and who, in some instances are diagnosed with delusional disorder or a schizophrenia spectrum disorder, therefore definitions of schizophrenia and persecutory delusions are explored below.

The essence of the DSM-IV (APA, 2000) description of diagnostic criteria for the schizophrenic disorders is that there should be two or more of the listed characteristic symptoms which include; delusions, hallucinations, disorganised speech, grossly disorganised or catatonic behaviour, and negative symptoms. It is noted that only one criterion need be present if delusions are bizarre. Further criteria specify duration, social/occupational dysfunction, exclusion of schizoaffective and mood disorders, exclusion of substance/general medical condition, and relationship to a persistent developmental disorder. Similarly, the ICD-10 describes the schizophrenic disorders as being 'characterised in general by fundamental and characteristic distortions of thinking and perception, and affects that are inappropriate or blunted. Clear consciousness and intellectual capacity are usually maintained although certain cognitive deficits may evolve in the course of time' (WHO, 1992).

Diagnostic criteria are arguably helpful when individuals present with particular difficulties that directly match the descriptions used in the diagnostic manuals. However, often individuals present with difficulties which do not neatly fit into these diagnostic criteria. As a result, diagnoses are not given. In order that those people who experience persecutory delusions or panic and who do not neatly fit the criteria for each of the disorders are included within this study, a definition of panic and persecutory delusions was also sought from the psychology literature.

Defining delusions has proved to be difficult within the literature because there is a lack of consensus when defining delusions. Debates around defining a delusional belief look for a difference between the content of normal beliefs and delusional beliefs, and for what causes delusional beliefs. The difficulty is apparent because delusions are not discrete discontinuous entities (Freeman, 2007), instead they are complex, multi-dimensional phenomena (Garety & Hemsley, 1994).

Persecutory delusions are defined within the category of 'delusional disorder' of the persecutory type in DSM-IV. This diagnosis is given if the patient believes that "The patient (or a close associate) is in some way being intentionally cheated, drugged, followed, slandered or otherwise mistreated." And that this occurs "For at least 1 month the patient has had delusions that are nonbizarre (the content is something that could reasonably happen)." (APA, 2000). Persecutory delusions within the diagnosis of delusional disorder differ from delusions that meet the diagnostic criteria for schizophrenia in that they are not bizarre. The term bizarre is very subjective and is likely to be interpreted differently among different researchers and mental health professionals.

Freeman and Garety (2000) outline a number of difficulties with definitions put forward for persecutory delusions and offer clearer criteria (see Table 1.1) offering more consistency for research in this area. However, they do not offer clarification of how the term bizarre can be defined in relation to the content of delusions.

Table 1.1. Criteria for a delusion to be classified as persecutory (Freeman & Garety, 2000)

Criteria A and B must be met :

A. The individual believes that harm is occurring, or is going to occur, to him or her
B. The individual believes that the persecutor has the intention to cause harm

There are a number of points of clarification :

I Harm concerns any action that leads to the individual experiencing distress
II. Harm only to friends or relatives does *not* count as a persecutory belief, unless the persecutor also intends this to have a negative effect upon the individual
III. The individual must believe that the persecutor at present or in the future will attempt to harm him or her
IV. Delusions of reference do *not* count within the category of persecutory beliefs

Freeman (2007) proposed that these criteria distinguish persecutory from anxious thoughts. These criteria were used to recruit participants for the present study.

1.3.2: Defining Panic

Panic disorder is a category within the 'neurotic, stress-related and somatoform disorders' group of the ICD-10 and is essentially described as "....recurrent attacks of severe anxiety (panic), which are not restricted to any particular situation or set of circumstances and are therefore unpredictable." (WHO, 1992). The DSM-IV divides panic disorder into two categories which are 'panic disorder with agoraphobia' and

'panic disorder without agoraphobia'. The definition used for the present study comes from the DSM-IV definition of panic disorder without agoraphobia. This is described as "recurrent unexpected panic attacks" and "at least one of the attacks has been followed by 1 month (or more) of one (or more) of the following", which relates to persistent "concern about having additional attacks, worry about the implications of the attack or its consequences (e.g. losing control, having a heart attack, "going crazy")' and/or 'a significant change in behaviour related to the attacks" (APA, 2000).

The essential feature of panic disorder is panic attacks which are defined as "A discrete period of intense fear or discomfort, in which four (or more) symptoms which include palpitations, sweating, shaking, shortness of breath, derealisation, a feeling of choking, chest pain, dizziness, fear of dying, and paresthesias, which develop abruptly and reach their peak within 10 minutes" (APA, 2000). The diagnosis of panic disorder is reserved for a subset of individuals who experience recurrent panic attacks (Clark, 1996). These criteria were used to recruit panic participants in the present study.

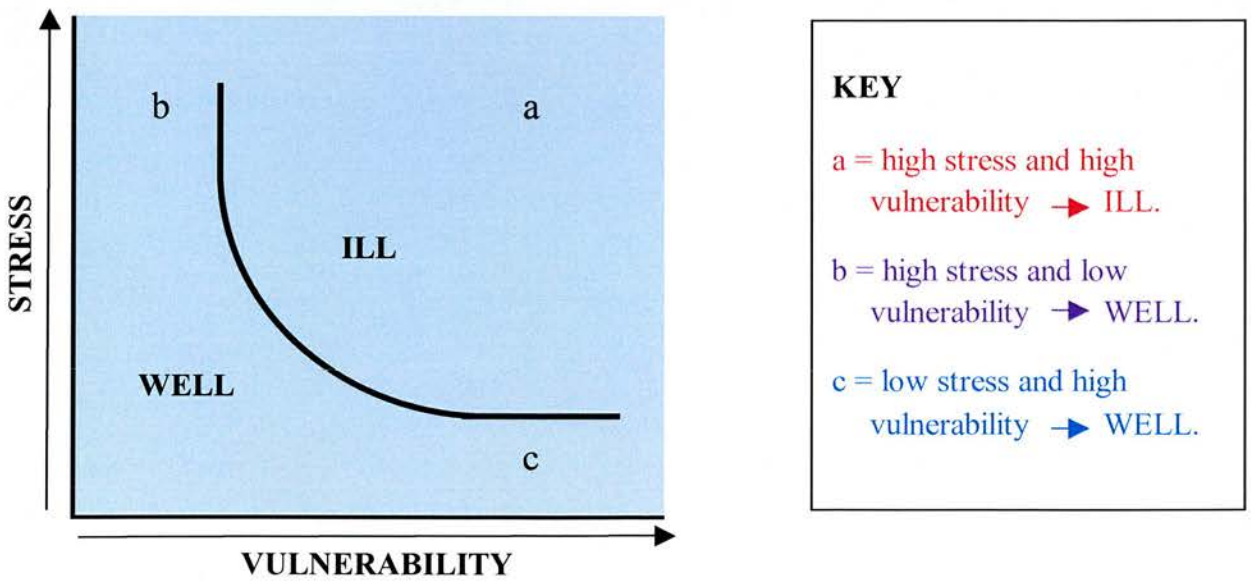
1.4: Cognitive models of psychosis

Historically, psychosis has been understood as having an organic cause. More recently, psychological theories have been implicated and developed to gain a deeper understanding of the symptoms of psychosis. It is beyond the remit of this thesis to describe all the psychological models of psychosis, and given that the focus is on people's interpretations of their experiences, a brief summary of the most influential cognitive models along with the stress vulnerability model is more appropriate and has more relevance to the present study.

1.4.1: Stress vulnerability model

Stress vulnerability models (e.g. Zubin & Spring, 1977; Nuechterlein & Dawson, 1984), sometimes referred to as diathesis stress models, have been widely used with regards to psychosis and are a sign of the multidimensional nature of psychosis. These models offer a biopsychosocial explanation for the development of psychotic symptoms which can be helpful in clinical work when providing psychoeducation to clients. Essentially, they assume that individuals have different levels of vulnerability to psychosis which can be exacerbated by stress and lead to psychosis. The greater the predisposition to schizophrenia, the less stress is needed for symptoms to emerge, however if vulnerability is low, more stress is needed to trigger an episode (Figure 1.1). Vulnerability can be in the form of genetic factors, birth complications, or early experiences (Freeman & Garety, 2004). Stress is defined as occurring as a result of 'the failure of routine methods for managing threats' (Gross, 1970), and may be in the form of life events or high expressed emotion experienced in a person's environment.

Figure 1.1 Stress Vulnerability Model



The stress vulnerability model gives context to the following cognitive models of delusions that are of relevance to this study.

1.4.2: Delusions as normal theories

Maher (1988) describes delusions as normal theories. He suggested that cognitive processes in delusional thinking do not differ from cognitive processes in non delusional thinking. The delusions are thought of as theories which provide order and meaning to explain surprising and puzzling experiences. When an explanation is found it provides feelings of relief and a reduction in tension. Maher goes on to report that theories will be judged by others as delusional when (a) they do not have access to the information on which the delusion is based or (b) they have access to the information but do not experience the same puzzlement as the person experiencing the delusion.

For example, Maher (1988) describes case studies from autopsies of delusional patients put forward by Southard at the beginning of the 20th century which suggest that the apparent somatic delusions that the patients expressed when alive explained the physiological phenomena that they were actually experiencing. One man who was thought to have experienced persecutory delusions and was thought to be full of hypochondriacal ideas such as "my stomach is full and I can't eat anything" was found to have signs of intestinal obstruction and other signs warranting a tentative diagnosis of abdominal cancer. This suggests that others did not have access to the perceptual experiences that the gentleman had and therefore judged his statements around being full as part of his delusional ideation.

Table 1.2. Ten formal propositions of Maher's model

1	Delusional thinking is not, in itself, aberrant. This means that the cognitive processes whereby delusions are formed differ in no important respect from those by which nondelusional beliefs are formed.
2	Delusions are best thought of as theories-much like scientific theories-that serve the purpose of providing order and meaning for empirical data obtained by observation. The following propositions about delusions thus apply equally well to the development of scientific theories.
3	The necessity for a theory arises whenever nature presents us with a puzzle. Puzzles arise when a familiar and hence predictable sequence of observation fails to occur in the expected fashion, but occurs instead in a new and unpredicted fashion. Puzzles are surprises. The events that are surprising are seen as significant
4	Puzzles demand explanation; the search for an explanation begins and continues until one is devised.
5	When an explanation for such a puzzle has been developed, it is accompanied by marked feelings of relief and tension reduction, or even exhilaration. This occurs whenever the explanation appears to account satisfactorily for a substantial range of the discrepant observations and for their departure from the predicted pattern.
6	Data obtained subsequently that contradict the explanation create cognitive dissonance and are unwelcome. Data that are consistent with the explanation reduce dissonance and are given particular status in the explanation.
7	Theories will be judged delusional by others if (1) the data upon which they are based are not available to those who are judging-the Martha Mitchell Effect is an instance of a belief system being dismissed as pathological because those who judged it to be delusional did not have personal access to the data upon which it is based; and (2) the data are available but most observers do not experience puzzlement or sense the significance that the patient does. This happens when events do occur as expected. The deluded patient nevertheless experiences puzzlement in the manner suggested in paragraph 8 below. The foregoing propositions may be summarised schematically as a sequence from observation to delusion, as follows: E. Expected sequence of experiences. O. Observed sequence of experiences. *E matches O.* No discrepancy and nothing to be explained. *E differs from O.* Discrepancy is noticed-Experience of puzzlement or perception of significance arises-A search procedure is activated, involving further observation-Development of hypotheses follows and these will be tested against new observations-Rejection of hypothesis when new observation fails to confirm it-Renewal of search, and so forth, until a satisfactory fit of observation to hypothesis is obtained-Feeling of relief-Reduction of dissonance-Raised resistance to new contradictory data together with low threshold for recognition of confirmatory data.
8	The experiences of "significance" and "relief" are assumed to have a real locus in the central nervous system, probably mediated by the matching of, or failure to match, one neutrally defined template (the expected sequence of observations) with another neutrally defined template (the experienced sequence of observations). If the neural locus hypothesis is correct, it is reasonable to suppose that the feeling of significance, with its accompanying tension and activation of the search mode, may well be produced endogenously by various neuropathologies that affect the relevant neural tissue, and that this may occur in the absence of any actual discrepancy in the environmental sequences or between the neural templates themselves. Thus the observation of an expected, trivial, or irrelevant event may be accompanied fortuitously by a feeling of significance and puzzlement even though the experienced event may not be discrepant from its expected form. The concept of "delusional mood" fits this formulation (i.e., the experience that familiar objects or situations seem to have acquired an unexplained significance). When this happens, the task of the patient is to discover why this seemingly trivial event or object is now significant.
9	Delusional theories based upon data unavailable to the public should develop whenever there is (1) a real impairment in sensory functioning, including the sensation of pain, kinaesthetic and visceral sensations, and the like, that has not been identified and diagnosed as such to the patient; (2) a defect in the processes that select incoming information for processing (i.e., an attentional deficit); or (3) the experience of disturbance in personal expressive behaviour, such as language disturbances or motor impairment, that have not been given an independent diagnosis.
0	A delusional theory, like other theories, is not readily abandoned until it can be replaced by a theory that better explains the experiences that the patient is having. Hence the folk-clinical observation that delusional patients do not readily abandon their theory in the face of critical contradictory evidence does not indicate a pathology of reasoning. It merely tells us that deluded patients are like normal people-including scientists-who seem extremely resistant to giving up their preferred theories even in the face of damningly negative evidence.

Taken from Maher (1988)

Maher's model (Maher, 1974; 1988) has ten formal propositions (Table 1.2). However, a basic version describing the practicalities of the model explains four main components to a persecutory delusion: (1) the experience is the result of a disorder of perception due to an impairment of function in sensory input pathways rather than a cognitive disability. As a result of the impaired sensations, the sensory experience is unusual; (2) the uniqueness of this unusual experience is noted and may lead to a belief that other people are lying, which in turn leads to a feeling of being victimised and persecuted; (3) a causative agent is identified where the sensations are painful or unpleasant. This causative agent may or may not be visible. If no causative agent is visible, the patient is left with the possibility of invisible agencies such as radio waves, demonic or devine powers, FBI etc; (4) the patient attempts to understand why this is happening by drawing on past experiences. Maher suggests that if the patient has a guilty secret in his past or present life, he may conclude that this explains why he is now being punished in this way.

Maher's model may have been influential in prompting research into delusions within healthy populations, and supports, as well as being influential in, the continuum model. In addition, this model may also have played an influential role in Morrison's (2001) misinterpretation model of psychosis. Maher (1988) provides a summary of evidence that is consistent with his model which includes (a) the empirical observations that delusions have been found in a number of different disorders (Maher & Ross, 1984), and (b) that healthy participants can be provoked into experiencing irrational beliefs under anomalous conditions like sensory deprivation. Maher also states that there is no independent evidence of actual impairment of reasoning ability in delusional patients. This argument was also put forward in a more recent paper by Maher (2005).

Garety and Hemsley (1994) provide a counter argument to Maher's claims. They argue that although there may be some people who experience unusual sensory experiences like an unacknowledged loss of auditory acuity, others who also experience delusions may not, which therefore limits the generalisability of Maher's model. In addition, they review literature which casts doubt on Maher's claim that there is no evidence of actual impairment of reasoning ability in delusional patients.

In contrast to Maher's claim, Garety and Hemsley (1994) reviewed some experimental studies of reasoning biases in people with psychosis. The review found that people who experience delusions make excessively external attributions for negatively valued events and positively valued events (Kaney & Bentall, 1989), and that the participants showed a social reasoning bias in that they made excessive person attributions for negative events and were over confident about their judgements (Bentall *et al.*, 1991). Since then there has been a number of studies that have found a jumping to conclusions bias in persecutory delusions (e.g. Dudley *et al.*, 1997). In contrast to Morrison *et al.* (2001) and Maher (1974), Garety and Hemsley (1994) imply, in line with the stress vulnerability model, that there is a biological component to the development of delusional explanations. More specifically, they suggest that delusions are the result of information processing deficits which occur as a result of cognitive dysfunction, and these deficits can lead to anomalous experiences. This model is supportive of the categorical model rather than the continuum model.

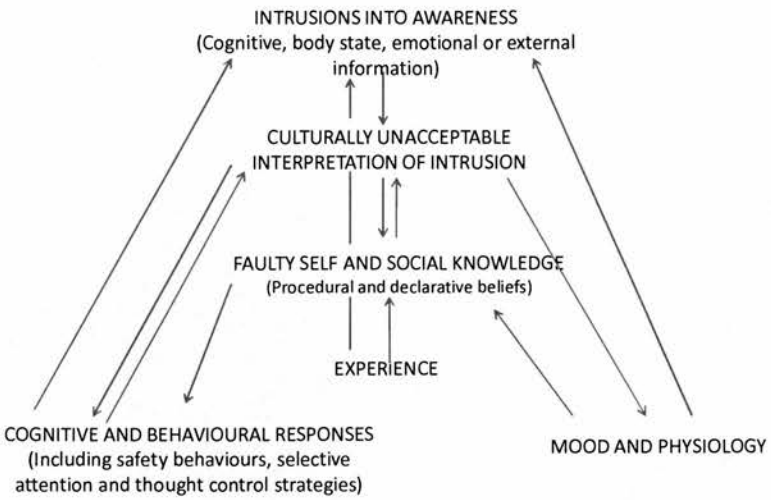
Maher's model led to clinicians and researchers asking questions about why the delusional patient rejects the more natural explanation. Maher suggested that delusional ideas spring from unusual internal experiences and therefore odd

experiences lead to odd ideas (Freeman, 2007). Many different cognitive models have also tried to answer this question by implicating different cognitive factors.

1.4.3: A cognitive misinterpretation model of psychosis

Morrison (1998) outlined a cognitive approach to auditory hallucinations that is based on the models of panic and anxiety developed by Clark (1986), Beck (1976) and Salkovskis (1991). He proposed that (a) 'hallucinations are normal phenomena, and that it is the misinterpretation of such phenomena as threatening the physical or psychological integrity of the individual that causes the distress and disability that are commonly seen in schizophrenic patients experiencing hallucinations.' Morrison states that evidence for this comes from research carried out by Allen and Argus (1968) who suggested that hyperventilation can cause hallucinations to occur in people who experience schizophrenia. And (b) 'the interpretations of auditory hallucinations are maintained by safety seeking behaviours (including hypervigilance)'. He suggests that the misinterpretations have an impact on negative mood and physiological arousal which in turn trigger another hallucination, leading to a vicious cycle similar to that found in panic. At the same time, the misinterpretation brings about safety seeking behaviours, which in turn increases the probability of another hallucination occurring and stops the individual from testing whether the misinterpretation was true or not thereby maintaining the belief that the misinterpretation is true. Morrison (2001) developed the model from being a generic cognitive model based on anxiety disorders to one that takes into account metacognitions and is applied to delusions as well as hallucinations (see figure 1.2).

Figure 1.2 A cognitive model of psychosis



Taken from Morrison (2001)

The cognitive model of psychosis developed by Morrison (2001) suggests that delusions can be seen as interpretations of intrusions into awareness, and that it is the interpretations of these intrusions that cause the associated distress and disability. It also assumes that these interpretations are caused by faulty self and social knowledge, which are in turn caused by past trauma. This model also argues that intrusions and their interpretations are maintained by mood, physiology, and cognitive and behavioural responses, which are guided by procedural beliefs such as 'scanning for danger is a good survival strategy' and declarative beliefs such as 'people are dangerous'.

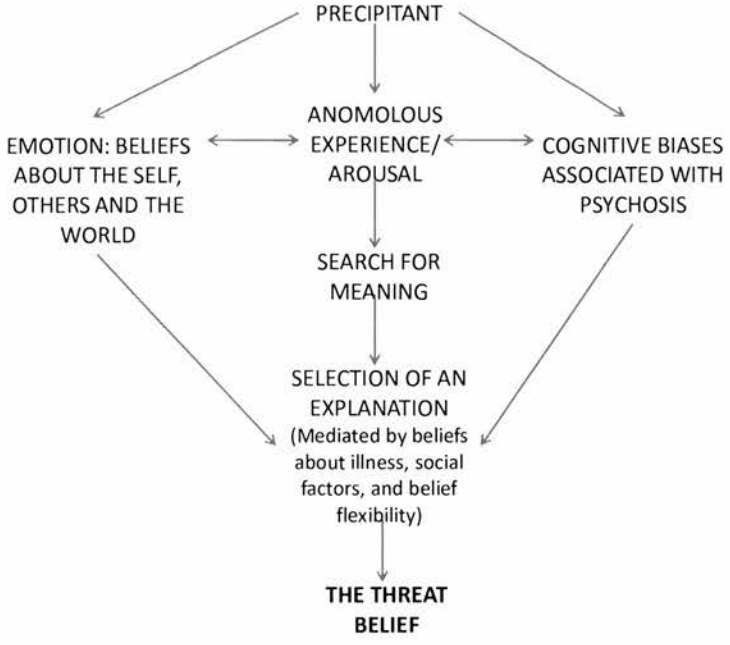
Metacognitive appraisals of delusions are also implicated in the development and maintenance of psychosis. Morrison (2001) states that individuals who hold positive beliefs about unusual experiences may take drugs to induce the experiences, or they may attend more to unusual experiences, or the experiences may occur as a coping response. However, he adds, if the unusual experiences are experienced in a negative way, for example being appraised as uncontrollable or dangerous, or lead to occupational or social functioning difficulties, they become distressing and problematic.

Morrison (1998) also states that it is possible that negative appraisals around the uncontrollability or danger of psychotic experiences are likely to invoke a perceived threat to their physical or psychological well being. This is consistent with the Self-Regulatory Executive Function (S-REF) model which suggests that vulnerability to emotional disorder is majorly influenced and maintained by metacognitive appraisals. In addition, Morrison's claims are supported by research showing that individuals who experienced auditory hallucinations scored higher on the uncontrollability and danger subscale of the metacognitions questionnaire (Cartwright-Hatton & Wells, 1997) when compared with psychiatric and non psychiatric controls (Baker & Morrison, 1998). It should be acknowledged that Morrison's model is a fairly new model and has not been fully empirically tested as yet.

1.4.4: The threat anticipation cognitive model of persecutory delusions

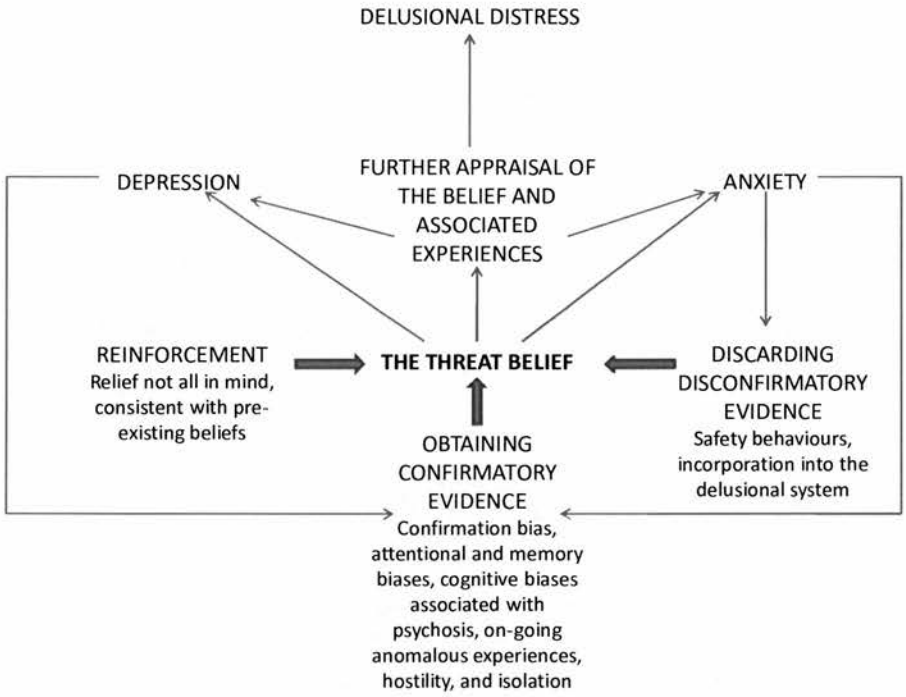
Freeman *et al* (2002) developed a multifactorial model of persecutory delusions (see figure 1.3). They suggest that many of the processes implicated in the maintenance of anxiety disorders (Clark, 1999) should be implicated in the maintenance of persecutory delusions. It is proposed that both persecutory delusions and worry are similar in that they both involve anticipation of danger and have physical, social or psychological threat content (Wells, 1994; Freeman & Garety, 2000). For this reason anxiety is hypothesised to be the key emotion in the formation of persecutory delusions.

Figure 1.3 A schematic presentation of Freeman *et al.* (2002) cognitive model of the formation of a persecutory delusion



Taken from Freeman *et al.* (2002)

Figure 1.4. A schematic presentation of Freeman *et al.* (2002) cognitive model of the maintenance of a persecutory delusion



Taken from Freeman *et al.* (2002)

Freeman *et al.*'s (2002) model is based on previous work done by Freeman and colleagues and the work of Maher, Birchwood, Chadwick, and Bentall (Freeman *et al.* 2002). According to Freeman *et al.* (2002), in individuals who are predisposed to psychosis, a delusion will be formed by a stressor (e.g. life event) which may cause arousal, which in turn will induce an inner-outer confusion (Fowler, 2000), which in turn will cause an anomalous experience (e.g. misinterpreting thoughts as voices) of which an explanation will be sought. This explanation will depend on things like beliefs, emotions, metacognitions, cognitive flexibility and cognitive biases. Maintenance of a persecutory belief occurs when confirmatory evidence of their belief is obtained (e.g. by seeking out evidence for their belief), and evidence against their beliefs (disconfirmatory evidence) is discarded (e.g. through safety behaviours such as avoidance). Emotions and negative beliefs about the self, others and the world are also

implicated in this model and serve to maintain the delusion. Further appraisals such as beliefs about illness (metacognitive beliefs) will also have an impact on emotions and serve to maintain the delusion. All of this occurs against a background of previous experiences and knowledge (see figure 1.4).

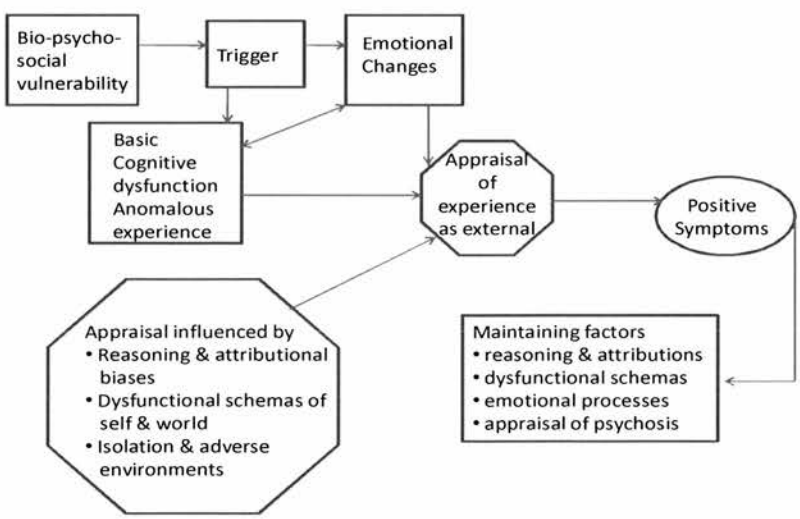
Freeman (2007) reviewed the psychology of persecutory delusions. He notes that there is an association of paranoia with lowered self-esteem and depression, although different levels of self-esteem can be found amongst individuals experiencing paranoia, and low self-esteem and depression could be one of many vulnerability factors for paranoia. He concludes that there is considerable evidence of affect and related processes having a direct, nondefensive role in the development of paranoid thoughts and that anxiety may be especially important in paranoid thoughts. However, models have not yet, been fully empirically tested and Freeman (2007) recognises this suggesting that further research could involve testing whether psychological models of paranoia can be shown to have high accuracy in explaining the occurrence of persecutory thoughts.

1.4.5: Delusions as a result of reasoning biases

Reasoning biases such as reduced data gathering ('jumping to conclusions') (Garety & Freeman, 1999), a failure to generate or consider alternative explanations of experiences (Freeman *et al.* 2004), and a strong confirmatory reasoning bias (Freeman, Garety, Kuipers and McGuire, 2005) are implicated in the maintenance of a persecutory delusion (Freeman, 2007) and are integrated into Freeman's threat anticipation cognitive model of persecutory delusions.

Research around the 'jumping to conclusions bias' has been carried out by Phillippa Garety and colleagues since the 1980's. They found evidence to suggest that people who experience delusions are quicker to jump to conclusions than healthy or non-deluded psychiatric controls (Garety & Hemsley, 1994). They report that individuals experiencing delusions make decisions based on less information than healthy controls and therefore show hasty decision making. Furthermore, they suggest that this hasty decision making is what leads to the development of delusional explanations. However, it has been stated that only 40-70 per cent of these individuals show evidence of this hasty decision making (Freeman & Garety, 2004), which suggests that reasoning biases on their own cannot account solely for persecutory delusions. This illustrates the complexity of persecutory delusions and the need for a multifactorial model. In addition, Fraser, Morrison and Wells (2006) found no differences between their panic and their delusions groups on a jumping to conclusions bias task.

Figure 1.5. A cognitive model of the positive symptoms of psychosis



Taken from Kuipers *et al.* (2006)

This model of the positive symptoms of psychosis (see figure 1.5) was put forward by Garety, Kuipers, Fowler, Freeman and Bebbington (2001). They suggest that appraisal of unusual experiences plays a central role in the development of positive psychotic symptoms. They also suggest that emotional changes and low self-esteem are very important and cognitive dysfunction such as information processing deficits are emphasised in the development of positive symptoms of psychosis. Furthermore, they suggest that reasoning biases play a role in symptom formation and maintenance (Kuipers *et al.* 2006). This model differs from Morrison's and Freeman's models in that cognitive dysfunction (e.g. information processing deficits) is seen to be a factor that distinguishes between psychosis and other disorders such as anxiety or depression in this one but not in Morrison's. These multifactorial models differ mainly in the emphasis of different model components.

1.4.6: Delusions as a result of dysfunctional attributional style

This cognitive theory implicates cognitive dysfunction and draws on research implicating a dysfunctional attributional style (Bentall, 1994; Bentall & Kinderman, 1998, 1999; Bentall, Kinderman & Kaney, 1994).

The delusion as defence model of persecutory delusions has been given a lot of thought within the literature and suggests that people who experience persecutory delusions externalise negative attributions to guard against low self-esteem. However, this has been challenged by others (Garety and Freeman, 1999) because studies have found that a number of individuals experiencing delusions exhibit low self-esteem as measured by self-esteem questionnaires. They argue that if externalising negative

attributions protects against low self-esteem then people would not experience low self-esteem and would instead experience normal to high levels of self-esteem. In response, Bentall *et al.* (2001) report that self-esteem does not necessarily need to be high in the delusion as defence model, and recognises that there are inconsistencies in the research literature which may be due to how it is measured due to the fact that self-esteem in individuals who experience persecutory delusions may fluctuate.

Richard Bentall and colleagues are proponents of the delusion as defence model. They assume that people experiencing persecutory delusions have negative beliefs about the self that are vulnerable to activation by negative life events. This is consistent with the stress vulnerability model. In addition they assume that those experiencing persecutory delusions try to avoid activating negative beliefs about the self by attributing threatening events to the actions of another person (Bentall *et al* 2001). It seems that in contrast to Freeman *et al*'s theory which suggests that persecutory delusions are the direct result of emotional concerns, Bentall's model suggests that persecutory delusions are a result of a tendency to avoid negative emotions.

1.4.7: Delusions as a result of a theory of mind deficit

One further cognitive theory which has suggested cognitive dysfunction and has received a lot of attention in the literature, implicates a theory of mind deficit (Frith, 1992; 1994). Testing this model is outwith the boundaries of the present study, however, it has received a lot of attention within the literature and so warrants a mention here. It has been proposed that certain psychotic symptoms associated with schizophrenia reflect a deficit in the ability to appreciate other people's mental states

(beliefs, desires, feelings and intentions) (Frith, 1992). According to Frith's theory, persecutory delusions occur when the person experiencing the delusions is unable to determine what other's beliefs and intentions are and they assume that others are purposefully hiding their intentions, which leads them to believe that a conspiracy exists.

One problem that has been highlighted with this theory is that although it gives a good explanation of how individuals experiencing delusions come to their conclusion that a conspiracy exists, it does not describe why the explanation is delusional in nature. For example, it is possible that people can experience a situation where others' perceived mental states are considered as being purposefully hidden but will not necessarily conclude there is a conspiracy. Secondly, there are people who experience theory of mind deficits, but they do not develop persecutory beliefs.

Some studies have shown that theory of mind difficulties do occur in people who experience persecutory beliefs (e.g. Craig *et al.* 2004), however other studies have found that theory of mind deficits are not present (e.g. Walston *et al.* 2000). Other findings have suggested that theory of mind is strongly related to thought disorder, verbal memory and cognitive disorganisation rather than "paranoia" (Greig *et al.* 2004). This suggests that theory of mind is not a necessary factor in persecutory delusions and cannot account for the processes that result in the delusional explanation. Therefore a theory of mind deficit theory of persecutory delusions is not sufficient within itself to explain the occurrence of persecutory delusions.

1.5: Continuum versus Category debate

Cognitive models hypothesise that symptoms of psychosis lie on a continuum from subclinical to clinical and that the presence of psychotic experiences alone is not sufficient to be considered as symptomatic of psychosis (Garety, 2007). The continuum approach suggests that delusions are not qualitatively different from normal beliefs, but simply represent a more extreme end of the population spectrum or distribution of anomalous mental phenomena (Johns & Van Os, 2001; Van Os, 2003). The alternative to the continuum model is the categorical approach which makes a clear distinction between presence and absence of mental disorder and argues that a distinctive mechanism is responsible for the formation and fixation of delusions (Jaspers, 1963 cited in Van Os, 2003).

Freeman (2007) recognises the argument that delusions might be better understood on a continuum with normal experience and refers to his previous research which reviewed 15 studies and concluded that there is a high rate of delusional beliefs in the general population. They found that around 1-3 per cent of the general (nonclinical) population experience delusions similar in severity to clinical cases of psychosis, and that another 5-6 per cent experience less severe levels but were related with social and emotional difficulties. A further 10-15 per cent were said to experience regular delusional ideation.

Another study found that there was a lot of overlap in the range of scores on the Peters delusions inventory (PDI) from both healthy and delusional groups (Peters *et al.* 1999) which is consistent with the continuum model. These researchers also found that the participants in the delusions group had significantly higher scores on the three

dimensions within the PDI which measures distress, preoccupation and conviction. They concluded that it is not simply the presence of a delusion that is problematic but the strength of the interpretation of the delusion, its emotional impact and how much people think about it which leads to the inability to function to full capacity. This illustrates the multidimensional nature of delusional beliefs as well as providing support for the continuum model of psychosis.

According to Van Os (1999) there are two continuum views which apply to psychosis. One suggests that psychotic states are on a continuum with normality and reflect dimensions of normal personality variation. The second refers to psychotic symptoms being on a normal continuum which increases in severity from healthy to affective states such as anxiety and depression through to clinical psychosis. Both suggest that psychosis is on a continuum with normal experience. One piece of research of which the results promote the argument for the continuum model found that mean scores of delusion proneness as measured by the PDI were lowest amongst the healthy control group, highest amongst the clinical psychosis group, and the second clinical group, which consisted of people experiencing anxiety and depression, produced mean scores that fell between the other two groups (Van Os *et al.* 1999).

The categorical model of psychosis assumes that the presence of a delusional belief equates to being unwell. There are a number of difficulties with this view. Firstly, it is widely acknowledged that simply the presence of what may be classed as delusional beliefs is not enough to cause clinical symptoms, and this is evidenced by research carried out within healthy populations (e.g. Kendler *et al.* 1996; Van Os *et al.* 2000; Johns *et al.* 2001). In addition, people can experience culturally acceptable beliefs

which may also be arguably classed as delusional, for example religious beliefs (Peters *et al.* 1999). This does not equate to being unwell as the category debate suggests. However, in support of the category debate, significant differences are generally found in studies comparing clinical populations with healthy populations.

Secondly, the level of distress, conviction and preoccupation associated with delusional beliefs have been implicated as changing along the normal continuum from mild to severe (e.g. Appelbaum *et al.* 1999; Peters *et al.* 1999) rather than being present or not present as is suggested with the categorical approach. In addition, research has found that neuroticism may precede, and contribute to the onset of psychosis (Weiser *et al.* 2001; Krabbendam *et al.* 2002; Freeman & Garety, 2003).

Thirdly, previous research has found that there is a high rate of delusional beliefs within the general healthy population (Peters *et al.* 1999, 2004; Freeman *et al.* 2005) who are not accessing services. All of this evidence lends support to the continuum rather than the categorical model of psychosis.

In summary, some cognitive models of psychosis, such as Morrison's and Maher's models, are based on the assumption that psychosis is on a normal continuum, which supports the continuum model. However, others, such as Garety *et al.* (2001), suggest that there is a biological basis to psychosis which supports the categorical model.

Some components which are implicated as being important for the development and maintenance of psychosis by the cognitive models are interpretations/explanations, emotion, self-esteem, metacognitions, and safety behaviours. To date, these different

aspects that are said to be involved in the development and maintenance of delusions have been studied in relative isolation. The current study seeks to explore a variety of these indices together, within the context of a continuum model. This study seeks to do this by measuring the responses of healthy controls, panic disordered patients and people who experience delusions to standardised measures of those variables implicated in the development and maintenance of delusions. These variables include misinterpretations of body state information, metacognitions, experiential avoidance (as a safety behaviour), emotionality, and self-esteem. Research evidence for the inclusion of each element is reviewed below.

1.6: Evidence of Misinterpretations

1.6.1: Delusions

According to Morrison (2001) delusions are misinterpretations of intrusions into awareness which cause the associated distress and disability. It has been suggested that the nature of intrusions are of three different kinds; external stimulus information, cognitive state information, and body state information (Wells and Matthews, 1994). The initial interpretation of the intrusion will determine choice of cognitive and behavioural responses or strategies that will affect the subsequent occurrence of similar intrusions. For example if someone interprets a delusion as a result of stress or sleep deprivation, they may reduce arousal or get some sleep but not give the delusion any further thought. However if the same person was to interpret it as being a sign of madness or indicative of someone's attempts to harm them, they may engage in hypervigilance for similar experiences, attempt to suppress the experience, punish themselves for it or adopt safety behaviours to prevent the feared outcome, all of which may contribute to the maintenance of further delusions.

Maher (1974) noted that delusional beliefs are considered as explanations of experience, and that internal feelings (e.g. physiological arousal) as well as external events (e.g. others' behaviour), are the kinds of experiences that cause delusional explanations. In addition, Freeman (2007), states that persecutory delusions are viewed as explanations that contain threat beliefs about physical, social or psychological harm. He gives an example saying that people who are vulnerable to paranoid thinking try to make sense of internal unusual experiences by interpreting external information in an unhelpful way. For example, a person may go outside feeling unusual and rather than accept that this is the case, they interpret the feeling as evidence, together with the facial expressions of strangers in the street, that there is a threat.

Misinterpretations of intrusions regarding bodily sensations are central to the cognitive model of panic (Clark, 1986) as well as other anxiety disorders such as obsessive compulsive disorder (e.g. Salkovskis, Forrester, Richards & Morrison, 1998; Wells, 1995), generalised anxiety disorder (Wells, 1995),and hypochondria (Warwick and Salkovskis, 1990).

Morrison suggests that many delusions arise from misinterpretations of bodily sensations. An epidemiological example is available that develops the analogy with regards to misinterpretations that Morrison (1998) made between auditory hallucinations and panic disorder. Williams (2002) describes the treatment of a young woman with a diagnosis of schizophrenia and uses the cognitive model of panic disorder (Clark, 1986; see figure 1.6) as a template when understanding her psychotic experiences, therefore cognitive therapy was the treatment of choice.

The young woman described experiencing pulses akin to throbbing in her body which she thought were being sent to harm or kill her by her husband and/or others. After a brainstorming session a possible list of explanations were made including physiological symptoms of anxiety and each explanation was ruled out based on information and evidence gained. Through evidence gathering and guided discovery the young woman was able to interpret the pulsing in a more culturally acceptable and less distressing way by attributing the pulsing to anxiety related physical symptoms and to physical changes in her body as a result of her pregnancy.

Safety behaviours which helped her to avoid thinking about the pulsing were identified and replaced with strategies concerned with thinking about the normality of the pulsing. By the twelfth session a reduction in the frequency of the pulsing phenomena, the duration of the phenomena when it did occur, and the degree of distress experienced was reported. Williams (2002) clearly states that he is in no way suggesting that this is a good model for psychosis in general but rather that it may be helpful when formulating with individuals within a sub group of people who misinterpret the physiological sensations associated with anxiety in a delusional and catastrophic manner. He also makes a distinction between the sub group mentioned above and individuals who misinterpret such sensations catastrophically in socially acceptable ways and are understood to suffer from panic disorder.

There are some further epidemiological examples in the literature of people who experience psychosis and misinterpret bodily sensations. For example, Reeves & Torres (2003) present seven cases in which patients experiencing psychosis misinterpreted physical pain and expressed this pain as a delusion. In one case, a 42

year old man diagnosed with schizophrenia misinterpreted pain he experienced down his leg which was caused by a slipped disc. He attributed the cause of the pain as devils stabbing him with knives so that they could enter his body through the wounds. His condition was very painful and required removal of the spinal disc, however, his treatment was delayed because his description of the pain was seen as a delusion. In another case example a 47 year old man diagnosed with paranoid schizophrenia began refusing to attend his outpatient appointments and refill his prescriptions because he was growing vampire teeth and could not go outside during the daytime, or he would be destroyed. An oral examination revealed that he had lost all of his central upper teeth, which made the incisors on either side of his mouth more noticeable. The authors concluded that 'psychotic patients may perceive or misinterpret stimuli related to physical symptoms incorrectly. They may fail to communicate these symptoms properly to others, and their complaints may sound bizarre or delusional.'

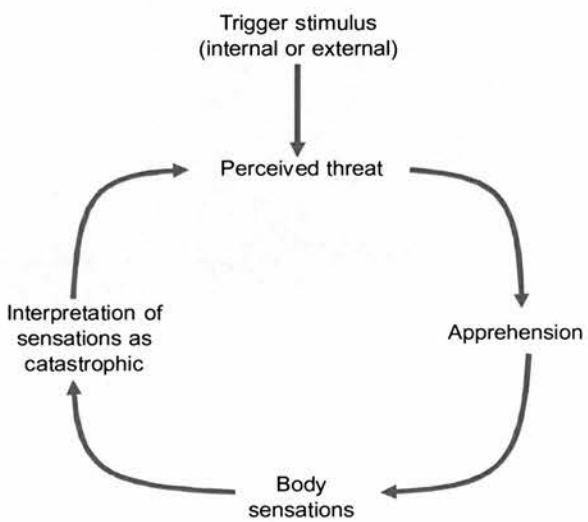
All of these examples suggest that at least some people who experience psychosis misinterpret internal bodily sensations, therefore, it makes sense to measure the interpretations of bodily sensations between both groups as a measurement of attributions for the present study.

1.6.2: Panic

The literature proposes that the common theme that occurs among panic attacks is the misinterpretation of the bodily sensations. According to Clark's theory of Panic (figure 1.6), individuals who experience recurrent panic attacks have a relatively enduring tendency to interpret certain bodily sensations in a catastrophic fashion. The misinterpreted sensations are basically those involved in normal anxiety responses

(e.g., palpitations, breathlessness, dizziness, paresthesias). The catastrophic misinterpretations involve perceiving these sensations as much more dangerous than they really are, and, in particular, interpreting the sensations as indicative of an immediately impending physical or mental disaster. Whereas people who do not experience panic are more likely to interpret their physical sensations as being the result of 'normal' experiences rather than evidence that something bad is going to happen.

Figure 1.6. Clark's (1986) Cognitive model of panic



Taken from Clark (1989)

With reference to Morrison's (2001) explanation of how delusional interpretations are processed, we can see that Morrison's cognitive model of delusions is an expanded version of Clark's model of panic.

1.6.3: Attribution Theory

Presently, attribution theory in persecutory delusions suggests that individuals attribute the cause of negative events to external factors to defend themselves from threats to their self-esteem, especially when combined with internal attributions for positive events (self serving bias (SSB)). The self serving bias has also been found within healthy populations and it is believed that within delusional populations this bias is exaggerated. The self serving bias is said to preserve self-esteem by reducing the difference between their idealised view of self and their actualised view of self (Bentall, Kinderman & Kaney, 1994; Bentall *et al.* 2001). The attributional theory for persecutory delusions is still not widely accepted as a definitive explanation for the maintenance or cause of paranoid like thinking (Humphreys and Barrowclough, 2006). Explanations for why this is the case have been proposed and suggest that there may be difficulties with the self serving bias theory itself or with the way in which it is assessed (Garety and Freeman, 1999).

The research which has been carried out has measured attributions using the Attributional Style Questionnaire (ASQ; Peterson *et al.* 1982) and the Internal, Personal, and Situational Attributions questionnaire (IPSAQ; Kinderman and Bentall, 1996). The ASQ was criticised for its reliabiltiy so Kinderman and Bentall (1996) developed the IPSAQ. Both questionnaires use hypothetical events and there is some doubt over whether hypothetical events serve as an equal to real events (Martin & Penn, 2002).

As previously mentioned, the present study used a measure from the health psychology literature (Symptoms Inventory Questionnaire (SIQ); Robbins and

Kirmayer, 1991) which gives examples of common physical symptoms (e.g. headaches, dizziness, dry mouth, sweating) and offers three different interpretations for each. The three different attributional styles are characterised by a psychological, physical, or environmental cause. This measure is fairly realistic in that everyone experiences common physical symptoms such as headaches and therefore can be used on all three groups (Panic, delusions, and healthy control group). The measure was also adapted to take into account the possibility that individuals who experience persecutory type thoughts may attribute the common physical symptom to something other than the three attributional styles offered.

1.7: Metacognition

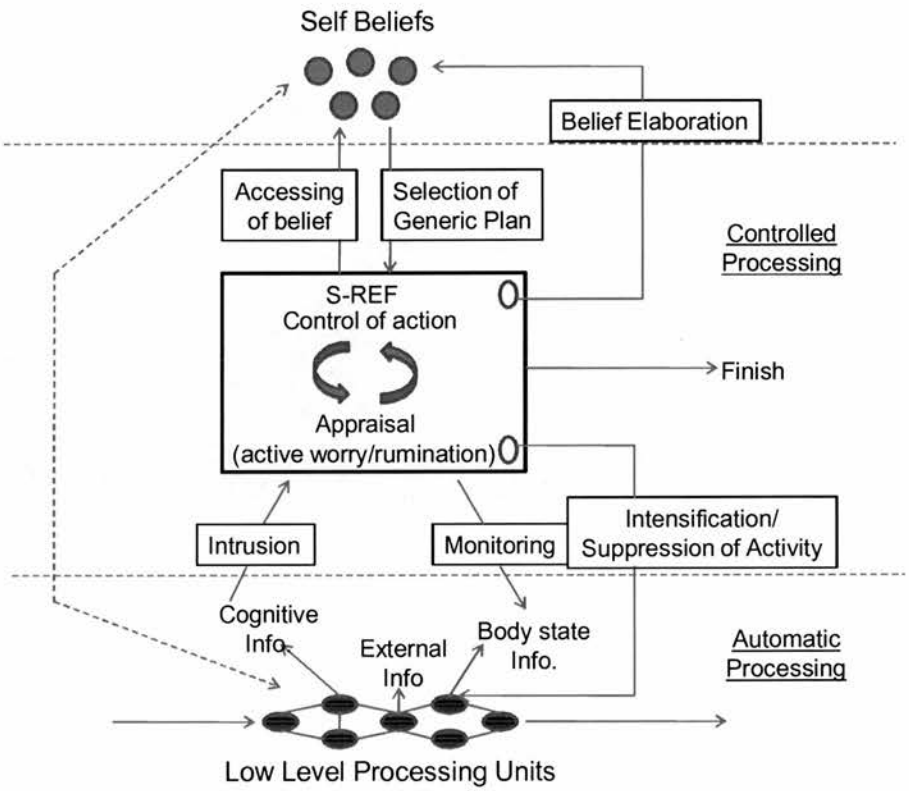
Metacognition has been identified as being an important factor which has been implicated in anxiety disorders (Wells, 2000) and psychosis (Morrison, 2001). It is described as "...any knowledge or cognitive processes that is involved in the appraisal, monitoring or control of cognition" (Wells, 2000).

1.7.1: The Self Regulatory Executive Function (S-REF) Model

Meta cognitive beliefs are said to be an important factor contributing to the Self-Regulatory Executive Function (S-REF) within the S-REF model of emotional disorders proposed by Wells & Matthews (1994; 1996). The S-REF model was developed in an attempt to overcome issues linked to schema theory and link schema theory with information processing and self regulation (Wells, 2000). Wells describes the S-REF model as being based on three interacting levels of cognition (see figure 1.7): (1) a stimulus driven lower level network of processing units which function outside conscious awareness but can impact on conscious processing in the form of an

intrusion; (2) a level of controlled processing which is involved in the conscious appraisal of events and the control of action and thought; (3) a store of self knowledge (beliefs) in long term memory. These beliefs have a metacognitive component and consist partly of plans for processing.

Figure 1.7. S-REF model (Wells & Matthews, 1996)



Taken from Wells (2000)

Wells (2000) notes that metacognition, attention, the regulation of processing and dynamic aspects of processing have been overlooked in schema theory and cognitive therapy and this model has been developed to illustrate the mutual causal relations between all of the components. Metacognitive models have been put forward for a

number of anxiety based disorders such as Generalised anxiety disorder (GAD) and Obsessive Compulsive disorder (OCD). In these metacognitive models, which are grounded in the S-REF model, metacognitions are triggered, and they then impact directly on emotions and behaviour. A coping strategy is implemented which in turn reinforces the self knowledge (which is often a metacognition) that lead to the selection of the coping strategy. Metacognitive beliefs are linked to the interpretation, selection and execution of particular thought processes, attention strategies and behaviours.

There are two modes of S-REF processing: (1) object mode and (2) metacognitive mode. Within the object mode the underlying assumption is that appraisals and beliefs are accurate and thoughts must be acted on. The goal then is to eliminate threat. Strategies are then put in place to evaluate the threat and implement threat reducing behaviours (e.g. worry, threat monitoring). According to Wells, (2000) the probable result from processing in object mode will be that maladaptive knowledge is strengthened. In metacognitive mode thoughts are appraised as events rather than reality, and these thoughts must be evaluated. The goal is to modify thinking by evaluating thoughts and also executing metacognitive control behaviours (e.g. suspend worry, redirect attention). The probable outcome for this mode of processing will be the restructuring of self knowledge and new plans developed. Wells (2000) concludes that the S-REF model predicts that metacognitive knowledge, appraisals' and strategies are a key influence on the vulnerability to and maintenance of emotional disorder.

1.7.2: Metacognition in anxiety and psychosis

As already noted, metacognitions are implicated in Morrison's cognitive model of psychosis which draws from the S-REF model. Morrison (2001) suggests that positive beliefs about psychotic experiences are associated with hallucinations and delusions, and that negative beliefs about psychotic experiences are associated with distress. Studies have consistently found that metacognitive beliefs about psychotic experiences play a role in their development and maintenance (Baker & Morrison, 1998; Lobban, Haddock, Kinderman, & Wells, 2002; Morrison & Wells, 2003). However, this research has mainly focussed on hallucinations rather than persecutory delusions. More recently, one study found that beliefs about paranoia as a strategy for managing interpersonal threat were associated with frequency of paranoid thoughts, and negative beliefs about paranoia were associated with distress (Morrison *et al.* 2005). However, replication of these relationships will not be attempted in the present study as it is beyond the boundaries of the present research.

Fraser, Morrison and Wells (2006) found no significant differences between their panic and delusion groups on their metacognition scores as measured by the metacognitions questionnaire (MCQ). In addition, Morrison and Wells (2003) compared the metacognitive beliefs of patients with delusions and patients with panic. They found that the groups scores were often similar and elevated in comparison to non patients.

1.8: Experiential Avoidance

Experiential avoidance is described as occurring when a person is unwilling to experience private experiences such as bodily sensations, emotions, thoughts, memories, images, and behavioural predispositions. In addition it happens when a person actively changes these experiences by reducing the amount of times they experience it or particular aspects of it (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996).

Experiential avoidance is a term used within the Acceptance and Commitment Therapy (ACT) literature, and it appears similar as a construct to other terms widely used within the literature such as avoidance, cognitive avoidance, experiential control and emotional avoidance. A wide range of therapies acknowledge that avoidance is a problem and can play a part in the maintenance of a wide range of psychological disorders. Avoidance is often used as a safety behaviour strategy as discussed previously. Individuals who avoid an aversive experience, put themselves in a position where they are unable to test whether the event is aversive or not and this is often referred to as a failure to disconfirm. If there is a failure to disconfirm then the behaviour is maintained and the avoidance behaviour can become problematic. A general example of this is if a person is bitten by a dog and they become aversed to dogs and therefore avoid them, they never meet other dogs and therefore do not disconfirm their belief that all dogs are dangerous. The avoidance behaviour can generalise to not going to parks or refraining from going outside at all because the neighbour has a dog. The avoidance maintains the belief and the behaviour becomes problematic.

Hayes *et al.* (2004) reasons that avoidance can be harmful because private events are often unresponsive to deliberate control efforts (see Wenzlaff & Wegner, 2000 for a review of thought suppression). Experiential avoidance has been noted within different therapies such as psychoanalysis, client centred therapy, and gestalt therapy (Hayes, 2004) for a long time and has recently received more attention through proponents of ACT.

Experiential avoidance has not been studied in psychotic samples but the evidence of association between experiential avoidance and psychopathology is sufficient in other disorders that it is worth studying here. Hayes and colleagues (2004) point out that avoidance can paradoxically increase the likelihood of unwanted private events, and conclude that excessive experiential avoidance is likely to be associated with higher levels of psychopathology and a lower quality of life. This is evidenced by research which has been carried out.

One study (Wells & Papageorgiou, 1995) tested the effects of ruminative worry on a group of non-clinical participants who were assigned to five groups; (a) control group; (b) Imagery group; (c) Distraction group; (d) Usual-worry group; and (e) film worry group). The participants were asked to rate their anxiety levels before they saw a gruesome short film and again after they had watched the film. Frequency of verbal worries and images during the film, and the amount of film watched were also measured after the film by the participants. Each group were then exposed to a short time where they were asked to either (a) image about the film and its implications, (b) engage in a distraction task, (c) worry about things that usually cause them to worry, (d) settle down, (e) worry about the film and its implications in verbal form.

Participants were then asked to record the frequency of intrusive thoughts over the next 3 days. The investigators found that verbal worry increased the number of intrusive images experienced by participants in this group. Evidence for these effects in clinical populations also exist (e.g. Craske *et al.* 1990).

Examples of strategies that ensure experiential avoidance include thought suppression, emotional suppression, avoidance coping, reappraisal, and self deception (see Chawla, 2007 for a review). Avoidance is thought to possibly bring about the negative symptoms of schizophrenia (Freeman *et al.* 2001), and a literature search for avoidance and delusions identified only one study which directly measured avoidance in delusions. Within this study, avoidance was found to be the most popular type of safety behaviour used by individuals experiencing persecutory delusions (Freeman *et al.* 2001).

Thought suppression, another type of avoidance, is said to be applied to private experiences with high social disapproval in a psychotic population (Bach and Hayes, 2002). This suggests that individuals experiencing delusions as well as other forms of psychosis are likely to use this method of coping. Individuals experiencing auditory hallucinations reported using distracting activities such as listening to music, behavioural tasks such as taking exercise, and cognitive tasks such as ignoring as ways of suppressing symptoms (Shergill *et al.* 1998).

Acceptance is the opposite of avoidance, and is mentioned in person centred based cognitive therapy (PCBCT; Chadwick, 2006) as well as being a central theme in ACT.

Chadwick (2006) offers a narrative to illustrate the experience of acceptance from a client's perspective within the context of mindfulness.

> You don't have to worry about what's right or wrong in your head, you know, it's that not judging what's going through your head, it's just accepting it as what it is, not worried about vindictive voices, or whatever, it's just accepting it, that's the way it is. No right, no wrong....Whereas before, this kind of stuff was happening I was fighting against it, thinking "no, this is wrong, this is wrong", fighting against these images. (p.89)

Another narrative offered by Chadwick (2006) illustrates the difficulty that an individual had in accepting thoughts because they invoked a strong judgement like 'I'm a bad person, sick in the mind.', and these judgements were supported by metacognitive beliefs such as 'I should not have these experiences, only a sick person would have thoughts like these.' (pp 89.) This suggests that acceptance and improving insight into metacognitive beliefs may be helpful strategies to employ when recovering from psychoses, as opposed to avoidance based coping/safety strategies.

Research has been carried out on acceptance versus thought suppression in individuals who experience panic. One study involved a group of participants who experienced panic disorder with or without agoraphobia (Levitt *et al.*, 2004). The participants were assigned to three groups: (1) acceptance group where individuals listened to a narrative which described the benefits of being willing to experience their thoughts and feelings; (2) suppression group where individuals listened to a tape encouraging them to gain control over their thoughts and feelings by pushing negative thoughts and emotions away; and (3) no instruction control group where individuals listened to a national geographic tape. Physical symptoms were then induced using CO2 gas and

anxiety levels and avoidance was measured. They found that the acceptance group reported less subjective anxiety and less avoidance (more willingness to participate in a second challenge) than did participants in the suppression or control groups. In addition, there were no significant differences between the three groups on self-report panic symptoms or physiological arousal, and there were no significant differences between suppression and control groups on subjective anxiety or willingness to participate in a second challenge. These findings suggest that by using an acceptance rationale individuals are more likely to show less avoidance, and reduced levels of subjective anxiety, which impacts favourably on behaviour.

Morrison (2001) suggests that many of the clinical developments pioneered in the field of anxiety disorders could be applied to psychosis. He goes on to say that identification and manipulation of safety behaviours, generation of alternative explanations for difficulties encountered and developing an alternative explanation in collaboration with the client for their difficulties through a cognitive formulation would be helpful in engaging the client and inform choice of intervention.

1.9: Emotionality

Previously, research into emotions and psychosis has been a neglected area. However Freeman and Garety (2003) put forward the simple argument that if emotional disturbance is present then it may influence psychosis, suggesting that further research in this area is needed.

Emotion is a central theme for models of delusions (Freeman *et al.* 2002; Bentall *et al.* 2001), and plays a part in the formation and maintenance of delusions in

Morrison's (2001) model. The S-REF model also implies that emotional processing occurs at both the lower and upper levels. Research into emotions and delusions has mainly focussed on anxiety, depression and self-esteem to date. However, individuals tend to experience a multitude of emotions which are not limited to these three areas. The application of emotions in models of psychosis suggests that there is an increasing awareness that emotion is an important component in psychosis, as well as in the neuroses.

Emotional disturbances such as anxiety, depression and irritability are said to occur, in the majority of cases, in the prodromal period (two to four weeks) before positive symptoms of psychosis such as hallucinations and delusions are experienced (Freeman & Garety, 2003). Anxiety and depression have also been found to occur along with positive symptoms of psychosis (Birchwood, Iqbal, Chadwick, & Trower, 2000; Turnbull & Bebbington, 2001). Anger is another emotion which has been implicated in psychosis (Cullari, 1994), however, another study found no raised levels of anger in a group of individuals who experienced persecutory delusions (Freeman *et al.* 2001).

Garety *et al.* 2005 conducted a study to see whether the contributions of reasoning and emotional processes to delusional severity are independent or act in combination. They used the Beck Anxiety Inventory (BAI) and the Beck Depression Inventory (BDI) to measure anxiety and depression in individuals who experienced mainly persecutory delusions. They found that anxiety, but not depression showed a clear contribution to severity of delusional conviction as measured by the Psychotic Symptoms Rating Scale (PSYRATS; Haddock *et al.* 1999).

Freeman and Garety (2003), in their review, suggest that emotions other than anxiety and depression may have a central role in the formation and maintenance of particular types of delusions defined by their content. The emotions identified were disgust, jealousy, guilt, and shame. The BES includes disgust, guilt and shame in its measurement of emotional experience.

The Basic Emotions Scale (BES) was developed to allow a measure of emotionality for five basic emotions: Fear, sadness, happiness, disgust and anger. It has not been used with individuals experiencing persecutory delusions, however it has recently been used to measure emotionality in individuals who had experienced psychoses as well as individuals who had experienced anxiety, and healthy controls (Livingstone *et al.* 2008). This study found that both clinical groups experienced similar levels of emotionality in comparison to healthy volunteers with the clinical groups experiencing greater scores on negative emotions such as sadness, fear and disgust. The clinical groups reported experiencing happiness less often than the healthy control group.

Emotion has been implicated in the formation and maintenance of psychosis (e.g. Freeman *et al.* (2002); Morrison, 2001; Garety *et al.* 2001) and therefore has clinical implications for therapeutic work with people who experience psychosis. Research on emotion regulation and psychosis has been neglected which is possibly down the the historical separation between the neuroses and psychoses (Livingstone *et al.* 2008).

1.10: Self Esteem

Freeman (2007) talks about the relationship between paranoia and emotion. He and colleagues put forward the view that persecutory delusions are a direct reflection of emotional concerns. They argue that there are two distinct forms of paranoia; 1. Poor Me Paranoia which is a defense and 2. Bad Me Paranoia which is a direct reflection of extreme negative emotion. Freeman *et al.* (2001) state that if delusions are a defense, then self-esteem should be normal but if paranoia builds on negative views of the self then self-esteem should be low. Freeman (2007) refers to Bentall (2001) who argued after looking at the self-esteem data that there are very mixed findings concerning levels of self-esteem in paranoia with some having preserved self-esteem and others having low levels of self-esteem. They explain this by saying that there is instability in self-esteem in people with paranoia, and that these individuals are locked into a struggle to defend against negative emotion, sometimes winning and sometimes losing.

The studies carried out in non clinical populations around paranoia and self-esteem found that paranoia is repeatedly found to correlate with lower self-esteem. In addition Drake *et al.* (2004) found that in a study of nearly 200 first episode clients, paranoia was related to lower SE at a number of points in time over 18 ms. Furthermore, Drake *et al.*'s study is one of many in the literature implicating affective problems with the positive symptoms of psychosis and providing evidence that low SE and anxiety predict the development of delusions and hallucinations (Krabbendaum *et al.* 2002). Again, the clinical implications of this warrant further investigation to allow for evidence based best practice.

1.11: Rationale for the present study

The literature reviewed has shown that there is growing evidence for the similarities between anxiety related disorders and Psychosis. Morrison's (2001) model of psychosis is based on Clark's (1986) panic model and there is some evidence to suggest similarities between the disorders in the processing of information. However, what is still unknown is why one group interprets their experiences in a catastrophic but culturally acceptable way and the other interprets their experiences in a persecutory and culturally unacceptable way. This study aims to explore possible constructs which may indicate why these differences between the groups' interpretations occur.

The multidimensional nature of psychosis has been illustrated by the models proposed, and therefore a number of the constructs indicated in this review will be measured. This study aims firstly to determine similarities and differences in the interpretations of physiological symptoms made by panic and delusion clinical groups

compared with a group of individuals who have no previous history of mental health problems. Secondly, this study aims to explore similarities in other areas that have been implicated in persecutory delusions and panic, such as emotion, metacognitions, experiential avoidance, and self-esteem. Significant differences are expected between the clinical and the control groups on all measures and similarities are expected between the clinical groups in most areas.

The present study is exploratory and by no means seeks to have a direct answer to the question of the differences between the interpretations of the two groups, however, it

does seek to begin to explore possible constructs which may indicate an area of further exploration. It is unlikely that any one factor will cause the difference in interpretations as psychosis is a complex phenomenon, however, if there are differences between the clinical groups in one area, it may be worth further exploration.

1.12. Research question and hypotheses

The primary research question of this study is:

Why do groups who experience the same sensations interpret them differently, and what factors might explain these differences?

The research hypotheses are:

1. There will be similar levels of anxiety in the clinical groups compared to the control group.
2. Clinical groups will differ in their interpretations of somatic symptoms.
3. Any further factors that differ between the clinical groups that might help explain any differences in their interpretations of common somatic symptoms will be explored.
4. There will be significant differences between the clinical groups and the healthy control group on all measures.

Chapter 2: Methodology

2.1. Measures and rationale for their selection

Self report questionnaires were used so that quantitative scores could be obtained and compared between groups. The Symptom Interpretation Questionnaire (SIQ) was taken from the Health Psychology literature to determine whether there are differences in the attributions made for somatic symptoms between the groups. Metacognitive beliefs were measured using the Metacognitions Questionnaire (MCQ–30). Levels of self-esteem were measured by using the Self Concept Questionnaire (SCQ). Emotionality was measured by using the Basic Emotions Scale (BES). Levels of experiential avoidance were measured using the Acceptance and Action Questionnaire (AAQ–2). In addition, levels of anxiety and levels of delusional ideation were also assessed using the State Trait Anxiety Inventory (STAI) and the Peter's Delusions Inventory (PDI) respectively.

The internal reliability of each measure is reported. Internal reliability is often found using Cronbach's alpha (α). This measures how well the items within the questionnaire are measuring the same construct. The higher the alpha, the more likely each item is internally consistent with the others and is therefore measuring the same underlying construct. Usually a reliability coefficient of .70 or higher is considered as being acceptable (Clark-Carter, 1997).

2.1.1: The Symptom Interpretation Questionnaire (SIQ)

The SIQ (Robbins & Kirmayer, 1991) is a widely used 39 item self report questionnaire which was developed to measure attributional style in medical patients. It consists of thirteen common physical symptoms (e.g. headache) which are presented in a statement (e.g. If I had a prolonged headache, I would probably think it is because) and is followed by three possible attribution styles 1) somatising attributional style (There is something wrong with my muscles, nerves or brain), (2) psychologising attributional style (I am emotionally upset), or (3) as a normalising attributional style (A loud noise or bright light or something else has irritated me). Participants rate the extent to which they would attribute each possible cause to the somatic symptom on a four point scale (A to D), and each point has a value judgement attached (A=Not at all; B= Somewhat; C=Quite a bit; D= A great deal). The SIQ also records the occurrence of 13 common somatic symptoms by asking the participant whether they have experienced the symptom in the last three months. The scale was adapted so that any external attributions could also be rated.

The SIQ was developed to measure attributions for common somatic symptoms. The researchers found that there are three types of attributions made with these symptoms: (1) psychological; (2) normalising; and (3) physical. Attribution theory is a major influence on the development of this questionnaire and is concerned with how individuals interpret events and how this relates to their thinking and behaviour (Weiner, 1986). Attribution theory is used to understand and explain why people behave the way they do. Measuring symptom attributions informs research in the area of health, however as far as I am aware it has not been used to compare attributional styles amongst individuals experiencing psychosis and individuals who experience

panic. Robbins & Kirmayer (1991) believe that symptom attributional style may contribute to the somatisation and psychologisation of distress that are often encountered in primary care. Measuring attributional style of common somatic symptoms in a psychiatric population may lead to future studies on the relationship between attributional styles and distress in psychiatric populations. Furthermore, the scale has been found to possess adequate internal reliability (Robbins & Kirmayer, 1991) (Table 2.1).

Table 2.1 Internal reliability of SIQ subscales

Subscale	N	α
Psychological	100	.86
Somatic	100	.71
Normalising	100	.81

The SIQ was adapted to include 'other' as a further option to allow participants to include any external attributions or internal attributions other than the existing somatic, psychological and normalising causes offered. It was chosen to measure interpretations in the present study because it is a widely used questionnaire with good internal reliability, and it has been used with clinical groups as well as non-clinical groups in the past (e.g. Ritsner, 2003 & Wise and Mann, 1995). In addition it is grounded in attribution theory and it allows for the measurement and comparison between interpretations of common physiological sensations in all three groups. Morrison (2001) proposes that people with psychosis as well as people with panic disorder interpret internal experiences (thoughts, emotions, body state information) in a similar way. The SIQ will potentially help to identify in what way they these groups are similar and how these clinical groups differ from a healthy control group.

2.1.2: Basic Emotions Scale (BES)

The Basic Emotions Scale (BES) (Power, 2006) is a self report questionnaire which measures emotionality. It assesses how often people experience 20 different emotions 'during the last week' and 'in general' using a 7 point Likert scale (from 1=not at all to 7=all of the time), and how well they felt they coped with that emotion (from 1=cope very well to 7=cope very badly). There are 5 basic emotions (Anxiety, Anger, Sadness, Disgust, and Happiness) which alternate between the 20 items and this facilitates a total score of between 4 and 28 for each basic emotion and for coping ability. Total scores for trait and state emotionality can range between 20 and 140.

The theory behind the development of the BES comes from models of discrete basic emotions as opposed to the positive-negative affect models of emotion. Basic emotion theorists argue that there are a limited number of 'basic' emotions from which more complex emotions are derived (Power, 2006). The 'basic' aspect of these emotions are said to relate to a range of features including being innate, being universal across cultures, and appearing early in child development (Power, 2006). There seems to be no universal agreement amongst theorists about how many basic emotions exist, however the five basic emotions that are measured in BES tend to appear on almost all lists (Power, 2006). The internal reliability was good for all five subscales of the BES

Table 2.2 Internal reliability of BES subscales.

Subscale	N	α
Anger	219	.806
Sadness	219	.842
Disgust	219	.839
Fear	219	.790
Happiness	219	.825

Anxiety, depression, and anger are emotions which have been implicated in psychosis, and emotions are also implicated in models of psychosis signifying their importance in the development and maintenance of psychosis. Therefore emotionality was a variable of interest within this research. The BES was chosen, firstly, because it is a valid and reliable measure (see table 2.2), secondly, because it is an economical way of measuring state and trait emotionality as well as coping ability in one measure, and because it is easily understandable for participants.

2.1.3: Metacognitions Questionnaire (MCQ−30)

The Metacognitions questionnaire – 30 (MCQ-30: Wells & Cartwright-Hatton, 2004) is a shortened version of the original MCQ which contained 65 items. It was developed to measure dimensions of metacognitive beliefs, cognitive confidence judgements and selective attention to mental events (cognitive self-consciousness) (Wells, 2001). The theory behind the development of the MCQ was the Self-Regulatory Executive Function (S-REF) model (Wells, 2000; Wells & Matthews, 1994, 1996) which suggests that metacognition is an important factor in the development and maintenance of psychological disorder (Wells & Cartwright-Hatton, 2004).

The number of items in the original MCQ was shortened to 30 items in the MCQ-30 to reduce the participant response burden and has good internal consistency (see Table 2.3), and a factor structure that is consistent with that of the original scale. The five subscales are : (1) Positive beliefs about worry, (2) Negative beliefs about thoughts concerning uncontrollability and danger, (3) Cognitive confidence (assessing confidence in attention and memory), (4) Negative beliefs concerning the

consequences of not controlling thoughts and (5) Cognitive self-consciousness (the tendency to focus attention on thought processes) (Wells & Cartwright-Hatton, 2004). Each of the five subscales are represented by six items each which are interwoven throughout the questionnaire. Each item is evaluated on a four point scale (1=Do not agree; 2=Agree slightly; 3=Agree moderately; 4=Agree very much. Higher scores on the overall score of metacognitions and on the five subscales suggest higher levels of dysfunctional metacognitions and higher vulnerability to worry. Scores can range between 30 and 120.

Table 2.3 Internal reliability of MCQ-30 subscales

Subscale	N	α
Cognitive confidence	182	.93
Positive beliefs	182	.92
Cognitive self-consciousness	182	.92
Uncontrollability and danger	182	.91
Need to control thoughts	182	.72

The MCQ-30 was used in the present study because it is a reliable instrument which measures metacognitions and is more economical than the original MCQ. An exploratory factor analysis was carried out to determine construct validity between the MCQ and the MCQ-30. Four of the five factors were the same subscales used in the original MCQ. For these factors the factor structure replicated those of the original MCQ. The fifth factor ('beliefs about the need to control thoughts') three out of the 6 items loaded highly, two modestly, and one showed a weak loading (Wells & Cartwright Hatton (2004).

Metacognitions were measured because they are said to influence appraisals and beliefs (Wells & Cartwright-Hatton, 2004), therefore it is possible that specific aspects of these cognitions may be related to the kinds of interpretations that are made. In addition, the present study was influenced by Morrison's cognitive model of psychosis which draws on the S-REF model, and metacognitive appraisals of the delusions are strongly implicated in the development and maintenance of psychosis (Morrison, 2001). The MCQ-30 was used to measure metacognitions because it shows strong internal reliability and it is more economical for participants to fill out. As a number of measures are being used in this study, reduction in response burden for participants is important.

2.1.4: Self Concept Questionnaire (SCQ)

The SCQ (Robson, 1989) is a 30 item questionnaire which was developed for use in clinical research. It consists of 30 items that are based on 7 components of self-esteem, according to theoretical and empirical information reviewed by Robson (1988). The seven components include: (1) subjective sense of significance, (2) worthiness, (3) appearance and social acceptability, (4) Competence, (5) resilience and determination, (6) Control over personal destiny, and (7) the value of existence. Items are scored on an 8 point Likert scale with four anchor points ranging from 0=completely disagree to 7= completely agree, giving a maximum score for 'global' self-esteem of 210. Higher scores indicate higher levels of self-esteem. (Robson, 1989). The SCQ has proven to have good overall reliability (Cronbach's α of .89) with good convergent construct validity[1](control=correlation of 0.804 ($p< 0.0001$);

[1] Construct convergent validity was tested against Rosenberg's (1965) widely used measure of self-esteem. High construct validity indicates good assessment of a construct – in this case self-esteem.

anxiety group= correlation of 0.85 ($p<0.0001$)) and clinical validity[2] (the correlation between the clinician's estimate and the SCQ was 0.85 ($p<0.0001$); Robson, 1989).

Self-esteem was measured because attributional style affects self-esteem (Abramson, 1978). The SCQ was used to measure self-esteem in the present study because it is easily understandable, can be completed in just a few minutes, and has good reliability and validity for measuring global self-esteem. In addition, this measure has been used with clinical groups and non clinical groups in the past (e.g. Hall and Tarrier, 2003; Robson, 1989) with no reported problems.

2.1.5: Acceptance and Action Questionnaire (AAQ–II)

The AAQ (Bond *et al.* 2004) is a general measure of experiential avoidance/psychological flexibility. Experiential avoidance is the phenomenon that occurs when a person is unwilling to remain in contact with particular private experiences (e.g. bodily sensations, emotions, thoughts, memories, images, behavioural dispositions) and takes steps to alter the form or frequency of these experiences or the contexts that occasion them, even when these forms of avoidance cause behavioural harm (Hayes *et al.* 2004; 1996). One account of experiential avoidance is provided by Acceptance and Commitment Therapy (ACT) and its underlying theory of language and cognition, Relational Frame Theory (RFT) (Hayes *et al.* 2004).

[2] Clinical validity was assessed by means of nine experienced clinicians who estimated the self-esteem of patients well known to them on a ten point visual analogue scale and then asked the patients to complete the SCQ (Robson, 1989).

The AAQ-II (Bond, 2008 personal communication) is a brief self report measure containing 10 items which are rated on a 7 point Likert scale from 1=Never true to 7=Always true, giving a maximum score of 70. Higher scores on the AAQ-II reflect greater experiential avoidance, while lower scores reflect greater acceptance and action.

It was developed to address the reliability problems encountered by the AAQ-I in some populations. The reliability of the AAQ-II is reported to be consistently good with a mean alpha coefficient across seven samples of .83 (ranging from .76 - .87), and a three and 12 month test-retest reliability of .80 and .78, respectively. In addition to its good reliability, findings indicate that the AAQ-II is associated with variables to which it is theoretically tied, and it is not associated with variables to which it is theoretically unconnected (Bond, 2008 in communications).

The AAQ-II was chosen as a measure of experiential avoidance because of its good reliability and validity and because it is a brief measure thereby reducing the response burden of participants. In addition it is easy to read and understand.

2.1.6: State Trait Anxiety Inventory (STAI)

The STAI (Spielberger *et al.* 1983) is a well validated measure of anxiety symptoms. Therefore it is seen to be the standard anxiety measure used in research. It is a self evaluation questionnaire which measures state and trait anxiety. State anxiety is measured by asking the participant how they feel right now in relation to the 20 statements that follow. Trait anxiety is measured by asking the participants how they feel generally in relation to another 20 statements that follow. Each statement (e.g. I

feel calm) is rated by the participant on a four point scale from 1 to 4 with each point holding a value judgement (1=almost never; 2=sometimes; 3=often; 4=almost always). The participant indicates which value judgement best describes how they feel. Overall scores can be directly interpreted as: higher scores meaning higher levels of anxiety on their respective scales and lower scores mean low levels of anxiety.

Table 2.4. Internal reliability of STAI

Anxiety	α
State	.83-.92
Trait	.86-.92

The STAI was chosen to measure anxiety in the present study because it shows good internal reliability (see table 2.4) and is a widely used and validated measure of state and trait anxiety. Anxiety was measured as it has been implicated in both panic and psychosis. In addition, it was important to measure anxiety levels to ensure that both groups were experiencing anxiety so that the SIQ was measuring experiences that were similar amongst the clinical groups.

2.1.7: Peters Delusions Inventory (PDI)

The PDI (Peters *et al.* 2004) is a twenty one item self report questionnaire measuring delusional ideation in the general population as well as in a clinical population. The twenty one item measure is a shortened version of the original forty item measure which, along with the forty item measure, shows good internal reliability (n= 385; α=.82) and validity. Participants answer yes or no to each of the 21 items (e.g. Do you ever feel as if people are reading your mind?) and if the answer is no they go

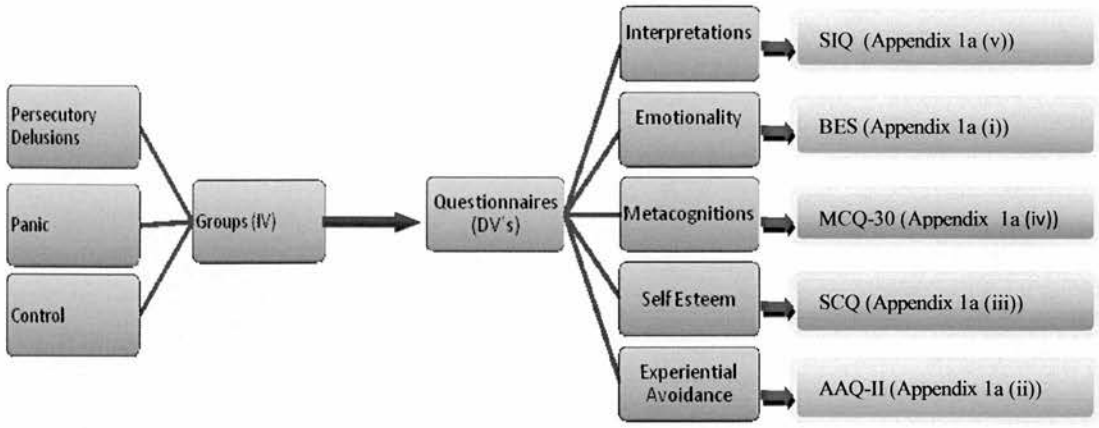
straight on to the next item. However, if the answer to an item is yes, the participant is asked to rate the extent to which the beliefs are (1) Distressing (Distress), (2) How often they think about them (Preoccupation), and (3) How much they believe them to be true (Conviction) on a 5 point scale from 1 (Not at all distressing; Hardly ever think about it; Don't believe it's true) to 5 (Very distressing; Think about it all the time; Believe it's absolutely true). Each subscale (distress, conviction and preoccupation) incurs possible scores of between 0 and 105. In addition, every 'Yes' answer accumulates another point incurring scores of between 0 and 21. Therefore, Yes/No scores in addition to each subscale score gives an overall score of between 0 and 336 with higher scores representing higher levels of delusional ideation.

The PDI-21 was used in the present study because it has good internal reliability as evidenced by the alpha coefficient, it measures delusional ideation in clinical and non clinical populations, and it is a shorter version of the previous 40 item measure, thereby reducing response burden.

2.2: Study Design

A quantitative methodology was adopted, and within this, a between subjects experimental design with three levels of the independent variable and five separate dependant variables (see figure 2.1) was deemed as most appropriate to answer the research questions. The independent variable (IV) - 'Group' has 3 levels: 1. Persecutory delusions group, 2. Panic group, 3.Control group. The dependent variables (DV's) are: 1. Interpretations of somatic symptoms, 2. Emotionality, 3. Metacognitions, 4. Self Esteem and 5. Experiential avoidance.

Figure 2.1. Experimental Design.



2.3: Procedures

2.3.1: Preparation

All of the questionnaires, except the STAI and the PDI, were formatted to look similar (See Appendix 1). They were retyped using Microsoft word and the format for each questionnaire was similar to the AAQ-II. The questions remained exactly the same as they appeared in the original questionnaires but the presentation was changed so that they were consistent. The presentation of questionnaires changed in the way that the first item on each questionnaire was given a lightly shaded background alternating with the next question having no shading and so on. All of these questionnaires were stapled together in the same order (see table 2.5). The STAI and PDI were presented as separate questionnaires but given at the same time as the amalgamated questionnaire.

2.3.2: Participants

All participants were adults between the ages of 18 and 65 who volunteered to participate in the study. There were 42 participants in total, consisting of 26 females and 16 males, average age 39.0 years (range 18-61). Participants in the clinical groups were composed of inpatients and outpatients within Lanarkshire adult mental health services, and participants in the healthy control group were people who worked and/or lived in Lanarkshire or surrounding areas.

2.3.3: Recruitment

Participants were recruited using opportunistic sampling. A clinician information sheet (Appendix 2) was distributed to clinicians who agreed to help with recruitment. This information sheet included details of the inclusion and exclusion criteria for the study (see table 2.5). Participants who met the inclusion criteria for the clinical groups were approached by staff who were involved in their care (Psychiatric nurses; Psychiatrists, Clinical and Counselling Psychologists, Clinical Associates and Occupational therapists), and asked if they wanted to participate in the research. If they said they would like to take part or that they would think about it, they were given a consent form and a summary information sheet (see Appendix 3) which included the contact details of the researcher, research supervisor's and course co-ordinator to enable them to express any concerns or queries. Alternatively, clinicians, with their client's permission, would directly give the researcher the client's details and the researcher would contact the potential participant to arrange a time to meet. In these cases, the participant would receive an information sheet and sign a consent form on meeting with the researcher. Otherwise, participants were required to send their signed consent form with their details to the researcher in a stamped addressed

envelope who, in turn, contacted them to arrange a suitable time to meet. Meetings took place either at the clinic where they saw their psychologist or at their home, if requested and appropriate. In all cases, clinician's were asked to advise clients to wait at least 24 hours to think about whether they would like to participate or not before they gave their consent.

Table 2.6: Inclusion/Exclusion criteria

Inclusion criteria:

- Delusions group: Adults between the ages of 18-65 currently experiencing persecutory delusions, and who have a diagnosis of delusional disorder or schizophrenic spectrum disorder based on DSM-IV criteria.
- Panic group: Adults between the ages of 18-65 who meet DSM-IV criteria for Panic disorder.

Exclusion criteria:

- Delusions group: Organic or drug induced basis for the delusions.
- Panic group: The presence of delusions, or a first-degree relative with a diagnosis of schizophrenia.
- Both groups: Severe substance abuse. If participants are abusing substances, their answers will not reflect clearly their mental health state.

Recruitment for the control group involved approaching people working within Monklands General Hospital, in jobs which were not medical or mental health related positions. Some friends and family of these workers also volunteered.

Completed participant questionnaires were assigned to groups depending on the participants experiences. Individuals who experienced persecutory delusions were assigned to the 'persecutory delusions' group, people who experienced panic were assigned to the 'Panic' group, and individuals who had never been through the mental health system before were assigned to the 'Control' group.

2.3.4: Meeting with participants

A standard procedure was followed when meeting with participants. On meeting the investigator, participants were briefed on what taking part in the research would entail. They were told that the questionnaire takes about one hour to complete. For each participant, the researcher then went over instructions of the more complicated questionnaires (SIQ and the PDI-21) and answered any queries. The participants were also told that they could opt out of participating at any time. Participants were then given privacy to fill in the questionnaires in a closed room by themselves unless they specifically requested the researcher stay. The questionnaires were presented in the same order for each participant (see table 2.6). Participants were also given instructions of how to get in touch with the researcher if they needed to. Otherwise the researcher checked to see how they were getting on after half an hour, and would reappear after another fifteen minutes to half an hour depending what stage the participant was at in the questionnaire.

Once finished, the participants were debriefed and were given the opportunity to ask questions about the study or express feelings or thoughts they may have experienced while filling in the questionnaire. It is worth noting that the questionnaires did not tend to trigger any unpleasant thoughts or feelings while being completed by the participants. Finally, the questionnaires were sealed in a plain brown A4 envelope in the presence of the participant and each participant was thanked for their participation. In addition, all procedures and documentation used conformed to COREC guidelines.

Table 2.6: Order of Questionnaires

Order no.	Measure
1	State Trait Anxiety Inventory
2	Peters et al. Delusions Inventory
3	Basic Emotions Scale
4	Acceptance and Action Questionnaire - II
5	Self Concept Questionnaire
6.	Metacognition Questionnaire - 30
7.	Symptom Interpretation Questionnaire

2.3.5: Data Analyses

Statistical analyses were performed using SPSS for Windows Version 11 and Graphpad Instat Version 3. Exploratory data analyses were carried out to explore the data's distribution. The data did not appear to be normally distributed therefore tests of normal distribution and variance were carried out. Non-parametric tests were used on the data which did not pass these tests and parametric tests were carried out on those that did. Analyses of variance's (ANOVA's) were used to determine whether the groups differed significantly and planned post hoc comparisons were performed to determine the significance of the differences between all groups.

2.4: Ethics

A number of ethical issues were taken into consideration during the planning of this study. It was deemed important that participants did not feel pressured into participating so they were always advised to take 24 hours to think about it before consenting to participate in the study. Participants were always given the option of

opting out of the study. None of the participants could be classed as adults with incapacity because organic causes for the difficulties experienced were part of the exclusion criteria. This is acknowledged because this study was assessed by a special 'adults with incapacity' ethics board (the ethics team who assessed the ethical validity of the study agreed that it should have gone through the normal channels – see Appendix 4). Stamped addressed envelopes were provided for outpatients to send in their consent form and contact details.

Participants were given the opportunity to discuss any issues that questions may have brought up for them after they had filled in the questionnaire. Participants were given contact details of the researcher, the researcher's supervisors' and the programme director of the clinical psychology doctorate course so that they could voice any concerns they had about how the research was conducted. Participant records were not accessed if the researcher was not already working with them as requested by the ethics board. All information collected from the participants was treated anonymously and was kept securely in a locked cabinet at all times with the exception of when data was input into a statistical database. Data was stored on an NHS computer rather than a home computer as requested by the ethics committee.

The study proposal was reviewed by Scotland A Research Ethics Committee and the members of the committee gave a favourable written ethical opinion of the study on 28th May 2007 for implementation in Lanarkshire. The study was also passed at that time by the local research and development department in Lanarkshire.

2.5: Power Calculation

Cohen's statistical tables were consulted to calculate power. Cohen (1992) suggests that 21 people should be included in each of the three groups with a large effect size for One–way Analyses of Variance (ANOVA). A large effect size was expected between the non–clinical and clinical groups. Based on these calculations 21 participants were required for each group making a total of at least 63 participants required for the present study.

Difficulties during the recruitment phase meant that these numbers could not be reached which meant that power was reduced. However, previous research comparing the same three groups of participants (people with persecutory delusions, people with panic disorder, and non–patient controls) and using similar questionnaires, recruited 15 participants for each group (Fraser *et al.* 2006) which gives power of 0.64 and a medium effect size of 0.5.

Chapter 3: Results

3.1. Exploratory analyses

Exploratory data analyses were carried out to assess whether the assumptions of normal distribution and homogeneity of variance of parametric tests were met before using them on the data. Unequal sample sizes were also taken into account. Histograms and stem and leaf plots showed that some data may not be normally distributed, and box plots highlighted a few outliers in the data. For this reason a Kolmogorov-Smirnov (KS) test was used to determine normal distribution, and Bartlett's test was used to test for equal variances amongst groups. Results of these tests can be found in Appendix 5.

Non parametric tests (Kruskal-Wallis one-way analysis of variance (ANOVA) and Dunn's multiple comparison test) were used on the data that did not pass the normality and variance tests. The Kruskal-Wallis test was chosen as it is the non parametric equivalent of the one way ANOVA allowing multiple comparisons to be made when the assumptions of a one way ANOVA are not met. Dunn's multiple comparison post hoc test is a non-parametric test used to determine significant differences between multiple groups following a significant finding on a Kruskal-Wallis ANOVA test.

Parametric tests (one way analysis of variance (ANOVA) and post hoc Tukey-Kramer) were preferred on the data which meet the parametric assumptions as they are more powerful tests than the non parametric ones. The Tukey-Kramer test was selected over all other multiple comparison tests because it is powerful, it has good

control over type I errors, and it takes into account unequal sample sizes when calculating significant differences between groups.

3.2. Sample characteristics

The overall mean age for the participants in this study was 39.0 years (range=18-61 yrs). A one-way ANOVA revealed no significant difference in age between the 3 groups, $F(2,38) = 0.631$, $p > 0.05$. There are observable differences between the numbers of males and females in each group (see Table 3.1). Analyses could not be reliably done on the data to determine whether there was a significant difference in gender between the 3 groups as the numbers in the panic group were too small.

In addition, there may be an impact of unknown variables such as educational level, types of medication taken, diagnoses, and duration of untreated psychosis. However, this information was not obtained.

Table 3.1. Descriptive statistics for age and gender of sample

Characteristic	Group		
	Delusion (N=16)	Panic (N=11)	Healthy Volunteers (N=15)
Gender (M/F)	10/6	2/9	4/11
Mean Age (SD)	38.40 (11.66)	37.18 (9.20)	42.00 (11.52)

3.3. Hypotheses testing

3.3.1. Hypothesis 1: There will be similar levels of anxiety in the clinical groups compared to the control group.

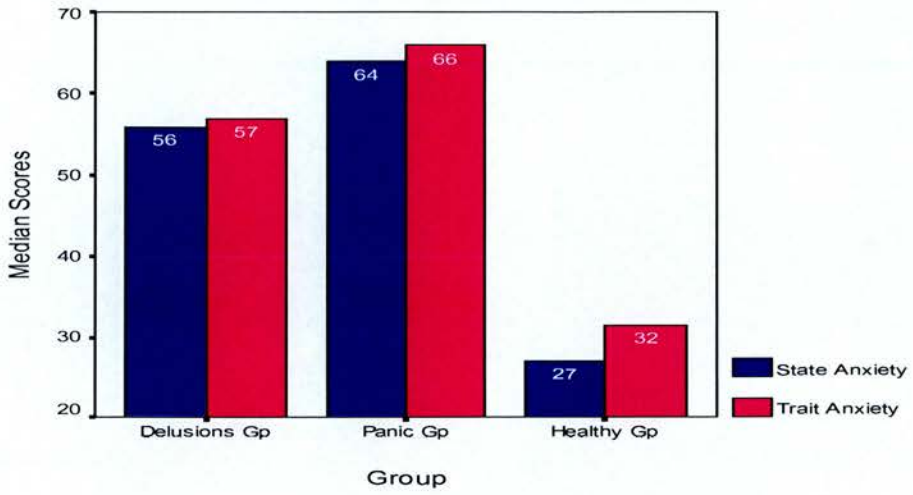
3.3.1.1. Anxiety levels amongst groups

Exploratory data revealed 2 outliers in the state anxiety data (1 low score within the panic group and the other a high score in the healthy control group). One outlier was also found in the trait anxiety data representing a high score within the healthy control group. For this reason, non-parametric tests were used.

Descriptive statistics (see figure 3.1) show, in line with the hypothesis, that there is very little difference between the clinical groups on levels of state and trait anxiety. The panic group's median scores are slightly higher than the delusion group scores on state and trait anxiety and both clinical groups scored much higher than the healthy control groups for both measures of anxiety.

A one way Kruskal-Wallis analysis of variance (ANOVA) revealed significant differences between the three groups for both state and trait anxiety (state: $\chi^2(2) = 23.353$, $p < .0001$; trait: $\chi^2(2) = 22.649$, $p < .0001$).

Figure 3.1. Levels of state and trait anxiety amongst groups



Dunn's multiple post hoc comparisons of the three groups indicate that there were no significant differences between the clinical groups, and as expected, the healthy control group scored significantly lower than the clinical groups on state and trait anxiety (State: Delusion vs Healthy Control mean rank difference=16.7, $p<0.001$; Panic vs Healthy Control mean rank difference=20.836, $p<0.001$; Trait: Delusion vs Healthy Control mean rank difference=14.931, $p<0.01$; Panic vs Healthy Control mean rank difference=21.328, $p<0.001$).

3.3.1.2. Summary of findings with regards to hypothesis 1

Hypothesis one is supported because there were no significant differences between the clinical groups on scores of state and trait anxiety, however, the differences between the clinical groups and the healthy control group were significant.

3.3.2 Hypothesis 2: Clinical groups will differ in their interpretations of somatic symptoms.

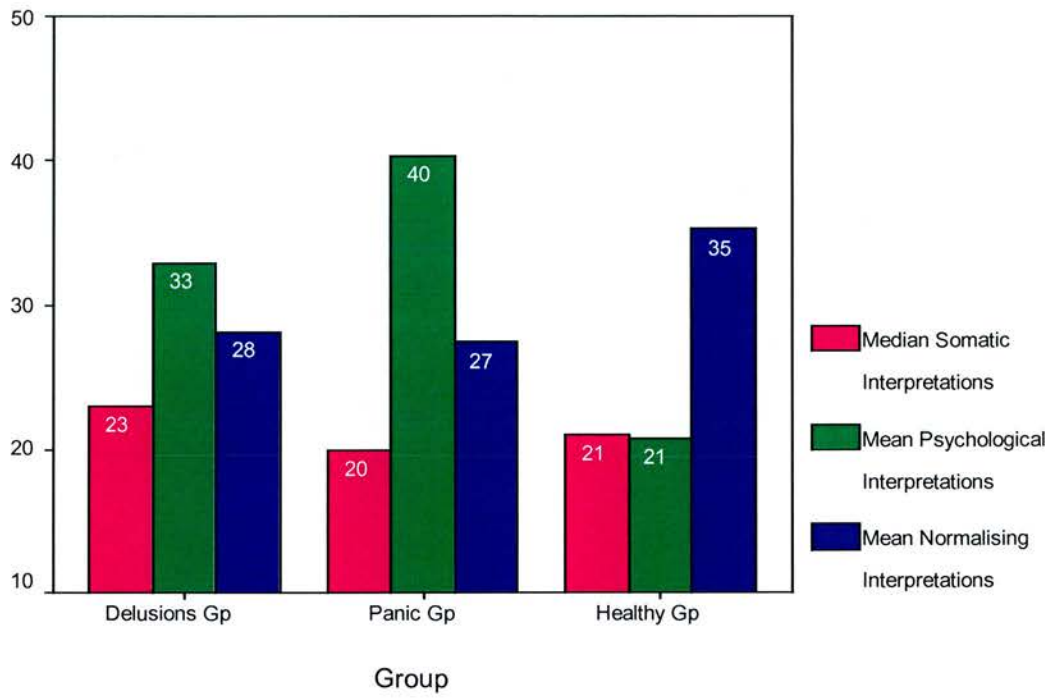
3.3.2.1 Interpretations of somatic symptoms amongst groups

All interpretations passed the homogeneity of variance test and the normality test. However, exploratory data analysis found one high outlier in the delusion group's somatising scores therefore median values were given for somatic interpretations.

Descriptive statistics (see figure 3.2) showed that the clinical groups gave more weight to psychological interpretations as being the cause of somatic symptoms than the healthy control group, and that the healthy control group gave more weight to normal attributions than the clinical groups. Interestingly, the panic group had slightly higher mean scores for psychological causal attributions than the delusion group, and the delusion group scored slightly higher than the panic group on somatic interpretations, although these differences were not significant.

A one way ANOVA revealed significant differences between the three groups for the weight given to psychological interpretations ($F(2,38) = 21.078$, $p < .0001$). However, the differences in scores between groups for somatising and normalising interpretations were not significant ($F(2,38) = 1.647$ *ns*; $F(2,38) = 2.580$ *ns* respectively).

Figure 3.2 Groups scores of the weight given to each causal attribution for common somatic symptoms



A Tukey-Kramer multiple comparison test showed that there was a significant difference between the clinical groups and the healthy control group (delusion vs. healthy control $q=6.028$, $p<0.001$; panic vs. healthy control $q=8.923$, $p<0.001$) on the weight given to psychological interpretations of common somatic symptoms with an overall alpha level of .05. The results also indicated that there were no significant differences between groups' attributions of somatic symptoms to a normal or somatic cause with an overall alpha level of 0.05.

No significant differences were found between the clinical groups on the weight given to all three possible causes attributed to somatic symptoms. However the difference between the clinical groups was approaching significance ($p=0.056$) when attributing psychological causes to somatic symptoms. Participants who experienced panic were

more likely to attribute somatic symptoms to psychological causes than those in the delusion group.

3.3.2.1.1 Number of somatic symptoms experienced amongst groups

Descriptive statistics of the number of physical symptoms experienced in the last 3 months shows that the clinical groups experienced more somatic symptoms over the past three months than the healthy control group (see table 3.2).

Table 3.2. Summary of number of physical symptoms experienced over the past three months between groups.

Groups (N)	Median	Minimum	Maximum
Delusion (16)	8.5	1	13
Panic (11)	12	8	13
Healthy Control (15)	3	0	8

A Kruskal–Wallis one way analysis of variance revealed that the number of somatic symptoms that participants had experienced in the last three months were significantly different between groups ($\chi^2(2) = 23.190$, $p < .0001$). A Dunn's post hoc multiple comparison test revealed that there was a significant difference between the healthy control group and the clinical groups (DELUSION VS HEALTHY CONTROL mean rank difference=13.954, $p<0.01$; PANIC VS HEALTHY CONTROL mean rank difference=22.721, $p<0.001$) with the clinical groups experiencing more somatic symptoms in the past three months than the healthy control group. There were no significant differences between the two clinical groups.

3.3.2.2 'Other' Interpretations of somatic symptoms amongst groups

Some participants offered 'other' interpretations (see Appendix 6 for the actual comments made). The interpretations offered were divided into the three main categories in line with the questionnaire: Normalising, somatic and psychological attributions. (see table 3.3 for descriptive statistics). There were no delusional interpretations of somatic symptoms offered by individuals from the delusions group. Two interpretations were ambiguous and one did not offer a causal attribution (see Table 3.3).

Table 3.3. A summary of 'other' interpretations

Groups (no./ percentage of participants from relative group offering 'other' interpretations)	No. of 'Other' Interpretations				
	Normal	Psychological	Somatic (including existing physical illness)	Ambiguous/ non-explanatory	Total
Delusion (9/56%)	22	6	5	2/1	36
Panic (5/45%)	13	2	9	0	24
Healthy control (3/20%)	2	2	2	0	6

As can be seen from table 3.3, participants in the delusions group offered more alternative interpretations than those in the panic group or the healthy control group, the majority of which were normal attributions of somatic symptoms. No statistical analysis was carried out on this data because the number of participants in each group who offered 'other' interpretations was too small to get an accurate picture of whether there were any significant differences between groups.

3.3.2.2.1 Delusions Group: Themes of 'Other' Interpretations of somatic symptoms

Themes within the 'normal' interpretations were mainly attributing somatic symptoms to exercise or lack of it, lack of sleep, and side effects of medication. Psychological interpretations included themes of mainly stress, fear and rumination. Themes of a more somatic nature included existing physical conditions and medication side effects as well as possible physical conditions. There were also more ambiguous interpretations. For example, in response to the statement 'If I was sweating a lot, I would think it is because:' a participant wrote: "Maybe outside forces". This could be attributed to weather conditions or something more bizarre-like, however not enough information was gathered to clarify this answer. Another response to a different statement was also ambiguous. The statement was 'If I got dizzy all of a sudden, I would probably think it is because:' and the participant wrote "Maybe I'm just weak". This could be in the context of physical or psychological weakness. In addition, a further response to a statement did not offer any interpretation of the somatic symptom. The statement was 'If I had a prolonged headache, I would probably think that it is because:' and the participant wrote "As I have a sore head".

3.3.2.2.2 Panic Group: Themes of 'Other' Interpretations of somatic symptoms

Themes within the normal interpretations of somatic experiences were mainly attributed to medication side effects and lack of sleep. Themes of a psychological nature included anxiety and panic. Themes attributing somatic symptoms to physical causes included existing, as well as possible, physical illness. No ambiguous responses were offered.

3.3.2.2.3 Healthy Control Group: Themes of 'Other' Interpretations of somatic symptoms

This group offered the lowest number of 'other' interpretations. 'Normal' responses included lack of sleep and "Not enough choice of food" in the context of a cause for losing their appetite. More psychological responses included "Baby on the way, tests to come" in the context of being unable to sleep, which suggests *worry* about test results, and "Tension-bad posture". Responses of a somatic nature as a cause of somatic symptoms included "Viral infection symptom" and "Hormonal problems". No ambiguous responses were given and there were also no responses which lacked in causal attributions.

3.3.2.3 Summary of findings with regards to Hypothesis 2

Hypothesis 2 proposed that the clinical groups would differ in their interpretations of somatic symptoms. There were no significant differences between the clinical groups with regards to all three causal attributions. However, the difference between the panic and delusions group was approaching significance when the somatic symptoms were thought to have a psychological cause, with the panic group attributing more weight to psychological causes of somatic symptoms than the delusion group. The results also indicate that there are no significant differences between all three groups' attributions of somatic symptoms to a normal or somatic cause. In addition, the delusion group, followed closely by the panic group, offered similar numbers of alternative interpretations of somatic symptoms in comparison to the healthy volunteers.

Nevertheless, the results partially support hypothesis two because although the clinical groups reported similar numbers of somatic symptoms, the delusional group do not attribute them to a psychological cause as strongly as the panic group. The 'other' themes did not detect any delusional content, however, the delusions group were the only group to offer what could be considered as ambiguous interpretations. It may be argued that the lower levels of attribution to psychological causes are suggestive of protecting the self.

3.3.3. Hypothesis 3: (a) There will be significant differences between the clinical groups and the healthy control group on all measures. (b)Factors that differ between the clinical groups that might help explain any differences in their interpretations of common somatic symptoms will be explored.

Significant differences were found between the clinical and healthy groups on state and trait anxiety as well as psychological attributions to somatic symptoms. However, no significant differences were found between the clinical groups and healthy control group on levels of somatising and normalising attributions to common somatic symptoms.

Hypothesis 3 assumed that there would be differences between the panic and delusion groups' interpretations of common somatic symptoms. Unexpectedly, no significant differences were found, however, tentatively, there was partial support for hypothesis two and further differences between the clinical groups may help gain insight into these possible differences between clinical groups' interpretations of common somatic symptoms.

The results of the dependent variables 'interpretations' and 'anxiety' have already been addressed by the results pertaining to hypotheses 1 and 2, therefore the remaining 5 dependent variables (1=metacognitions; 2=delusional ideation; 3=Emotionality; 4=experiential avoidance; and 5=self-esteem) will be addressed below. (see Table 3.4)

3.3.3.1 Metacognitions

Box plots highlighted two outliers in the metacognitions data (one score in the delusions group was low and another in the healthy control group was high). For this reason and due to non-normal distribution of data in the panic group, non-parametric tests were used. Descriptive statistics show that the clinical groups scored higher than the healthy control group on median metacognition scores and illustrate the overlapping range between the groups (see Table 3.4)

A Kruskal-Wallis one-way ANOVA revealed a significant effect for total scores between groups on metacognitions ($\chi^2(2) = 19.08$, $p < .0001$). A Dunn's post hoc multiple comparison test revealed a significant difference between the healthy control group and the panic group (mean rank difference=16.660, $p<.001$) and between the healthy group and the delusions group (mean rank difference=18.021, $p<.001$) with individuals in the clinical groups scoring higher on metacognitions than those in the healthy control group. There were no significant differences between the two clinical groups.

Table 3.4 Descriptive statistics for all dependent variables explored in hypothesis 3 for each group.

	Group Mean (SD)			Group Median (N)			Group Range			Statistic
	Delusion	Panic	Healthy	Delusion	Panic	Healthy	Delusion	Panic	Healthy	KW or F (sig.)
MCQ Metacognitions	79.63 (19.67	79.82 (15.89	47.6 (13.55)	84.5 (16)	89 (11)	41 (15)	35-109	52-97	33-81	KW=19.08 (p<.0001)
MCQ subscale: positive beliefs about worry	12 (5.02)	12.09 (4.72)	7.6 (2.92)	12 (16)	10 (11)	6 (15)	6-21	6-21	6-17	KW=10.295 (p<.01)
MCQ subscale: uncontrollability and danger	18.31 (5.49)	19.45 (4.91)	8.93 (3.58)	19.5 (16)	20 (11)	7 (15)	6-24	10-25	5-16	KW=20.669 (p<.0001)
MCQ subscale: need to control thoughts	16.69 (5.44)	16.55 (4.76)	9.93 (4.30)	19.5 (16)	19 (11)	8 (15)	6-23	8-23	6-20	KW=13.395 (p<.01)
MCQ subscale: cognitive self consciousness	16.56 (5.02)	17.27 (4.41)	11.53 (3.52)	16.5 (16)	16 (11)	11 (15)	7-24	10-24	7-19	F=7.217 (p<.01)
MCQ subscale: cognitive confidence	16.06 (4.52)	14.64 (6.01	9.6 (4.10)	16 (16)	16 (11)	8 (15)	9-24	6-23	6-19	KW=11.954 (p<.01)
PDI Delusional Ideation	124.31 (61.83)	66.55 (31.75)	18.8 (17.06)	120 (16)	58 (11)	13 (15)	35-224	20-117	0-48	KW=25.91 (p<.0001)
PDI Yes/No scores	11.25 (4.01)	6 (2.19)	2.67 (2.06)	12 (16)	6 (11)	2 (15)	4-17	2-10	0-6	KW=25.86 (p<.0001)
PDI subscale: Delusional distress	36.06 (19.12)	20.36 (10.64)	4.93 (4.86)	35.5 (16)	19 (11)	3 (15)	9-70	4-35	0-14	KW=24.995 (p<.0001
PDI subscale: Delusional conviction	40.13 (21.19)	20.82 (10.43)	6.67 (5.69)	35.5 (16)	16 (11)	5 (15)	12-75	10-37	0-17	KW=24.135 (p<.0001)
PDI subscale: Delusional preoccupation	36.88 (18.63)	19.36 (9.76)	5.13 (4.85)	35.5 (16)	19 (11)	3 (15)	9-70	4-36	0-13	KW=26.044 (p<.0001)
State emotionality	73.56 923.20)	80.36 (18.92)	48.87 (11.93)	70 (16)	85 (11)	47 (15)	46-128	46-110	34-76	F=10.831 (p<.001)
Trait Emotionality	81.5 (22.70)	80.91 (19.22)	50.33 (8.69)	76 (16)	90 (11)	49 (15)	48-124	51-106	36-63	KW=19.486 (p<.0001)
Experiential Avoidance	44.94 (14.24)	49.82 (9.49)	20.33 (6.30)	43.5 (16)	48 (11)	21 (15)	13-63	35-62	10-35	KW=24.626 (p<.0001)
Self Esteem	113.75 (30.23)	106.45 (18.37)	167.27 (21.86)	112 (16)	106 (11)	172 (15)	67-168	62-126	114-203	KW=22.879 (p<.0001)

3.3.3.1.1 Positive beliefs about worry

The metacognitions subscale 'positive beliefs about worry' includes 6 statements like 'worrying helps me to avoid problems in the future', and scores for this subscale can range from 6 to 24. Exploratory analysis revealed one outlier in the healthy control group representing a participant who scored higher than the others in the group. Descriptive statistics show that the clinical groups' median scores were higher than that of the healthy control group. It also illustrates the overlap in scores between all three groups (see table 3.4).

A one-way Kruskal-Wallis ANOVA indicated a significant difference between groups' total scores ($\chi^2(2) = 10.295$, $p<.01$). A Dunn's multiple post hoc comparison test of the three groups revealed that the significant differences lay between the healthy control group and the delusion group (mean rank difference=11.844, $p<.05$), and between the healthy control group and the panic group (mean rank difference=13.318, $p<.05$), with the clinical groups reporting higher levels of positive beliefs about worry than the healthy control group. There were no significant differences between the two clinical groups.

3.3.3.1.2 Negative beliefs about the uncontrollability of thoughts and corresponding danger.

The 'negative beliefs about the uncontrollability of thoughts and corresponding danger' subscale includes 6 items and can elicit a score between 6 and 24. Descriptive statistics show that the clinical groups showed higher levels of these negative beliefs

than the healthy control group (see Table 3.4). It also illustrates that there is an overlap between groups and only the clinical groups reported maximum scores.

A Kruskal-Wallis one-way ANOVA revealed a significant difference between groups ($\chi^2(2) = 20.669$, $p<.0001$). A Dunn's multiple post hoc comparison test of the three groups indicate that the significant differences lay between the healthy control group and the delusion group (mean rank difference=16.965, $p<.001$), and between the healthy control group and the panic group (mean rank difference=18.979, $p<.001$), with the clinical groups reporting higher levels of negative beliefs about uncontrollability and danger than the healthy control group. There were no significant differences between the two clinical groups.

3.3.3.1.3 Cognitive confidence

The 'cognitive confidence' subscale includes 6 items and can elicit a score between 6 and 24. Examples of statements include 'I have little confidence in my memory for words and names' and 'my memory can mislead me at times'. Higher scores on this subscale indicate lower levels of cognitive confidence.

Two high scoring outliers in the healthy control group were highlighted by a box plot. This ensured, along with the results from the parametric assumption tests that non-parametric tests were used. Descriptive statistics show that the clinical groups reported higher scores and therefore lower levels of cognitive confidence than the healthy control group (see Table 3.4). It also illustrates that there is an overlap between groups' scores.

A Kruskal –Wallis one way ANOVA was performed to determine whether the differences between groups were significant for levels of cognitive confidence. The analysis indicated a significant difference between groups ($\chi^2(2) = 11.954$, $p < .01$). A Dunn's post hoc multiple comparison test revealed that there was a significant difference between the delusion group and the healthy control group (mean rank difference=14.844, $p<.01$) with the delusion group experiencing lower levels of cognitive confidence than the healthy group. There were no significant differences between the two clinical groups or the healthy group and the panic group.

3.3.3.1.4 Need to control thoughts

The 'need to control thoughts' subscale includes 6 items and can elicit a score between 6 and 24. Examples of statements include 'It is bad to think certain thoughts' and 'I should be in control of my thoughts all the time'. Higher scores on this subscale indicate a greater need to control thoughts.

Exploratory analysis revealed one high scoring outlier in the healthy control group. This ensured, along with the results from the parametric assumption tests that non-parametric tests were used. Descriptive statistics show that the clinical groups expressed a greater need to control thoughts than the healthy control group (see Table 3.4). It also illustrates that there is an overlap between groups' scores.

A Kruskal-Wallis one-way ANOVA revealed significant differences on the results for the need to control thoughts between group ($\chi^2(2) = 13.395$, $p < .01$). A Dunn's multiple post hoc comparison test of the three groups indicate that the significant

differences lay between the healthy control group and the delusion group (mean rank difference = 14.733, p<.01), and between the healthy control group and the panic group (mean rank difference = 13.824, p<.05), with the clinical groups reporting a greater need to control thoughts than the healthy control group. There were no significant differences between the two clinical groups.

3.3.3.1.5 Cognitive self consciousness

The 'cognitive self consciousness' subscale includes 6 items and can elicit a score between 6 and 24. Examples of statements include 'I think a lot about my thoughts' and 'I monitor my thoughts'. Higher scores on this subscale indicate a higher level of self consciousness around thoughts.

Exploratory analysis and results of assumption tests suggested parametric tests would be best used on this data. Descriptive statistics show that the clinical groups expressed a higher level of cognitive self consciousness than the healthy control group (see Table 3.4). It also illustrates that the clinical groups scored maximum levels of cognitive self consciousness whereas the healthy control group did not, and that there is an overlap between groups' scores.

A one-way ANOVA revealed significant results between groups on cognitive self consciousness ($F(2,39) = 7.217$, $p < .01$). A Tukey-Kramer multiple post hoc comparison test of the three groups indicate that the significant differences lay between the healthy control group and the delusion group ($q=4.525$, $p<.01$), and between the healthy control group and the panic group ($q=4.676$, $p<.01$), with the clinical groups reporting a higher level of cognitive self consciousness than the

healthy control group. There were no significant differences between the two clinical groups.

3.3.3.2. Delusional ideation

Descriptive statistics illustrate that the delusions group scored higher than the other 2 groups for overall levels of delusional ideation, and the panic group showed greater levels of delusional ideation than the healthy control group (see Table 3.4). Due to heterogeneity of variance, non-parametric tests were used.

A Kruskal –Wallis one-way ANOVA revealed a significant effect for overall scores on delusional ideation between groups ($\chi^2(2) = 25.91$, $p < .0001$). A Dunn's post hoc multiple comparison test revealed that there was a significant difference between the healthy control group and the panic group (mean rank difference=14.030, $p<.05$) and between the healthy group and the delusions group (mean rank difference=22.292, $p<.001$) with the clinical groups scoring higher on levels of delusional ideation than the control group. However, there are large standard deviations for each group on Peters et al. Delusions Inventory (PDI) scores. Large standard deviations on the PDI scores for the delusions group may indicate a problem with either the way that delusions were measured or that the individuals in the delusions group may not have been experiencing delusions as part of a delusional syndrome. In addition, there were no significant differences found between the clinical groups on measures of interpretation. This may be due to the way in which the interpretations were measured or it could be a reflection of similarities of the groups given that a diagnosis was not part of the inclusion criteria.

Surprisingly, there were no significant differences between the two clinical groups even though the descriptive statistics (see Table 3.4) raise expectations that there would be. It should be acknowledged that the non-significant difference between the clinical groups' may be the result of a Type II error.

3.3.3.2.1 Yes/No scores

Descriptive statistics showed that the delusions group endorsed more delusional ideas offered by the questionnaire than the other two groups with panic endorsing less than the delusion group, and the healthy control group endorsed the least amount of delusional ideas (see Table 3.4). Due to heterogeneity of variance and lack of normal distribution in the healthy control group, non-parametric statistics were used.

A Kruskal –Wallis one-way ANOVA indicated a significant effect for overall scores on delusional ideation between groups ($\chi^2(2) = 25.86$, $p < .0001$). A Dunn's post hoc multiple comparison test revealed that there was a significant difference between the healthy control group and the delusion group (mean rank difference=22.340, $p<.001$). However, the differences between the healthy control group and the panic group did not reach significance, and there were no significant differences between the two clinical groups.

3.3.3.2.2 Levels of distress caused by delusional ideation between groups

Descriptive statistics revealed that the delusions group showed higher levels of delusional distress than the other two groups with panic showing lower levels of distress than delusion group and the healthy control group showed the least amount of delusional distress (see Table 3.4). Due to heterogeneity of variance and lack of normal distribution in the healthy control group, non-parametric statistics were used.

A Kruskal –Wallis one-way ANOVA revealed significant differences for overall scores on delusional distress between groups ($\chi^2(2) = 24.995$, $p < .0001$). A Dunn's post hoc multiple comparison test revealed that there was a significant difference between the healthy control group and the delusion group (mean rank difference=21.785, p<.001), and between the healthy control group and the panic group (mean rank difference=14.385, p<.01.) However, there were no significant differences between the two clinical groups.

3.3.3.2.3 Levels of delusional conviction between groups

Descriptive statistics illustrate that the delusions group showed higher levels of delusional conviction than the other two groups with panic showing lower levels of conviction than the delusion group, and the healthy control group showed the least amount of delusional conviction (see Table 3.4). Due to heterogeneity of variance, non-parametric statistics were used.

A Kruskal –Wallis one-way ANOVA revealed a significant difference for overall scores on delusional conviction between groups ($\chi^2(2) = 24.135$, $p < .0001$). A Dunn's post hoc multiple comparison test revealed that there was a significant difference between the healthy control group and the delusion group (mean rank difference=21.542, p<.001), and between the healthy control group and the panic group (mean rank difference=13.21., p<.05). However, there were no significant differences between the two clinical groups.

3.3.3.2.4. Levels of delusional preoccupation between groups

Descriptive statistics showed that the delusions group showed higher levels of delusional preoccupation than the other two groups, with panic showing lower levels of preoccupation than the delusion group and the healthy control group showed the least amount of delusional preoccupation (see Table 3.4). Due to heterogeneity of variance, non-parametric statistics were used.

A Kruskal –Wallis one-way ANOVA revealed a significant difference for scores on delusional preoccupation between groups ($\chi^2(2) = 26.044$, $p < .0001$). A Dunn's post hoc multiple comparison test revealed that there was a significant difference between the healthy control group and the delusion group (mean rank difference=22.352, $p<.001$), and between the healthy control group and the panic group (mean rank difference=13.815, $p<.05$). However, there were no significant differences between the two clinical groups.

3.3.3.3. Emotionality

3.3.3.3.1 State Emotionality

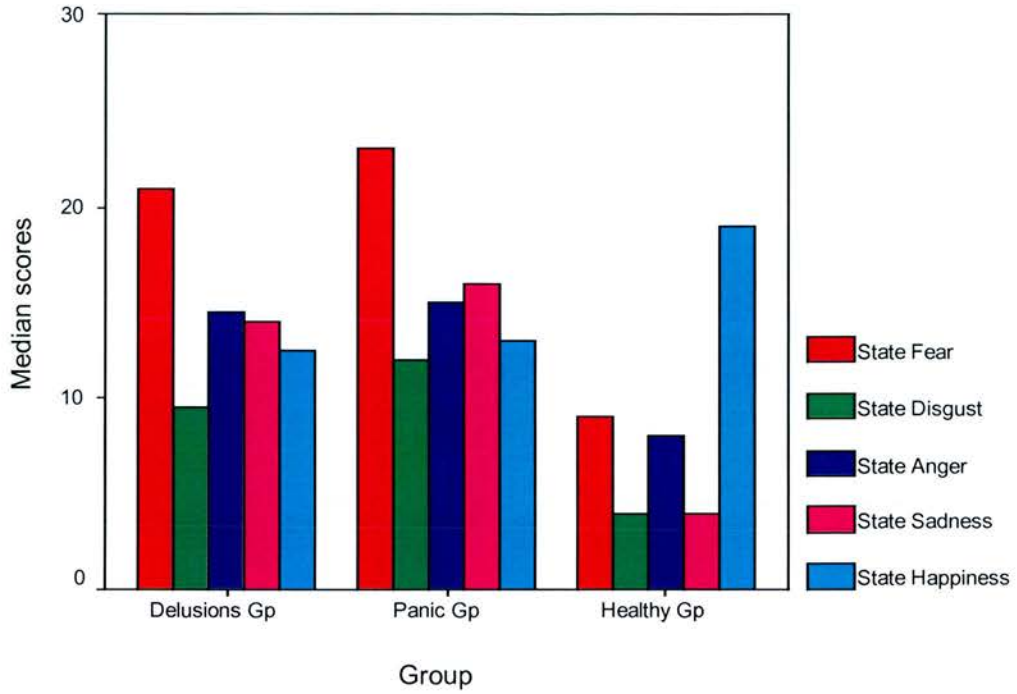
Descriptive statistics illustrate that the clinical groups showed similar mean levels of state emotionality which were higher than those of the healthy control group (see Table 3.4).

A one way ANOVA revealed significant differences for state emotionality between the three groups ($F(2, 39)=10.831$, $p<.001$). A Tukey Kramer multiple comparison test found that the significance lay between the healthy control group and the two clinical groups with the former scoring significantly lower on overall scores of state emotionality than both clinical groups (delusions vs. healthy control $q=5.196$, $p<.01$; panic vs. healthy control $q=6$, $p<.001$). There were no significant differences found on overall scores of state emotionality between the two clinical groups.

Parametric assumptions were violated for state and trait emotionality subscales, therefore non-parametric tests were used to analyse the data. A summary of the state emotionality subscale scores (see figure 3.3) show that the healthy control group scored lower on all emotions that may be thought of as being negative than the clinical groups and scored higher on levels of happiness than the clinical groups.

A one way Kruskal-Wallis ANOVA revealed significant differences between scores for the subscales of state emotionality between the three groups and a significant effect was found for fear ($\chi^2(2) = 15.024$, $p < .001$); disgust ($\chi^2(2) = 14.621$, $p < .001$); anger ($\chi^2(2) = 13.283$, $p < .01$); sadness ($\chi^2(2) = 21.121$, $p < .0001$) and happiness ($\chi^2(2) = 10.529$, $p < .01$).

Figure 3.3 Median scores of state emotionality subscales by group



Dunn's multiple comparison test found that the clinical groups showed significantly more fear (healthy vs. delusion: mean rank difference=13.096, $p<.01$; healthy vs panic: mean rank difference=17.352, $p<.01$), disgust (healthy vs. delusion: mean rank difference=12.1, $p<.05$; healthy vs. panic: mean rank difference=17.145, $p<.001$), anger (healthy vs. delusion: mean rank difference=12.944, $p<.01$; healthy vs. panic: mean rank difference=15.918, $p<.01$), and sadness (healthy vs. delusion: mean rank difference=16.181, $p<.001$; healthy vs. panic: mean rank difference=19.991, $p<.001$) than the healthy control group. The healthy control group showed significantly higher levels of happiness than the delusion group (healthy vs. delusion: mean rank difference=-11.948, $p<.05$), and the panic group (healthy vs. panic: mean rank difference=-13.803, $p<.05$).

Significant differences were found between the clinical groups and the healthy control group on all state emotionality subscales. The panic group scored slightly higher than the delusion group on all four negative emotionality subscales. They had the same mean and median scores for state happiness. However, there were no significant differences found between the two clinical groups on any of the subscales.

3.3.3.3.2 Trait Emotionality

Descriptive statistics show that the clinical groups showed higher levels of trait emotionality than the healthy control group and the clinical groups showed similar levels (see Table 3.4).

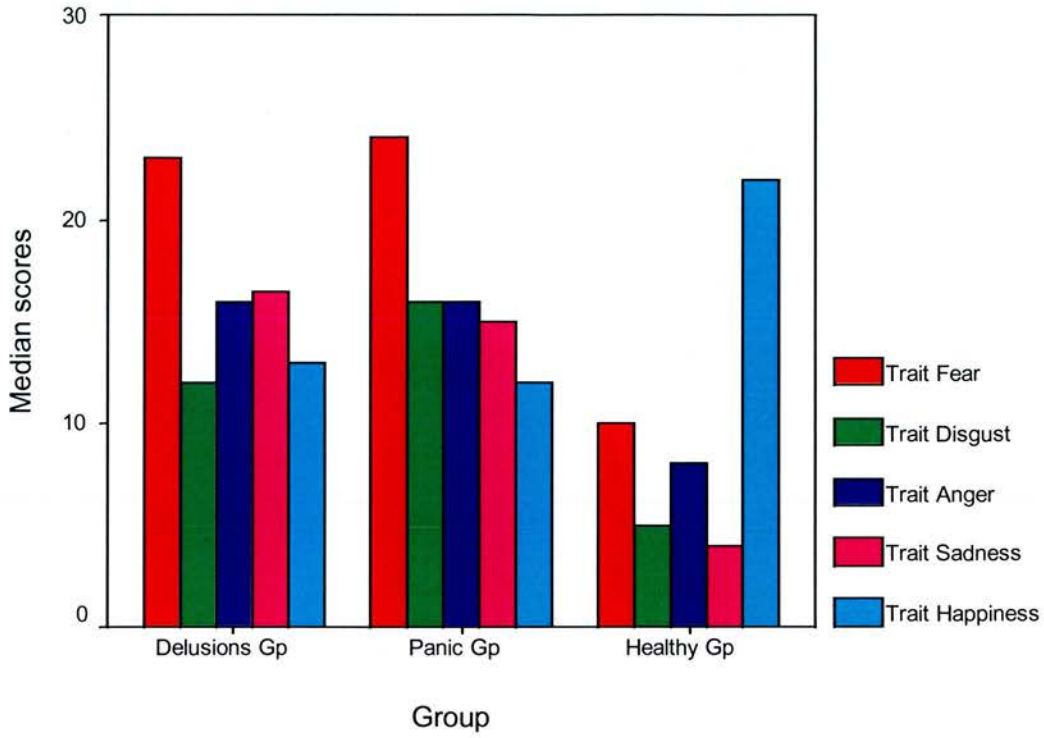
A Kruskal–Wallis one-way ANOVA revealed a significant difference between groups on scores of trait emotionality ($\chi^2(2) = 19.486$, $p < .0001$). A Dunn's post hoc multiple comparison test revealed that there was a significant difference between the healthy control group and the delusion group (mean rank difference=17.388, $p<.001$), and between the healthy control group and the panic group (mean rank difference=17.473, $p<.001$) with the healthy control group scoring significantly lower than the clinical groups. However, there were no significant differences between the two clinical groups.

A summary of the trait emotionality subscale scores (see figure 3.4) show that the healthy control group scored lower on all emotions that may be thought of as being negative, than the clinical groups and scored higher on levels of happiness than the clinical groups.

A one way Kruskal-Wallis ANOVA was carried out on the scores for the subscales of trait emotionality between the three groups and a significant effect was found for fear ($\chi^2(2) = 15.632$, $p < .001$); disgust ($\chi^2(2) = 15.839$, $p < .001$); anger ($\chi^2(2) = 21.185$, $p < .0001$); sadness ($\chi^2(2) = 22.863$, $p < .0001$) and happiness ($\chi^2(2) = 16.709$, $p < .001$).

A Dunn's multiple comparison test found that the clinical groups showed significantly more fear (healthy vs. panic: mean rank difference=-18.158, p<.001; healthy vs. delusion: mean rank difference=-12.629, p<.05), disgust (healthy vs. delusion: mean rank difference=14.306, p<.01; healthy vs. panic: mean rank difference=16.991, p<.01), anger (healthy vs. delusion: mean rank difference=17.319, p<.001; healthy vs. panic: mean rank difference=19.1, p<.001), and sadness (healthy vs. delusion: mean rank difference=18.535, p<.001; healthy vs. panic: mean rank difference=-19.112, p<.001) than the healthy control group. The healthy control group showed significantly higher levels of happiness than the delusion group (mean rank difference=-13.373, p<.01), and the panic group (mean rank difference=-18.603, p<.001). There were no significant differences found between the two clinical groups on any of the subscales.

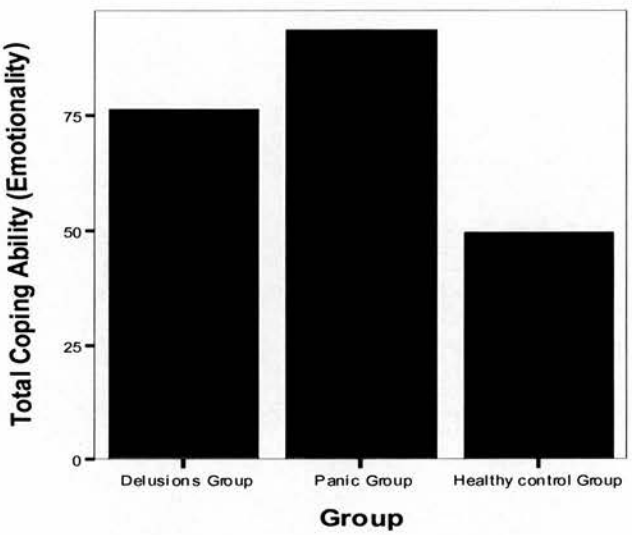
Figure 3.4 Median scores of trait emotionality subscales by group



3.3.3.3.3 Emotional coping

A summary of mean emotional coping scores is given in Figure 3.5. Lower scores represent a greater ability to cope with emotions and higher scores represent lesser ability to cope with emotions. This data suggests that the panic group were the least able to cope with emotions followed by the delusions group, and the healthy control group reported a greater ability than the clinical groups to cope with emotions.

Figure 3.5 Mean scores between groups on overall ability to cope with emotions



A one way ANOVA revealed a significant difference between the three groups for coping ability ($F(2, 39)=8.225$, $p<.01$). A Tukey Kramer multiple comparison test found that the significance lay between the healthy control group and the delusions group ($q=3.734$, $p<.05$) and between the healthy control group and the panic group ($q=5.594$, $p<.001$) with the healthy control group showing a significantly greater ability to cope with emotions than the two clinical groups. There were no significant differences found on overall scores of emotional coping ability between the two clinical groups.

3.3.3.4. Experiential Avoidance

Descriptive statistics show that the panic group reported greater levels of experiential avoidance than the other two groups and the healthy control group scored the greatest levels of acceptance and action (see Table 3.4). Due to heterogeneity of variance, non-parametric statistics were used.

A Kruskal–Wallis one-way ANOVA revealed a significant difference between groups scores for experiential avoidance ($\chi^2(2) = 24.626$, $p < .0001$). A Dunn's post hoc multiple comparison test revealed that there was a significant difference between the healthy control group and the delusion group (mean rank difference=17.588, $p<.001$), and between the healthy control group and the panic group (mean rank difference=21.764, $p<.001$) with the healthy control group scoring significantly lower than the clinical groups on levels of experiential avoidance. However, there were no significant differences between the two clinical groups on overall scores of experiential avoidance.

3.3.3.5. Self Esteem

Descriptive statistics show that the healthy control group have higher levels of self-esteem than the two clinical groups (see Table 3.4). Exploratory analysis found that there were three outliers in the self-esteem data (2 in the healthy control group: one was a low score and the other high, and 1 low scoring outlier in the panic group). For this reason non-parametric tests were used.

A Kruskal-Wallis one way ANOVA revealed significant differences between the three groups on levels of self-esteem ($\chi^2(2) = 22.879$, $p < .0001$). A Dunn's multiple comparison test found that the significance lay between the healthy control group and the two clinical groups with the former scoring significantly higher on levels of self-esteem than both the delusion group (mean rank difference=-17.723, $p<.001$) and the panic group (mean rank difference=-20.294, $p<.001$). There were no significant differences found on self-esteem scores between the two clinical groups suggesting that they reported similar levels of self-esteem.

3.3.3.6. Summary of findings for hypothesis 3

The results largely support hypothesis 3a because, as expected, significant differences were found between the clinical groups and the healthy control group on all measures except on the metacognition subscale of cognitive confidence and the number of delusional ideation items endorsed on the PDI. In both these case, the difference between the panic and healthy control group did not reach significance.

With regards to hypothesis 3b, no significant differences were found between the clinical groups on all measures. Having said this, the delusional group reported much higher levels of delusional ideation, delusional distress, delusional conviction, delusional preoccupation, and endorsed a higher number of delusional ideation items than the panic group, although these differences did not reach significance. This may be due to a type II error and possibly with equal sample sizes, or indeed bigger samples these difference may reach significance. In addition, the delusions group reported less cognitive confidence, and slightly lower levels of state emotionality and experiential avoidance along with slightly higher levels of self-esteem.

Chapter 4: Discussion

4.1: Summary of findings

The main aim of this study was to look at the similarities as well as differences between the clinical groups and the clinical and control groups in the context of the continuum model. The pattern of results supported some of the hypotheses and not others. Firstly, both clinical groups expressed similar levels of anxiety. Secondly, both clinical groups experienced a similar number of common somatic symptoms, and there is partial support for the idea that the clinical groups interpreted somatic symptoms differently, however, this is tentative. Thirdly, of all the variables that we hypothesised might lead to different interpretations between the clinical groups, none of them approached a meaningful difference.

The continuum model was largely supported in the context of psychosis. This was evidenced by an increasingly larger number of items on the Peter's Delusions Inventory (PDI) being endorsed between groups. The healthy control group endorsed the lowest number of delusional ideas (mean=2.7, SD=2.06), followed by the panic group (mean=6, SD=2.19), and the delusions group endorsed the most delusional ideas (mean=11.25, SD=4.01). The differences between the delusion group and the healthy control group were significant, however it should be noted that the differences between the numbers of items endorsed by the panic group were not significantly different from those endorsed by the healthy control group, and the differences between the clinical groups were not significantly different. It is not clear why this is the case. In this study, the panic group scores were similar to those of Peters *et al.*'s (2004) healthy control group, and the delusion group scores between the two studies

were similar, suggesting a similar result of a significant difference should occur. However, Peters *et al.* (2004) used different non-parametric tests due to the study design. It is possible that a significant difference has not been detected (Type II error) due to small and unequal sample sizes. The continuum model is further supported by the overlap in the range of delusional items endorsed between groups (see table 3.4 in results section).

The pattern of the overall 'delusional ideation' scores were reflective of the pattern of scores for the PDI subscales: distress, conviction, and preoccupation. There were significant differences between the clinical groups and the healthy control group on all measures, and there were no significant differences between the clinical groups. This supports Morrison's (2001) theory that there are similarities between the formation and maintenance of panic and delusions.

As expected, anxiety levels were similar amongst the panic group and the delusions group and these anxiety levels were significantly higher than those of the healthy control group, which supports findings by Fraser *et al.* (2006) and Livingstone *et al.* (2008). Emotions other than anxiety, namely depression, anger and disgust, have been implicated in Persecutory delusions (Freeman & Garety, 2003) and were measured in the present study using the Basic Emotions Scale (BES; Power, 2006). The results of this study are similar to those of Suslow *et al.* (2003) and Livingstone *et al.* (2008) in that significant differences were found between the psychosis group and the healthy control group for fear, disgust, sadness and happiness (Joy in Suslow's 2003 study), with the psychosis group experiencing higher levels of the more negative emotions and lower levels of joy/happiness than the healthy control group. This supports

previous research implicating emotions in psychopathology, and suggests that emotion plays a role in development and/or maintenance of psychosis and panic disorder.

An interesting finding of this study was that the clinical groups reported significantly higher levels of anger than the healthy control groups. This finding is interesting as it contrasts with data reported by Suslow (2003) and Livingstone *et al.* (2008), which found no significant differences between groups on anger levels. On examination of the results (Livingstone, personal communication, 2008) the differences lay in the healthy control group scores. The control group for the present study appeared to have lower scores than the Livingstone study. Freeman *et al.* (2001) also found no raised levels of anger in individuals who were experiencing persecutory delusions. Therefore, this finding adds to the sparse but inconsistent findings in the literature with regards to persecutory delusions and anger (Freeman, 2003). However, these results also suggest that the anger levels of individuals who experience persecutory delusions are similar to those experienced by individuals who suffer from panic disorder. Furthermore, the clinical groups showed higher levels of fear than any other emotion, whereas the control group scored higher on happiness than any other emotion.

Emotional coping as measured by the BES showed that the clinical groups were significantly less able to cope with emotions than the healthy control group and interestingly, the panic group were less able to cope with emotions than the delusion group, however this difference was not significant.

Self-esteem levels, as measured by the self concept questionnaire (SCQ), were found to be significantly higher in the healthy control group as compared with the clinical groups. This finding is consistent with previous research findings implicating low self-esteem in a number of mental health problems including psychosis (Silverstone, 1991; Hall & Tarrier, 2003). Self-esteem is reported to be implicated in the formation and maintenance of psychotic disorders (Hall & Tarrier, 2003), therefore is another factor which is important in individual therapy.

Experiential avoidance (EA), more recently referred to as 'psychological flexibility' in the context of the acceptance and action questionnaire (AAQ-II), is a safety behaviour that has been implicated as influencing psychopathology. The results of this study support this idea, as evidenced by the clinical groups, showing significantly higher experiential avoidance and therefore less psychological flexibility than the healthy control group. This suggests that individuals from both clinical groups use avoidance strategies, and that they have lower levels of psychological flexibility and acceptance than healthy controls. These findings are in line with previous research that found avoidance was frequently used by people with persecutory delusions (Freeman *et al.*, 2001). Avoidance is also implicated in the maintenance of delusional beliefs (Freeman *et al.*, 2002; Morrison, 2001), therefore, it should be recognised in the assessment, formulation and treatment of psychosis.

Metacognitions are beliefs about thoughts that may, for example, have a worry content or delusional content. The findings of the present study support previous research (Morrison & Wells, 2007) and theories (Self-Regulatory Executive Function; S-REF model) in this area which implicate dysfunctional metacognitions in psychopathology.

The clinical groups expressed higher levels of dysfunctional metacognitions than the healthy control group. This is in line with Morrison & Well's (2007) study who found that people with psychosis showed higher levels of metacognitive beliefs than non-patients. Interestingly, the 'need to control thoughts' metacognitions subscale only found a significant difference between the delusions group and the healthy control group, and although the panic group showed higher levels of dysfunctional metacognitive beliefs than the healthy control group, the differences were not significant. A type II error cannot be ruled out as a cause for this finding, however, if this result is replicated in future research with larger sample sizes, it may have clinical implications. On the other hand, there is a possibility that a type 1 error could account for this finding because a number of comparisons were made which increases the familywise error rate.

The S-REF model implicates metacognitive beliefs in the vulnerability to and maintenance of psychopathology (Morrison *et al.*, 2007). In addition, Morrison (2005) suggests that positive metacognitive beliefs such as 'being suspicious of others keeps me safe' are associated with the occurrence of psychotic phenomena, and that negative beliefs such as 'I'm mad' are associated with the distress as a result of them. For this reason, it seems important that metacognitions should also be assessed, and integrated into the formulation and intervention of psychotic experiences.

The present study found significant differences between the clinical groups and the healthy control group on weight given to psychological interpretations of somatic symptoms (e.g. *If I had a prolonged headache, I would probably think that it is*

because I am emotionally upset). The clinical groups reported significantly higher levels of psychological attributions than the healthy control group. In addition, the clinical groups and the healthy control group showed similar levels of normalising (e.g. *If I had a prolonged headache I would probably think that it is because a loud noise, bright light or something else has irritated me*) and somaticising (e.g. *If I had a prolonged headache I would probably think that there is something wrong with my muscles, nerves or brain*) attributions of common somatic experiences. This suggests that there may be an association between psychologising attributions and psychopathology. However, future research with bigger sample sizes is needed to validate these findings. There is also some uncertainty of what the Symptom Interpretation Questionnaire (SIQ) is actually measuring (Aronson, 2006) therefore it may be helpful to use a different questionnaire in future research. No previous studies have used this questionnaire in these populations therefore no direct comparisons can be made.

Surprisingly, there were no significant differences between the clinical groups in their interpretation of somatic symptoms. Morrison (2007) suggests that individuals who experience panic and those who experience delusions similarly arrive at explanations of internal experiences through normal reasoning processes. It is also acknowledged that they are separate disorders, and that their interpretations are distinct. Therefore, it was expected that there would be differences in somatic interpretations between the clinical groups. Possible differences were implicated by the data in that the delusion group reported higher levels of psychologising attributions than the panic group, and these differences were approaching significance ($p=.056$). Further differences were indicated by the results of 'other' interpretations. As previously described, the SIQ

was adapted so that externalising attributions other than those given within the questionnaire could be recorded. From those 'other' interpretations offered, the delusions group alone offered attributions which could be interpreted in different ways and were labelled 'ambiguous' in the results (e.g. 'If I was sweating a lot, I would think it is because: "Maybe outside forces"). A cautionary stance should be taken with these findings as theses differences were not significant and therefore only provide partial support for the idea that the clinical groups interpret somatic symptoms differently.

Another interesting finding in this study was that the delusions group did not offer any delusional interpretations and the panic group offered no catastrophising interpretations for common somatic symptoms. One possible explanation for this is that the somatic experiences may need to be anomalous rather than common in order to induce delusional explanations. As mentioned previously, Morrison (2002) suggests that in individuals who are predisposed to psychosis, a delusion will be formed by a stressor (e.g. life event) which may cause arousal, which in turn will induce an inner-outer confusion (Fowler, 2000), which in turn will cause an anomalous experience (e.g. misinterpreting thoughts as voices) of which an explanation will be sought. This suggests that an anomalous experience is necessary before a delusional explanation will occur. However, Bell, Halligan and Ellis (2008) would disagree. They carried out a study to determine whether pathological levels of anomalous perceptual experiences were necessary to account for the presence of delusions, and found that this was not the case. They measured anomalous perceptual experiences in a non clinical sample, a group of non hallucinating delusional patients, and a group of hallucinating delusional patients. They found that there were no

significant differences between any of the groups on any of the anomalous perceptual experience indices on the Cardiff Anomolous Perception Scale (CAPS). The authors concluded that 'pathological levels of anomalous perceptual experience, as measured by the Cardiff Anomalous Perceptions Scale, are not necessary to account for the presence of all delusions'.

Overall, the results show a lack of differences between the two clinical groups, with the exception of the possibility that the delusion group may show a stronger bias for psychological attributions of common somatic symptoms than the panic group. However, as mentioned earlier, this is a tentative result. Again, with the exception of this result, the research and cognitive theories underlying each of the variables measured are supported by these results.

4.2. Clinical and theoretical implications

Each of the variables measured within this study (e.g. metacognitions) have implications for clinical work. Cognitive models of psychosis tend to emphasise different factors. For example metacognitions are emphasised in Morrison's (2001) model whereas the model proposed by Freeman *et al.* (2002) emphasises the role of emotion in persecutory delusions. However, if all of these variables are implicated in psychosis, it suggests that they should all be assessed and be integrated into clients' formulations and intervention plans. As with all therapies, this should be in accordance with the needs of the client and with how each factor is affecting their everyday life. A number of authors have pointed out that psychosis is a complex phenomena and in the same way that each cognitive model emphasises different

symptoms within psychosis, it would be expected that clients too present with a different emphasis on what factors cause the most difficulties for them.

The results regarding the interpretations of common somatic symptoms suggest that the psychologising of somatic symptoms (e.g. If my stomach was upset I would probably think it was because I've worried myself sick) may be implicated in psychopathology as evidenced by the two clinical groups putting significantly more weight on psychological attributions for common somatic symptoms than the healthy control group. It could be argued that the larger number of females in this study could account for the higher psychologising scores in the clinical groups as a previous study has found that psychologisers were more likely to be female and normalisers and somatisers to be male (Kessler *et al.*, 1999). However, if this were the case, we would expect to find higher levels of somatising or normalising in the delusions group as this group predominantly consisted of males.

Psychologising may be associated with the formation of persecutory beliefs. For example, if a loss of appetite was attributed to the psychological attribution 'I'm worrying so much that food just doesn't taste good anymore', this attribution could be considered as evidence that there is something to worry about which in turn could cause a misinterpretation of other people's actions as threatening, which results in distress. This example is in line with Freeman's (2002) formation model of persecutory delusions. He suggests that in individuals who experience psychosis, a delusion will be formed by a stressor (e.g. life event) which may cause arousal, which in turn will induce an inner-outer confusion (Fowler, 2000), which in turn will cause an anomalous experience (e.g. misinterpreting thoughts as voices) of which an

explanation will be sought. This explanation will depend on things like beliefs, emotions, metacognitions, cognitive flexibility and cognitive biases. If psychologising is involved in the formation of persecutory beliefs, being aware of them and when they occur will help to prevent these distressing beliefs from occurring. Therefore, psychologising attributions should be assessed and then formulated in collaboration with the client to inform treatment plans.

A reduction of psychologising attributions may be of use in the treatment stage of therapy. Williams (2002) described a young woman who experienced less distress when normalising her experiences in therapy. It may be that the increased normalising interpretations were actually serving to reduce psychologising appraisals. However, research looking at the relationship between psychologising attributions and distress is needed in the delusions population to confirm or deny the importance of these attributions.

With regards to emotions, the clinical groups showed significantly higher levels of the more negative emotions than the healthy control group and significantly less levels of happiness which suggests that emotions are important in persecutory delusions as well as panic. Emotions are central to Freeman's (2002) model of persecutory delusions and are implicated in both the formation and maintenance of persecutory beliefs, and therefore, should also be incorporated throughout the course of individual clinical work.

Emotional coping, as measured by the BES in the present study, showed that the clinical groups were less able to cope with emotions than the healthy control group. Therefore increasing emotional coping strategies during the treatment stage is important. As Bach *et al.* (2006) states, people who experience delusions are hospitalised not because they are experiencing delusional beliefs but because they are behaving in a non acceptable way in response to those beliefs. Therefore, learning to cope with the beliefs could impact on behaviour and reduce rehospitalisation rates.

Metacognitions have also been identified in this study as having a role in psychopathology evidenced again by the significant differences between the clinical groups and the healthy control group. These findings, along with the previous research and theories implicating metacognitions (e.g. S-REF model and Morrison's (2001) cognitive model) suggests that clinicians should carefully assess the metacognitive beliefs held by their clients, as these are implicated as being significantly more dysfunctional in both panic disorder patients and delusional patients, compared to non disordered individuals.

A careful assessment of self-esteem should also be carried out because, in addition to the literature which suggests that individuals experiencing delusions tend to experience low self-esteem, the present results also suggest that individuals who experience panic as well as those who experience delusions, show significantly lower levels of self-esteem than non-disordered individuals. This has implications for individual therapy in that clinician's should be at least aware of the issues that impact on the individual's self-esteem and monitoring any changes that occur.

Significantly higher levels of experiential avoidance were found amongst the clinical groups compared with the healthy control group. This also has implications for individual therapy in the assessment, formulation and treatment of difficulties as avoidance is often implicated in the maintenance of many different disorders.

The results also provide support for Morrison's (2001) cognitive model of psychosis, which is based on Clark's (1986) model of panic. The evidence provided by this study is the consistent similarities in scores on many variables. This suggests that Morrison's model may be useful to inform the assessment, formulations and treatment of at least some individuals experiencing persecutory delusions.

Another finding within this study which has potential clinical implications is from the 'other' interpretations offered by a participant from the delusions group. This participant gave statements which could be interpreted in more than one way. For example, (as mentioned earlier), in response to the statement 'If I was sweating a lot, I would think it is because:' a participant wrote: "Maybe outside forces". It is possible that this could be attributed to weather conditions or something more bizarre-like, however not enough information was gathered to clarify this answer. It is possible that clinician's may misinterpret client's attributions as delusional within clinic settings. Research shows that clinicians' misinterpretations of delusions can also cause distress (e.g. Reeves & Torres, 2003). This has implications for training staff working with people who experience psychosis. It may be helpful to train staff not to focus on whether the interpretation is culturally acceptable or not but to gather more information in order to understand it. This is important for a number of reasons; (a) if clinicians can show an acceptance of client's experiences, clients are more likely to

accept their experiences rather than trying to control them; (b) the more knowledge gained, the more tailored the treatment plan will be for that particular person, and (c) reduction of stigma attached to psychosis.

It seems that this study has a number of clinical implications particularly for individual therapy and staff training. However, it is important to acknowledge that these implications are not solely based on the present study, but are also based on previous research and theories behind it.

Overall, the findings of the present study support the cognitive models that implicate higher levels of 'negative' emotions, dysfunctional metacognitions, avoidance (safety behaviours), unhelpful interpretations and low self-esteem in people who experience persecutory delusions as well as those who experience panic. However, there was an absence of significant differences between the clinical groups in their interpretations of common somatic symptoms. This finding may be due to the way in which somatic attributions were measured. Future research may provide a better understanding of attributions between these groups of people using a different measure. Perhaps with the Cardiff Anomolous experiences Scale (CAPS; which measures anomalous experiences as opposed to common ones.

Measuring interpretations of experiences is important because appraisals of experiences are central to the model developed by Garety *et al.* (2001) as well as being implicated in both Morrison's (2001) model and Freeman's (2002) model. It was expected that the delusion group would express more culturally unacceptable

interpretations than the panic group because, as Maher (1974) suggested, physiological arousal as well as external events can cause delusional explanations. However, as mentioned previously, there is tentative support for these differences.

Jaspers (1963) suggested that there was a distinction between the neuroses and psychoses. The results from this study suggest in line with Morrison (2001) that there are similarities between them. Continual overlapping of scores between all three groups throughout the results lend support to the continuum as opposed to the categorical model. In addition, if the healthy-affect-psychosis continuum model were to hold true, expectations for the present study include increasingly higher scores from healthy control group to panic group, and highest scores for delusions group on delusion proneness as measured by the PDI. The results generally support this hypothesis with the delusions group reporting the highest levels of delusional ideation and the healthy control group the lowest and the panic group in between. The differences between the clinical groups did not reach significance but maybe in a study with a larger sample size, these differences would be significant. So although the general pattern of results support the healthy-affect-psychosis continuum model, this implication should be treated with caution unless future studies with bigger sample sizes can validate these results.

Significantly higher levels of dysfunctional metacognitions were found in the clinical groups as compared with the healthy control groups, which lends support to the S-Ref model's prediction that metacognitions play a role in psychopathology. The high levels of dysfunctional metacognitions also lend support to Morrison's (2001) model

which implicates metacognitions in psychosis. The significantly high levels of anxiety and other emotions experienced by the clinical groups compared with those of the healthy control group also supports Morrison's suggestion that anxiety disorders and psychosis are similar in nature, and Freeman's (2002) model which implicates emotions in persecutory delusions.

Morrison (2001) acknowledges that while there are similarities between anxiety and psychosis, there is a difference between them in the cultural acceptability of interpretations of internal experiences. In the present study, the opportunity to express delusional and catastrophic explanations was given on the Symptom Interpretation Questionnaire (SIQ) in which people could express 'other' causal attributions for common somatic symptoms. However, no delusional interpretations were offered by the delusional group and no catastrophic interpretations were offered by the panic group. This raises questions about whether common somatic symptoms alone, which are the same as those experienced under anxiety provoking conditions, can trigger delusional thoughts. It also raises questions of whether persecutory beliefs are situationally dependent and occur only under anxiety and fear provoking situations or whether they are trait like in nature and all explanations of experiences are delusional. Further questions raised are around whether somatic symptoms need to be anomalous in nature in order to trigger a delusional belief. However, Bell *et al.* (2008) conclude from their research using the Cardiff Anomalous Perception Scale (CAPS) that anomalous experience is not necessary for delusions to occur.

4.3. Strengths and Limitations of the research

The limitation that made the most impact on this study was the unequal sample sizes which led to a reduction in power. This was due to recruitment issues. Changes were made to the delivery of services which made it difficult to access individuals who experienced panic. The small sample size for the panic group had implications for the type of analyses used, and may have increased the likelihood of a significant effect not being identified (Type II error). However, the results supported, where possible, previous research and theoretical models underlying it.

A further limitation to this study was that the participants were recruited from clinician's caseloads and therefore were subject to a possible selection bias. Some potential participants who met criteria for the delusions group did not participate, demonstrating a further possibility of bias in the recruitment stage of the research in those who did take part.

Limited demographic data were collected, which has implications for the information collected and the results. Although careful recruitment of individuals from the same area was ensured for all three groups, there is no way of knowing their educational levels, which may have had an impact on individuals understanding of the questionnaires, and may have differed amongst groups. In addition, the groups may have differed for other demographic variables, such as their socioeconomic status and their marital status, which would have been helpful to know about when considering the differences between groups as this would have had an impact on the results.

It is important to acknowledge that although participants experienced current persecutory delusions and current re-occurring panic attacks, these difficulties may not have been the main difficulty that they experienced, which may have increased the possible co-morbidity rates amongst participants. As it became clear that the recruitment of both clinical groups was more difficult than previously anticipated, the inclusion criteria was widened to include people who experienced ongoing panic attacks but they did not necessarily need to have a diagnosis of panic disorder. Similarly, the inclusion criteria was also widened for the delusion group so that people did not necessarily have to have a diagnosis of delusional disorder or of any diagnosis along the schizoaffective spectrum of disorders as long as they experienced regular distressing persecutory ideation. The exclusion criteria stayed the same. This may have diluted the diagnostic pool of participants that were originally expected to be recruited. However, co-morbidity of symptoms is often found within clinical populations, which could mean that these results are relevant to the kinds of people seen by clinicians in NHS services.

All of the dependent variables in this study were measured using self report questionnaires which may have an impact on the ecological validity of the results. More recently, other more realistic ways of studying paranoid type thoughts are being conducted with the use of virtual reality (VR). This may be more representative of real life occurrences than questionnaire based studies which involve reflecting on experiences. Studies using the virtual reality paradigm have been used successfully to study persecutory thoughts (Freeman *et al.*, 2005; 2007; 2008a; 2008b; Valmaggia *et al.*, 2007).

One strength of the research is that participants experienced current delusion or panic at the time of the study allowing present thoughts, emotions, behaviours and physical sensations to be accessed rather than having to think about them retrospectively after a period of recovery.

A further limitation of this study was that participants were recruited using an opportunity sampling technique. Ethical limitations ensured that recruitment took place in Lanarkshire alone which restricts generalisability. However, because all three groups were recruited from the same area, it meant that environmental variables could be minimised.

A further strength of this study was that the healthy participants had no history of psychological difficulties and were not mental health professionals. This was ensured to minimise other possible background variables. Strict exclusion criteria were applied to also minimise possible confounding variables. For example people in the panic group who had family members with psychosis were excluded so that their answers on the delusional ideation questionnaire were not biased or a reflection of predisposition to psychosis.

The research which has been carried out to date has focussed on studying one or two variables implicated by cognitive theories at any one time. However, the present study, due to its exploratory nature, was able to assess a number of variables within one study.

4.4 Areas for further research

There are many opportunities for future research in trying to answer the question of what contributes to the differences in the interpretations of these particular two groups as there has been very little research done in this area. One recent study (Freeman, 2008) used a virtual reality paradigm with a non clinical population to assess differences between paranoid type beliefs and social anxiety in an attempt to answer the question 'What makes one person paranoid and another person anxious?' He found that the risk of paranoid reactions increased in the presence of perceptual anomalies as measured by the CAPS (Bell *et al.*, 2006). He also found that levels of anxiety, depression, interpersonal sensitivity, and worry had similar relationships to social anxiety and paranoia (Freeman, 2008). Similar research could be done with panic and persecutory delusions to measure the differences between catastrophic worry and distressing persecutory beliefs.

To prevent the possibility of clinicians, and other staff and carers from misinterpreting potentially ambiguous statements made by people who experience delusions, research could be carried out identifying staff and carers' attributional biases in relation to delusional explanations. This would initially assess the need for a training program. Following the outcome of this, if appropriate, a training plan could be developed with the aim of increasing understanding of the nature of delusions amongst staff, families and carers. This should include highlighting the normal continuum model, the recovery model, and should involve users and carers in the rolling out of the training plan. Staff, families and carers attributions may be assessed before and after the training and possibly a 6 to 12 month follow up period to assess the effectiveness of the training.

Future research could also involve looking at variables that were not included in the present study, such as measuring the performance between groups on a 'jumping to conclusions' tasks. Replication of the present study using larger sample sizes and possibly using logistical regression analysis to determine which factors best predict the interpretations of internal experiences, would also be useful in a bid to answer the research question.

Avoidance is an issue in maintaining many clinical difficulties and acceptance rather than control is proposed to be helpful in reducing avoidance. Further research looking at the effects of Acceptnce and Commitment Therapy (ACT) within the population of people who experience distressing persecutory beliefs using a pre and post treatment approach would also be helpful in informing clinical practice.

4.5 Conclusions

The results of this study suggest that there are few significant differences between individuals who experience regular distressing panic attacks and individuals who experience distressing persecutory beliefs in their interpretations of common bodily symptoms or on some of the variables implicated in the cognitive models put forward by Morrison (2001); Freeman (2002) and Garety *et al.* (2001).

If these results are replicated, and it is found that there are little differences between the two groups in general. It may be that the differences are purely in the cultural acceptability of their interpretations as Morrison suggests. If these results are

replicated, it may have implications for training professionals working in this area as well as implications for psychological treatment, so that professionals are able to appraise delusional thoughts as being acceptable. However, it may be that delusional and panic interpretations of internal experiences are different but only under distressing circumstances with anomalous internal experiences.

Overall findings support the continuum model of psychosis because the clinical groups scored significantly differently from the healthy control group on nearly all measures, and there was consistent overlapping of scores between the groups. Given that this is the first time research has been carried out measuring the interpretations of common somatic symptoms between groups, and given the limitations to this study, further research looking at whether there is a difference between these two clinical groups in their interpretations other than their perceived cultural acceptability, would be helpful in understanding and destigmatising psychosis.

References

Abramson, L.Y. (1978) Learned helplessness in humans: critique and reformulation. *Journal of Abnormal Psychology 87*: 49-74.

American Psychiatric Association (2000) *Diagnostic and Statistical Manual of Mental Disorders* (4th edn, text revision) (DSM–IV). Washington, DC: APA.

Appelbaum, P.S., Robbins, P.C., Vesselinov, R., (2004). Persistence and stability of delusions over time. *Comprehensive Psychiatry* 45, 317–324.

Applebaum, P. S., Robbins, P. C., & Roth, L. H. (1999). Dimensional approach to delusions: Comparison across types and diagnoses. American Journal of Psychiatry, 156, 1938–1943.

Aronson, K. R. (2006). The reliability and validity of the Symptom Interpretation Questionnaire. *J Psychosom Res*, 61, 807-811.

Bach, P. & Hayes, Steven C. (2002). The use of Acceptance and Commitment Therapy to prevent the rehospitalisation of psychotic patients: a randomized controlled trial. *Journal of Consulting and Clinical Psychology*, 70, 1129–1139.

Bach, P., Gaudiano, B., Pankey, J., Herbert, J. & Hayes, S. (2006). Acceptance, mindfulness, values, and psychosis: Applying Acceptance and Commitment Therapy

(ACT) to the Chronically Mentally Ill. In R. Baer (Ed.). *Mindfulness-Based Treatment Approaches: Clinician's Guide to Evidence Base and Applications*. San Diego: Elsevier.

Baker, C. A., & Morrison, A. P. (1998). Cognitive processes in auditory hallucinations: Attributional biases and metacognition. *Psychological Medicine*, 28, 1199–1208.

Beck, A. T. (1976) *Cognitive Therapy and the Emotional Disorders*. Penguin Books.

Beer, M. D. (1996). The dichotomies: psychosis/neurosis and functional/organic: a historical perspectice. *History of Psychiatry*, 7, 231 - 255.

Bell, V., Halligan, P. W., & Ellis, H. D. (2008). Are anomalous perceptual experiences necessary for delusions? *J Nerv Ment Dis,* 196, 3-8.

Bentall, R. P. (1994). Cognitive biases and abnormal beliefs: Towards a model of persecutory delusions. In A. S. David & J. Cutting (Eds.), *The neuropsychology of schizophrenia,* London: Erlbaum 337–360.

Bentall, R. P., & Kinderman, P. (1998). Psychological processes and delusional beliefs: Implications for the treatment of paranoid states. In T. Wykes, N. Tarrier, & S. Lewis (Eds.), *Outcome and innovation in psychological treatment of schizophrenia* (pp. 119–144). Chichester: Wiley.

Bentall, R. P., & Kinderman, P. (1999). Self-regulation, affect and psychosis: The role of social cognition in paranoia and mania. In T. Dalgleish & M. Power (Eds.), *Handbook of cognition and emotion* (pp. 353–382). Chichester: Wiley.

Bentall, R. P., Corcoran, R., Howard, R., Blackwood, N., & Kinderman, P. (2001). Persecutory Delusions: A review and theoretical integration. *Clinical Psychology Review*, 21, 1143-1192.

Bentall, R. P., Kinderman, P., & Kaney, S. (1994). The self, attributional processes and abnormal beliefs: Towards a model of persecutory delusions. *Behaviour Research and Therapy, 32*, 331–341.

Bentall, R.P., Kaney, S., Dewey, M.E., (1991). Paranoia and social reasoning: an attributional theory analysis. *British Journal of Clinical Psychology* 30, 13-23.

Birchwood, M., Iqbal, Z., Chadwick, P., & Trower, P. (2000). Cognitive approach to depression and suicidal thinking in psychosis. 1. Ontogeny of post-psychotic depression. *British Journal of Psychiatry*, 177, 516-521.

Cartwright-Hatton, S., & Wells, A. (1997). Beliefs about Worry and Intrusions: The Meta-Cognitions Questionnaire and its Correlates. *Journal of Anxiety Disorders*, 11, 279-296.

Chadwick, P. (2006). Person-Based Cognitive Therapy for Distressing Psychosis. West Sussex: Wiley.

Chawla, N., & Ostafin, B. (2007). Experiential avoidance as a functional dimensional approach to psychopathology: an empirical review. *Journal of Clininical Psychology*, 63, 871-890.

Clark, D. M. (1986). A cognitive model of panic. *Behaviour Research and Therapy*, 24, 461–470.

Clark, D. M. (1989). Anxiety states: Panic and generalized anxiety. In Keith Hawton, Paul M Salkovskis, Joan Kirk and David M Clark (Eds.). Cognitive *Behaviour Therapy for Psychiatric Problems: A Practical Guide* (pp. 52-96). Oxford University Press.

Clark, D.M., 1996. Panic Disorder: From theory to therapy. In: Salkovskis, P.M., Editor, 1996. *Frontiers of cognitive therapy*, Guilford Press, New York.

Clark, DM (1999) Anxiety disorders: why they persist and how to treat them, *Behaviour Research and Therapy*, 37, 5- 27.

Cohen (1992) Quantitative methods in psychology: A Power Primer. *Psychological Bulletin,* 1992, 112, 155-159.

Craig, J. S., Hatton, C., Craig, F. B., & Bentall, R. P. (2004). Persecutory beliefs, attributions and theory of mind. *Schizophrenia Research*, 69, 29–33.

Cullari, S. (1994). Levels of anger in psychiatric inpatients and normal subjects. *Psychological Reports*, *75*, 1163–1168.

Cullen, W. (1808). *First lines of the practice of physic*. books.google.co.uk/books.

Drake, R. J., Pickles, A., Bentall, R. P., Kinderman, P., Haddock, G., Tarrier, N., *et al.* (2004). The evolution of insight, paranoia and depression during early schizophrenia. *Psychological Medicine*, 34, 285–292.

Dudley, R. E. J., John, C. H., Young, A. W., & Over, D. E. (1997). Normal and abnormal reasoning in people with delusions. *British Journal of Clinical Psychology*, 36, 243–258.

Fowler, D., Freeman, D., Smith, B., Kuipers, E., Bebbington, P., Bashforth, H., *et al.* (2006). The Brief Core Schema Scales (BCSS): psychometric properties and associations with paranoia and grandiosity in non-clinical and psychosis samples. *Psychological Medicine*, 36, 749-759.

Fraser, J., Morrison, A.P. & Wells, A. (2006) Cognitive processes, reasoning biases and persecutory delusions: A comparative study. *Behavioural and Cognitive Psychotherapy*, 34, 421-435.

Freeman D, Pugh K, Green C, Valmaggia L, Dunn G, Garety P (2007). A measure of state persecutory ideation for experimental studies. *Journal of Nervous and Mental Disease* 195, 781–784.

Freeman, D. (2006). Delusions in the non-clinical population. Cited in Freeman, D. (2007). Suspicious minds: The psychology of persecutory delusions. *Clinical Psychology Review*, 27, 425-457.

Freeman, D. (2007). Suspicious minds: The psychology of persecutory delusions. *Clinical Psychology Review*, 27, 425-457.

Freeman, D., & Garety, P. A. (2000). Comments on the content of persecutory delusions: Does the definition need clarification? *British Journal of Clinical Psychology*, 39, 407–414.

Freeman, D., & Garety, P. A. (2000). Worry, worry processes and dimensions of delusions: An exploratory investigation of a role for anxiety processes in the maintenance of delusional distress. *Behavioural and Cognitive Psychotherapy*, 27, 47-62.

Freeman, D., & Garety, P. A. (2003). Connecting neurosis and psychosis: the direct influence of emotion on delusions and hallucinations. *Behaviour Research and Therapy*, 41, 923-947.

Freeman, D., & Garety, P. A. (2004). *Paranoia: The psychology of persecutory delusions.* Hove: Psychology Press.

Freeman, D., Garety, P. A., & Kuipers, E. (2001). Persecutory delusions: Developing the understanding of belief maintenance and emotional distress. *Psychological Medicine*, 31, 1293–1306.

Freeman, D., Garety, P. A., Bebbington, P. E., Smith, B., Rollinson, R., Fowler, D., *et al.* (2005). Psychological investigation of the structure of paranoia in a non-clinical population. *British Journal of Psychiatry*, 186, 427–435.

Freeman, D., Garety, P. A., **Bebbington, P., Slater, M.,** Kuipers, E., Fowler, D., *et al.* (2005). The Psychology of Persecutory Ideation II A Virtual Reality Experimental Study. *Journal of Nervous Mental Disorders,* 193, 309–315

Freeman, D., Garety, P. A., Kuipers, E., Fowler, D., & Bebbington, P. E. (2002). A cognitive model of persecutory delusions. *British Journal of Clinical Psychology*, 41, 331–347.

Freeman, D., Garety, P. A., McGuire, P., & Kuipers, E. (2005). Developing a theoretical understanding of therapy techniques: Reasoning, therapy and symptoms. *British Journal of Clinical Psychology*, 44, 241−254.

Freeman, D., Gittins, M., Pugh, K., Antley, A., Slater, M., Dunn, G. (2008b). What makes one person paranoid and another person anxious? The differential prediction of social anxiety and persecutory ideation in an experimental situation. *Psychol Med*, 1-12.

Freeman, D., Pugh, K., Antley A, Slater, M., Bebbington, P., Gittins, M. *et al.* (2008a). A virtual reality study of paranoid thinking in the general population. *Br J Psychiatry* 192, 258–263.

Frith, CD (1992). *The Cognitive Neuropsychology of Schizophrenia.* Lawrence Erlbaum Associates; Hove.

Frith, CD (1994). Theory of mind in schizophrenia. In *The Neuropsychology of Schizophrenia* (eds AS David and JC Cutting), pp. 147-161.

Garety P (2007). A measure of state persecutory ideation for experimental studies. *Journal of Nervous and Mental Disease* 195, 781–784.

Garety, P. A. & Hemsley, D. R. (1994) *Delusions: Investigations into the Psychology of Delusional Reasoning.* London: Psychology Press.

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.

Garety, P. A., Freeman, D., Jolley, S., Dunn, G., Bebbington, P. E., Fowler, D. G., *et al.* (2005). Reasoning, emotions, and delusional conviction in psychosis. *Journal of Abnormal Psychology*, 114, 373-384.

Garety, P., Kuipers, E., Fowler, D., Freeman, D., Bebbington, P. E. (2001). A cognitive model of the positive symptoms of psychosis. *Psychological Medicine*, 31, 189–195.

Greig, T. C., Bryson, G. J., & Bell, M. D. (2004). Theory of mind performance in schizophrenia. *Journal of Nervous and Mental Disease*, 192, 12–18.

Gross, E (1970) cited in Zubin and Spring, (1977) Vulnerability: A New View on Schizophrenia *Journal of Abnormal Psychology* 86, 103-126.

Haddock, G., McCarron, J., Tarrier, N., Faragher, E. B. (1999). Scales to measure dimensions of hallucinations and delusions: the psychotic symptom rating scales (PSYRATS). *Psychological Medicine*, 29, 879–889.

Hall, P. L., & Tarrier, N. (2003). The cognitive-behavioural treatment of low self-esteem in psychotic patients: a pilot study. *Behav Res Ther*, 41, 317-332.

Hayes, S. C., Strosahl, K., Wilson, K. G., Bissett, R. T., Pistorello, J., Toarmino, D., *et al.* (2004). Measuring Experiential Avoidance: A Preliminary Test of a Working Model. *Psychological Record*, 54, 553-578.

Hayes, S. C., Wilson, K. G., Gifford, E. V., Follette, V. M., & Strosahl, K. D. (1996). Experiential avoidance and behavioral disorders: A functional dimensional approach to diagnosis and treatment. *Journal of Consulting and Clinical Psychology, 64,* 1152–1168.

Humphreys, L., & Barrowclough, C. (2006). Attributional style, defensive functioning and persecutory delusions: symptom-specific or general coping strategy? *British Journal of Clinical Psychology*, 45, 231-246.

Jaspers, K. (1963) General Psychopathology cited in Van Os, J. (2003) Is there a continuum of psychotic experiences in the general population? Epidemiol. Psichiatr. Soc. 12, 242–252

Jaspers, K. (1963). Cited in Freeman, D. & Garety, P (2003). Connecting neurosis and psychosis: the direct influence of emotion on delusions and hallucinations. *Behaviour Research and Therapy*, 41, 923-947.

Johns LC, Cannon M, Singleton N, Murray RM, Farrell M, Brugha T, *et al.* (2004). Prevalence and correlates of self-reported psychotic symptoms in the British population. *British Journal of Psychiatry* 185, 298–305.

Johns, L.C. & Van Os, J. (2001) The continuity of psychotic experiences in the general population. Clinical Psychology Review 21, 1125–1141.

Kaney & Bentall, (1989) cited in Garety, P. A. & Hemsley, D. R. (1994) *Delusions: Investigations into the Psychology of Delusional Reasoning*. London: Psychology Press.

Kendler, K. S., Gallagher, T. J., Abelson, J. M., & Kessler, R. C. (1996). Lifetime prevalence, demographic risk factors, and diagnostic validity of nonaffective psychosis as assessed in a US community sample. The National Comorbidity Survey. *Archives of General Psychiatry*, 53, 1022–1031.

Kinderman, P., and Bentall, R.P. (1996). A new measure of causal locus: The Internal, Personal and Situational Attributions Questionnaire. *Personality and Individual Differences,* 20:261-264.

Krabbendam, L., Janssen, I., Bak, M., Bijl, R., Graaf, R. Van OS, J. (2002) Neuroticism and low self-esteem as risk factors for psychosis. *Social Psychiatry and Psychiatric Epidemiology*, 37, 1-6.

Kuipers, E., Garety, P., Fowler, D., Dunn, G., Bebbington, P., Freeman, D., *et al.* (1997). London-East Anglia randomised controlled trial of cognitive-behavioural therapy for psychosis. I: effects of the treatment phase. *British Journal of Psychiatry,* 171, 319-327.

Kuipers, E., Garety, P., Fowler, D., Freeman, D., Dunn, G., & Bebbington, P. (2006). Cognitive, emotional, and social processes in psychosis: refining cognitive behavioral therapy for persistent positive symptoms. *Schizophrenia Bulletin*, 32 Suppl 1, 24-31.

Levitt, J. T., Brown, T. A., Orsillo, S. M., & Barlow, D. H. (2004). The effects of acceptance versus suppression of emotion on subjective and psychophysiological response to carbon dioxide challenge in patients with panic disorder. Behavior Therapy, 35, 747-766.

Livingstone, K., Harper, S., & Gillanders, D. (submitted) Emotional Experience & Emotion Regulation in Psychosis, 'Neurosis' and Healthy Controls, *Clinical Psychology and Psychotherapy.*

Lobban, F., Haddock, G., Kinderman, P., & Wells, A. (2002). The role of metacognitive beliefs in auditory hallucinations. *Personality and Individual Differences*, 32(8), 1351–1363.

Maher, B. (2005). Delusional thinking and cognitive disorder. *Integrative Physiological & Behavioral Science* 40, 3, 136-146.

Maher, B.A. (1974). Delusional thinking and perceptual disorder. *Journal of Individual Psychology*, 30, 98 - 113.

Maher, B.A. (1988). Anomalous experience and delusional thinking: the logic of explanations In: Oltmanns TF, Maher BA, eds. *Delusional Beliefs*. Chichester: Wiley; 15–33.

Maher, B.A., & Ross, J.S. (1984). Delusions. In H.E. Adams & P.B. Sutker (Eds.), *Comprehensive handbook of psychopathology*. New York: Plenum Press.

Martin, J. A., & Penn, D. L. (2002). Attributional style in schizophrenia: an investigation in outpatients with and without persecutory delusions. *Schizophrenia Bulletin*, 28, 131-141.

Morrison, A. P. (1998). A cognitive analysis of auditory hallucinations: Are voices to schizophrenia what bodily sensations are to panic? *Behavioural and Cognitive Psychotherapy*, *26*, 289–302.

Morrison, A. P. (2001). The interpretation of intrusions in psychosis: An integrative cognitive approach to hallucinations and delusions. *Behavioural and Cognitive Psychotherapy*, 29, 257–276.

Morrison, A. P., & Baker, C. A. (2000).Intrusive thoughts and auditory hallucinations: a comparative study of intrusions in psychosis. *Behaviour Research and Therapy,* 38, 1097-1106.

Morrison, A. P., & Wells, A. (2003). Metacognition across disorders: Comparisons of patients with hallucinations, delusions, and panic disorder with non-patients. *Behaviour Research and Therapy*, 41, 251–256.

Morrison, A. P., Gumley, A. I., Schwannauer, M., Campbell, M., Gleeson, A., Griffin, E., *et al.* (2005). The beliefs about paranoia scale: Preliminary validation of a metacognitive approach to conceptualising paranoia. *Behavioural and Cognitive Psychotherapy*, 33, 153–164.

Neve, M. (2004) Keywords in the history of medicine: Neurosis. *Lancet*, 363, 1170.

Nuechterlein, K. & Dawson, M. E. (1984) A Heuristic Vulnerability-Stress model of Schizophrenia *Schizophrenia Bulletin*, 10,300-12

Peters, E., Day, S., Mckenna, J., Orbach, G., (1999b). Delusional ideation in religious and psychotic populations. British Journal of Clinical Psychology, 38, 83–96

Peters, E.R., Joseph, S.A., Day, S., Garety, P.A., (2004). Measuring delusional ideation: the 21-Item Peters *et al.* Delusions Inventory (PDI). *Schizophrenia Bulletin* 30, 1005–1022.

Peters, E.R., Joseph, S.A., Garety, P.A., (1999a). Measurement of delusional ideation in the normal population: introducing the PDI (Peters *et al.* Delusions Inventory). *Schizophrenia Bulletin*. 25, 553–576.

Peterson, C., Semmel, A., Von Baeyer, C., Abramson, L., Metalsky, G., Seligman, M., (1982). The Attributional Style Questionnaire. *Cognitive Therapy and Research* 3, 287– 300.

Poulton, R., Caspi, A., Moffitt, T. E., Cannon, M., Murray, R., & Harrington, H. (2000). Children's self-reported psychotic symptoms and adult schizophreniform disorder: a 15-year longitudinal study. *Archives of General Psychiatry*, 57, 1053–1058.

Power, M.J. (2006). The structure of emotion: An empirical comparison of six models. *Cognition and Emotion*, *20*, 694–713.

Reeves, R.R. & Torres, R.A. (2003). Exacerbation of Psychosis by Misinterpretation of Physical Symptoms. *Southern Medical Journal*, 96, 702-704.

Ritsner, M. (2003). The attribution of somatization in schizophrenia patients: a naturalistic follow-up study. *J Clin Psychiatry,* 64, 1370-1378.

Robbins, J. M., & Kirmayer, L. J. (1991). Attributions of common somatic symptoms. *Psychological Medicine*, 21, 1029-1045.

Robson, P. (1989). Development of a new self-report questionnaire to measure self-esteem. *Psychol Med,* 19, 513-518.

Romme, M. A. J. & Escher, A. (1989). Hearing voices. *Schizophrenia Bulletin*, 15, 209-216.

Salkovskis, P. M., Forrester, E., Richards, H. C., & Morrison, N. (1998). The devil is in the detail: Conceptualizing and treating obsessional problems. In N. Tarrier, A. Wells & G. Haddock (Eds.), *Treating complex cases: A cognitive behaviour therapy approach*. Chichester: Wiley.

Salkovskis, P.M. (1991) The importance of behaviour in the maintenance of anxiety and panic: A cognitive account. *Behavioural Psychotherapy*, 19, 6-19.

Shergill, S. S., Murray, R. M., & McGuire, P. K. (1998). Auditory hallucinations: a review of psychological treatments. *Schizophrenia Research*, 32, 137-150.

Silverstone, P. H. (1991). Low self-esteem in different psychiatric conditions. *Br J Clin Psychol,* 30, 185-188.

Spielberger, C.D., Gorsuch, R.L., & Lushene, R. (1983). *Manual for the State-Trait Anxiety inventory.* Palo Alto, CA: Consulting Psychologists Press.

Turnbull, G., & Bebbington, P. (2001). Anxiety and the schizophrenic process: clinical and epidemiological evidence. *Social Psychiatry and Psychiatric Epidemiology*, 36, 235-243.

Valmaggia L, Freeman D, Green C, Garety, P. Swapp, D. Antley, A. *et al.* (2007). Virtual reality and paranoid ideations in people with an 'at risk mental state' for psychosis. *British Journal of Psychiatry*, 191, 63–68.

Van Os, J. (2003) Is there a continuum of psychotic experiences in the general population? *Epidemiol. Psichiatr. Soc.* 12, 242–252

Van Os, J., Hanssen, M., Bijl, R. V., & Ravelli, A. (2000). Strauss (1969) revisited: a psychosis continuum in the general population? *Schizophrenia Research*, 45, 11– 20.

Van Os, J., Verdoux, H., Maurice-Tison, S., Gay, B., Liraud, F., Salamon, R., *et al.* (1999). Self-reported psychosis-like symptoms and the continuum of psychosis. *Social Psychiatry and Psychiatric Epidemiology*, *34*, 459–463.

Walston, F., Blennerhassett, R. C., & Charlton, B. G. (2000). Theory of mind, persecutory delusions and the somatic marker mechanism. *Cognitive Neuropsychiatry*, 5, 161−174.

Warwick, H. M., & Salkovskis, P. M. (1990). Hypochondriasis. *Behaiour Research and Therapy*, 28, 105-117.

Weiser, M., Reichenberg, A., Rabinowitz, J., Kaplan, Z., Mark, M., Bodner, E. *et al* (2001) Association between nonpsychotic psychiatric diagnoses in adolescent males and subsequent onset of schizophrenia. *Archives of General Psychiatry*, 58, 959 -964

Wells, A. & Matthews, G. (1994). *Attention and Emotion. A Clinical Perspective.* Hove: Erlbaum.

Wells, A. & Matthews, G. (1996). Modelling Cognition in Emotional Disorder: The S-REF Model. *Behaviour, Research and Therapy*, 32, 867-870.

Wells, A. (1994). A multi-dimensional measure of worry: Development and preliminary validation of the anxious thoughts inventory. *Anxiety, Stress and Coping, 6*, 289–299.

Wells, A. (1995). Meta-cognition and worry: a cognitive model of Generalised Anxiety Disorder. *Behavioural and Cognitive Psychotherapy*, 23, 301-320.

Wells, A. (2000). *Emotional disorders and metacognition: Innovative cognitive therapy*. New York, US: Wiley.

Wells, A., & Cartwright-Hatton, S. (2004). A short form of the metacognitions questionnaire: properties of the MCQ-30. *Behav Res Ther*, 42, 385-396.

Wenzlaff, R. M., & Wegner, D. M. (2000). Thought Suppression. *Annual Review of Psychology*, 51, 59-91.

Williams, S. (2002). Anxiety, associated physiological sensations, and delusional catastrophic misinterpretation: Variations on a theme? In Morrison, A. P. (2002) *A Casebook of Cognitive Therapy for Psychosis*. Hove: Brunner Routledge.

Wise, T. & Mann, L (1995) The Attribution of Somatic Symptoms in Psychiatric Outpatients. *Comprehensive Psychiatry,* 36, 407-410.

World Health Organization (1992) *The ICD-10 Classification of Mental and Behavioural Disorders: Clinical Description and Diagnostic Guidelines*. Geneva: WHO.

Zubin, J. and Spring, B. (1977) Vulnerability: A New View on Schizophrenia *Journal of Abnormal Psychology* 86, 103-126

APPENDICES

APPENDIX 1

Questionnaires

APPENDIX 1a

Main Questionnaire comprising

i. BES

ii. AAQ-II

iii. SCQ

iv. MCQ-30

v. SIQ

APPENDIX 1a (i)

BES

The purpose of this scale is to find out about how much or how often you experience certain emotions and then to ask some questions about how you feel actually during particular emotions themselves.

The first part of the scale is designed to explore how you have felt DURING THE LAST WEEK. For each emotion, please circle ONE number only between 1 and 7, to indicate how you have felt.

OVER THE PAST WEEK I HAVE FELT:

	not at all			some of the time			all of the time
ANGER	1	2	3	4	5	6	7
DESPAIR	1	2	3	4	5	6	7
SHAME	1	2	3	4	5	6	7
ANXIETY	1	2	3	4	5	6	7
HAPPINESS	1	2	3	4	5	6	7
FRUSTRATION	1	2	3	4	5	6	7
MISERY	1	2	3	4	5	6	7
GUILT	1	2	3	4	5	6	7
NERVOUSNESS	1	2	3	4	5	6	7
JOY	1	2	3	4	5	6	7
IRRITATION	1	2	3	4	5	6	7
GLOOMINESS	1	2	3	4	5	6	7
HUMILIATED	1	2	3	4	5	6	7
TENSE	1	2	3	4	5	6	7
LOVING	1	2	3	4	5	6	7
AGGRESSION	1	2	3	4	5	6	7
MOURNFUL	1	2	3	4	5	6	7
BLAMEWORTHY	1	2	3	4	5	6	7
WORRIED	1	2	3	4	5	6	7
CHEERFUL	1	2	3	4	5	6	7

In the second part of this questionnaire we would like to know about how you feel IN GENERAL.

The question asks about HOW OFTEN you feel the emotion.

Again, for each question please circle ONE number only between 1 and 7 to indicate how you feel.

IN GENERAL , I FEEL THIS EMOTION:

	never			sometimes			Very often
ANGER	1	2	3	4	5	6	7
DESPAIR	1	2	3	4	5	6	7
SHAME	1	2	3	4	5	6	7
ANXIETY	1	2	3	4	5	6	7
HAPPINESS	1	2	3	4	5	6	7
FRUSTRATION	1	2	3	4	5	6	7
MISERY	1	2	3	4	5	6	7
GUILT	1	2	3	4	5	6	7
NERVOUSNESS	1	2	3	4	5	6	7
JOY	1	2	3	4	5	6	7
IRRITATION	1	2	3	4	5	6	7
GLOOMINESS	1	2	3	4	5	6	7
HUMILIATED	1	2	3	4	5	6	7
TENSE	1	2	3	4	5	6	7
LOVING	1	2	3	4	5	6	7
AGGRESSION	1	2	3	4	5	6	7
MOURNFUL	1	2	3	4	5	6	7
BLAMEWORTHY	1	2	3	4	5	6	7
WORRIED	1	2	3	4	5	6	7
CHEERFUL	1	2	3	4	5	6	7

In the third part of this questionnaire we would like to ask you for some information about HOW WELL YOU FEEL YOU COPE when you experience that emotion. For example, you might feel completely out of control of the emotion, or overwhelmed by the emotion in some other way.

Please note: even if you never experience a particular emotion, please answer the question by imagining how you think you would feel if you did experience that emotion.

Again, for each part of the question, please circle ONE number between 1 and 7 to indicate how well you feel you cope with the emotion.

	Cope very well						Cope very badly
ANGER	1	2	3	4	5	6	7
DESPAIR	1	2	3	4	5	6	7
SHAME	1	2	3	4	5	6	7
ANXIETY	1	2	3	4	5	6	7
HAPPINESS	1	2	3	4	5	6	7
FRUSTRATION	1	2	3	4	5	6	7
MISERY	1	2	3	4	5	6	7
GUILT	1	2	3	4	5	6	7
NERVOUSNESS	1	2	3	4	5	6	7
JOY	1	2	3	4	5	6	7
IRRITATION	1	2	3	4	5	6	7
GLOOMINESS	1	2	3	4	5	6	7
HUMILIATED	1	2	3	4	5	6	7
TENSE	1	2	3	4	5	6	7
LOVING	1	2	3	4	5	6	7
AGGRESSION	1	2	3	4	5	6	7
MOURNFUL	1	2	3	4	5	6	7
BLAMEWORTHY	1	2	3	4	5	6	7
WORRIED	1	2	3	4	5	6	7
CHEERFUL	1	2	3	4	5	6	7

APPENDIX 1a (ii)

AAQ-II

Below you will find a list of statements. Please rate how true each statement is for you by circling a number next to it. Use the scale below to make your choice.

1	2	3	4	5	6	7
Never true	Very seldom true	Seldom true	Sometimes true	Frequently true	Almost always true	Always true

1.	Its OK if I remember something pleasant.	1	2	3	4	5	6	7
2.	My painful experiences and memories make it difficult for me to live a life that I would value.	1	2	3	4	5	6	7
3.	I'm afraid of my feelings.	1	2	3	4	5	6	7
4.	I worry about not being able to control my worries and feelings.	1	2	3	4	5	6	7
5.	My painful memories prevent me from having a fulfilling life.	1	2	3	4	5	6	7
6.	I am in control of my life.	1	2	3	4	5	6	7
7.	Emotions cause problems in my life.	1	2	3	4	5	6	7
8.	It seems like most people are handling their lives better than I am.	1	2	3	4	5	6	7
9.	Worries get in the way of my success.	1	2	3	4	5	6	7
10.	My thoughts and feelings do not get in the way of how I want to live my life.	1	2	3	4	5	6	7

APPENDIX 1a (iii)

SCQ

Below you will find a list of statements. Please rate how true each statement is for you by circling a number next to it.

	Completely Disagree						Completely Agree
I am not embarrassed to let people know my opinions.	1	2	3	4	5	6	7
I seem to be very unlucky.	1	2	3	4	5	6	7
I'm easy to like	1	2	3	4	5	6	7
If a task is difficult that just makes me all the more determined.	1	2	3	4	5	6	7
There are lots of things I'd change about myself if I could.	1	2	3	4	5	6	7
I can never seem to achieve anything worthwhile.	1	2	3	4	5	6	7
I don't care what happens to me.	1	2	3	4	5	6	7
I have control over my own life.	1	2	3	4	5	6	7
Most people find me reasonably attractive.	1	2	3	4	5	6	7
I'm glad I'm who I am.	1	2	3	4	5	6	7
Most people would take advantage over me if they could.	1	2	3	4	5	6	7
I am a reliable person.	1	2	3	4	5	6	7
It would be boring if I talked about myself.	1	2	3	4	5	6	7
When I'm successful there's usually a lot of luck involved.	1	2	3	4	5	6	7
I have a pleasant personality.	1	2	3	4	5	6	7
I never feel down in the dumps for very long.	1	2	3	4	5	6	7
I often feel humiliated.	1	2	3	4	5	6	7
I can usually make my mind up and stick to it.	1	2	3	4	5	6	7
Everyone else seems much more confident and contented than me.	1	2	3	4	5	6	7
Even when I quite enjoy myself there doesn't seem much purpose to it all.	1	2	3	4	5	6	7
I often worry about what other people are thinking about me.	1	2	3	4	5	6	7
There's a lot of truth in the saying: "what will be, will be."	1	2	3	4	5	6	7
I look awful these days.	1	2	3	4	5	6	7
If I really try I can overcome most of my problems.	1	2	3	4	5	6	7
It's pretty tough to be me.	1	2	3	4	5	6	7
I feel emotionally mature.	1	2	3	4	5	6	7
When people criticise me I often feel helpless and second rate.	1	2	3	4	5	6	7
When progress is difficult, I often find myself thinking it's just not worth the effort.	1	2	3	4	5	6	7
I can like myself even when others don't.	1	2	3	4	5	6	7
Those who know me well are fond of me.	1	2	3	4	5	6	7

APPENDIX 1a (iv)

MCQ-30

These questions are concerned with beliefs people have about their thinking. Listed below are a number of beliefs that people have expressed. Please read each item and say how much you *generally* agree with it by *circling* the appropriate number. Please respond to all the items, there are no right or wrong answers.

		Do not Agree	Agree slightly	Agree moderately	Agree very much
1.	Worrying helps me to avoid problems in the future	1	2	3	4
2.	My worrying is dangerous for me	1	2	3	4
3.	I think a lot about my thoughts	1	2	3	4
4.	I could make myself sick with worrying	1	2	3	4
5.	I am aware of the way my mind works when I am thinking through a problem	1	2	3	4
6.	If I did not control a worrying thought, and then it happened, it would be my fault	1	2	3	4
7.	I need to worry in order to remain organised	1	2	3	4
8.	I have little confidence in my memory for words and names	1	2	3	4
9.	My worrying thoughts persist no matter how hard I try to stop them	1	2	3	4
10.	Worrying helps me to get things sorted out in my mind	1	2	3	4
11.	I cannot ignore my worrying thoughts	1	2	3	4
12.	I monitor my thoughts	1	2	3	4
13.	I should be in control of my thoughts all of the time	1	2	3	4
14.	My memory can mislead me at times	1	2	3	4
15.	My worrying could make me go mad	1	2	3	4
16.	I am constantly aware of my thinking	1	2	3	4
17.	I have a poor memory	1	2	3	4
18.	I pay close attention to the way my mind works	1	2	3	4
19.	Worrying helps me cope	1	2	3	4
20.	Not being able to control my thoughts is a sign of weakness	1	2	3	4
21.	When I start worrying, I cannot stop	1	2	3	4
22.	I will be punished for not controlling certain thoughts	1	2	3	4
23.	Worrying helps me to solve problems	1	2	3	4
24.	I have little confidence in my memory for places	1	2	3	4
25.	It is bad to think certain thoughts	1	2	3	4
26.	I do not trust my memory	1	2	3	4
27.	If I could not control my thoughts, I would not be able to function	1	2	3	4
28.	I need to worry, in order to work well	1	2	3	4
29.	I have little confidence in my memory for actions	1	2	3	4
30.	I constantly examine my thoughts	1	2	3	4

APPENDIX 1a (v)

SIQ

Listed below are conditions you may or may not have experienced. For each condition, **please circle the letter** next to each reason or group of reasons that *corresponds to how much that might explain the condition.* Please check every item for each question. Also, answer whether you have had the condition in the last 3 months by circling **A** (YES) or B (NO). Please answer all questions.

A	B	C	D
Not at all	Somewhat	Quite a bit	A great deal

1. If I had a *prolonged headache,* I would probably think that it is because:

I am emotionally upset	A	B	C	D
There is something wrong with my muscles, nerves or brain	A	B	C	D
A loud noise, bright light or something else has irritated me	A	B	C	D
Other. Please specify:	A	B	C	D

Have you had a prolonged headache in the last 3 months A-Yes B-No

2. If I was *sweating a lot,* I would probably think that it is because:

I must have a fever or infection	A	B	C	D
I'm anxious or nervous	A	B	C	D
The room is too warm, I'm overdressed or working too hard	A	B	C	D
Other. Please specify:	A	B	C	D

Have you noticed yourself sweating a lot in the past 3 months? A-Yes B-No

3. If I got *dizzy all of a sudden,* I would probably think it is because:

There is something wrong with my heart or blood pressure	A	B	C	D
I am not eating enough or I got up too quickly	A	B	C	D
I must be under a lot of stress	A	B	C	D
Other. Please specify:	A	B	C	D

Have you felt dizzy in the last 3 months? A-Yes B-No

4. If I noticed my *mouth was dry,* I would probably think that it is because:

I must be scared or anxious about something	A	B	C	D
I need to drink more liquids	A	B	C	D
There is something wrong with my salivary glands	A	B	C	D
Other. Please specify:	A	B	C	D

Have you had a dry mouth in the last 3 months? A-Yes B-No

5. If I felt my heart *pounding in my chest,* I would probably think that it is because:

I've exerted myself or drunk a lot of coffee	A	B	C	D
I must really be excited or afraid	A	B	C	D
There must be something wrong with my heart	A	B	C	D
Other. Please specify:	A	B	C	D

Have you noticed your heart pounding in the last 3 months? A-Yes B-No

6. If I felt *fatigued,* I would probably think that it is because:

I'm emotionally exhausted or discouraged	A	B	C	D
I've been over exerting myself or not exercising enough	A	B	C	D
I'm anaemic or my blood is weak	A	B	C	D
Other. Please specify:	A	B	C	D

Have you felt fatigued in the last 3 months? A-Yes B-No

7. If I noticed my *hand trembling,* I would probably think that it is because:

I might have some sort of neurological problem	A	B	C	D
I'm very nervous	A	B	C	D
I've tired the muscle in my hand	A	B	C	D
Other. Please specify:	A	B	C	D

Have you noticed your hands trembling in the last 3 months? A-Yes B-No

8. If I had *trouble sleeping,* I would probably think that it is because:

Some kind of pain or physical discomfort is keeping me awake	A	B	C	D
I'm not tired or I had too much coffee	A	B	C	D
I'm worrying too much or I must be nervous about something	A	B	C	D
Other. Please specify:	A	B	C	D

Have you had trouble sleeping in the last 3 months? A-Yes B-No

9. If my *stomach was upset,* I would probably think that it is because:

I've worried myself sick	A	B	C	D
I have the flu or stomach irritation	A	B	C	D
I've had something to eat that would not agree with me	A	B	C	D
Other. Please specify:	A	B	C	D

Have you had an upset stomach in the last 3 months? A-Yes B-No

10. If I *lost my appetite,* I would probably think that it is because:

I've been eating too much or my body does not need as much food as before	A	B	C	D
I'm worrying so much that food just doesn't taste good anymore	A	B	C	D
I have some stomach or intestinal problem	A	B	C	D
Other. Please specify:	A	B	C	D

Have you lost your appetite in the last 3 months? A-Yes B-No

11. If I had a *hard time catching my breath,* I would probably think that it is because:

My lungs are congested from infection, irritation or heart trouble	A	B	C	D
The room is stuffy or there is too much pollution in the air	A	B	C	D
I'm over excited or anxious	A	B	C	D
Other. Please specify:	A	B	C	D

Have you had a hard time catching your breath in the last 3 months? A-Yes B-No

12. If I noticed *numbness or tingling in my hands or feet,* I would probably think that it is because:

I'm under emotional stress	A	B	C	D
There is something wrong with my nerves or blood circulation	A	B	C	D
I am cold or my hand or foot went to sleep	A	B	C	D
Other. Please specify:	A	B	C	D

Have you had numbness or tingling in your hands or feet in the last 3 months? A-Yes B-No

13. If I was *constipated or irregular,* I would probably think that it is because:

There is not enough fruit or fibre in my diet	A	B	C	D
Nervous tension is keeping me from being regular	A	B	C	D
There is something wrong with my bowels or intestines	A	B	C	D
Other. Please specify:	A	B	C	D

Have you been constipated or irregular in the last 3 months? A-Yes B-No

Thank You Very Much For Your Help With This Questionnaire

APPENDIX 1b

STAI

SELF-EVALUATION QUESTIONNAIRE

Developed by C. D. Spielberger, R. L. Gorsuch and R. Lushene

STAI FORM X-1

NAME _____ DATE _____

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you *feel* right now, that is, *at this moment*. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

	NOT AT ALL	SOMEWHAT	MODERATELY SO	VERY MUCH SO
1. I feel calm	①	②	③	④
2. I feel secure	①	②	③	④
3. I am tense	①	②	③	④
4. I am regretful	①	②	③	④
5. I feel at ease	①	②	③	④
6. I feel upset	①	②	③	④
7. I am presently worrying over possible misfortunes	①	②	③	④
8. I feel rested	①	②	③	④
9. I feel anxious	①	②	③	④
10. I feel comfortable	①	②	③	④
11. I feel self-confident	①	②	③	④
12. I feel nervous	①	②	③	④
13. I am jittery	①	②	③	④
14. I feel "high strung"	①	②	③	④
15. I am relaxed	①	②	③	④
16. I feel content	①	②	③	④
17. I am worried	①	②	③	④
18. I feel over-excited and "rattled"	①	②	③	④
19. I feel joyful	①	②	③	④
20. I feel pleasant	①	②	③	④

CONSULTING PSYCHOLOGISTS PRESS
577 College Avenue, Palo Alto, California 94306

APPENDIX 1c

PDI

P.D.I.-21

This questionnaire is designed to measure beliefs and vivid mental experiences. We believe that they are much more common than has previously been supposed, and that most people have had some such experiences during their lives. Please answer the following questions as honestly as you can. There are no right or wrong answers, and there are no trick questions.

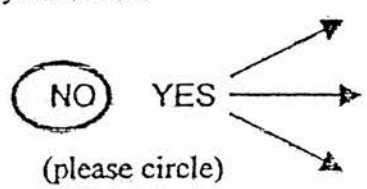
Please note that we are NOT interested in experiences people may have had when under the influence of drugs.

IT IS IMPORTANT THAT YOU ANSWER *ALL* QUESTIONS.

For the questions you answer YES to, we are interested in:
(a) how distressing these beliefs or experiences are
(b) how often you think about them; and
(c) how true you believe them to be.
On the right hand side of the page we would like you to circle the number which corresponds most closely to how distressing this belief is, how often you think about it, and how much you believe that it is true.
If you answer NO please move on to the next question.

Example

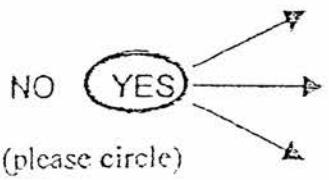
Do you ever feel as if people are reading your mind ?



(please circle)

Not at all distressing				Very distressing
1	2	3	4	5
Hardly ever think about it				Think about it all the time
1	2	3	4	5
Don't believe it's true				Believe it is absolutely true
1	2	3	4	5

Do you ever feel as if you could read other people's minds ?



(please circle)

Not at all distressing				Very distressing
1	(2)	3	4	5
Hardly ever think about it				Think about it all the time
1	2	(3)	4	5
Don't believe it's true				Believe it is absolutely true
1	2	(3)	4	5

6) Do you ever feel as if you are, or destined to be someone very important ?

NO YES

(please circle)

Not at all distressing				Very distressing
1	2	3	4	5
Hardly ever think about it				Think about it all the time
1	2	3	4	5
Don't believe it's true				Believe it is absolutely true
1	2	3	4	5

7) Do you ever feel that you are a very special or unusual person ?

NO YES

(please circle)

Not at all distressing				Very distressing
1	2	3	4	5
Hardly ever think about it				Think about it all the time
1	2	3	4	5
Don't believe it's true				Believe it is absolutely true
1	2	3	4	5

8) Do you ever feel that you are especially close to God ?

NO YES

(please circle)

Not at all distressing				Very distressing
1	2	3	4	5
Hardly ever think about it				Think about it all the time
1	2	3	4	5
Don't believe it's true				Believe it is absolutely true
1	2	3	4	5

9) Do you ever think people can communicate telepathically ?

NO YES

(please circle)

Not at all distressing				Very distressing
1	2	3	4	5
Hardly ever think about it				Think about it all the time
1	2	3	4	5
Don't believe it's true				Believe it is absolutely true
1	2	3	4	5

10) Do you ever feel as if electrical devices such as computers can influence the way you think ?

NO YES

(please circle)

Not at all distressing				Very distressing
1	2	3	4	5
Hardly ever think about it				Think about it all the time
1	2	3	4	5
Don't believe it's true				Believe it is absolutely true
1	2	3	4	5

16) Do you ever feel as if you had no thoughts in your head at all ?

NO YES

(please circle)

Not at all distressing				Very distressing
1	2	3	4	5
Hardly ever think about it				Think about it all the time
1	2	3	4	5
Don't believe it's true				Believe it is absolutely true
1	2	3	4	5

17) Do you ever feel as if the world is about to end ?

NO YES

(please circle)

Not at all distressing				Very distressing
1	2	3	4	5
Hardly ever think about it				Think about it all the time
1	2	3	4	5
Don't believe it's true				Believe it is absolutely true
1	2	3	4	5

18) Do your thoughts ever feel alien to you in some way ?

NO YES

(please circle)

Not at all distressing				Very distressing
1	2	3	4	5
Hardly ever think about it				Think about it all the time
1	2	3	4	5
Don't believe it's true				Believe it is absolutely true
1	2	3	4	5

19) Have your thoughts ever been so vivid that you were worried other people would hear them ?

NO YES

(please circle)

Not at all distressing				Very distressing
1	2	3	4	5
Hardly ever think about it				Think about it all the time
1	2	3	4	5
Don't believe it's true				Believe it is absolutely true
1	2	3	4	5

20) Do you ever feel as if your own thoughts were being echoed back to you ?

NO YES

(please circle)

Not at all distressing				Very distressing
1	2	3	4	5
Hardly ever think about it				Think about it all the time
1	2	3	4	5
Don't believe it's true				Believe it is absolutely true
1	2	3	4	5

APPENDIX 2

Clinician summary

Summary of a Research Project Being Carried out in Monklands Psychology Dept

Dear Clinician,

I would really appreciate your help in recruiting clients/patients who experience delusions and have a diagnosis of delusional disorder or schizophrenic spectrum disorder based on DSM-IV criteria, and those who meet DSM-IV criteria for Panic disorder, for inclusion in my research. This involves sending out or giving invitations to those who meet the inclusion/exclusion criteria.

I am currently undertaking a Doctorate course in Clinical Psychology at the University of Edinburgh, and being in my third year I am required to carry out a piece of research as part fulfillment of the course. **I am interested in why individuals experiencing psychosis report different interpretations of bodily sensations than, for instance panic disordered patients or the general population** (see research proposal). This research has implications for the further understanding and development of existing Psychological treatments for delusions.

As research in this area requires experience and skill with interviewing this client group, and because you have a duty of care to your patients, I feel it is relevant to give you some **information about my stage of training and some of the research governance procedures that have been put in place**. The qualifications I have earned so far are a BSc (Hons) undergraduate degree in Psychology and an MSc postgraduate degree in Psychology and Health, and I am due to complete a 4 year Doctorate degree in Clinical Psychology (D. Clin. Psychol) in 2008. During this time I have carried out 2 large and 4 small scale pieces of research. I also have five years of clinical experience of working with clients of all age groups with a wide variety of mental health difficulties within Psychology departments in Lanarkshire. In addition, I have trained in Cognitive Behavioural Therapy (CBT) for psychosis, prodromal monitoring for psychosis & bipolar disorder, and Behavioural Family Therapy (BFT). I have an academic as well as a clinical supervisor to ensure that patients are well supported throughout their participation in the research, and ethics approval has been gained from the local research and ethics committee (LREC) and the research and development (R&D) departments in Lanarkshire.

This piece of research involves identifying interpretations of somatic symptoms in **two client groups**;

1. Individuals who experience **delusions** and have a diagnosis of delusional disorder or schizophrenic spectrum disorder based on DSM-IV criteria.
2. Individuals who meet DSM-IV criteria for **Panic** disorder.

To ensure validity of the study, **15 participants** for each group are required. I would really appreciate your help in the recruitment process. I would appreciate it if you could identify possible participants from your caseload who meet the **inclusion criteria** of:

Delusions group: Adults between the ages of 18-65 currently experiencing persecutory delusions, and who have a diagnosis of delusional disorder or schizophrenic spectrum disorder based on DSM-IV criteria.

Panic group: Adults between the ages of 18-65 who meet DSM-IV criteria for Panic disorder.

Please also bear in mind the **exclusion criteria** of:

Delusions group: Organic or drug induced basis for the delusions.
Panic group: The presence of delusions, or a first-degree relative with a diagnosis of schizophrenia.
Both groups: Severe substance abuse. If participants are abusing substances, their answers will not reflect clearly their mental health state.

Once the potential participants have been identified as meeting the criteria, could you please send out, or give them the information sheet/consent form provided by way of invitation to participate in the research? If they are interested in participating they will be required to fill the consent form out and send it back to me in a stamped addressed envelope provided. Please advise potential participants to wait at least 24 hours before providing consent. Following receipt of the consent form, I will contact the patient to arrange a suitable time to meet with me on an individual basis. On meeting with me, the participants will be briefed fully about the aims of the study and what is required of them. Each participant will be given the questionnaires, and once completed, the questionnaires will be returned anonymously. Participants will have privacy while filling in the questionnaires, and all questionnaires will remain **anonymous** and **confidential**.

I hope to finish recruiting by December 2007, so we have a lot of time to identify potential participants and collect the data. I am happy to present the results to those involved in the recruitment process if you are interested. Your help in the recruitment process is hugely valued so I thank you in advance for your help.

Yours sincerely,

Wendy Prentice
Clinical Psychologist in Training

APPENDIX 3

Participant summary and consent form

NHS
Lanarkshire

Dear potential participant,

I am currently studying Clinical Psychology at the University of Edinburgh, and as part fulfilment of the course I am required to carry out a piece of research. This research is a study of physical sensations, emotions, beliefs, and thoughts to see how these differ between people who suffer different types of mental health problems, and people who do not experience any mental health problems. We hope to gain a greater understanding of mental health issues so that Psychological treatment can be tailored to the needs of individuals experiencing these types of problems.

You are invited to take part in this research, which will involve meeting with me to fill in questionnaires which include questions about your thoughts and beliefs regarding your experience of physical symptoms, as well as other questions relating to your beliefs and emotions. I estimate that your involvement in this study will take approximately one hour of your time in total, and you can withdraw from taking part at any time. Please be aware that withdrawing from this research will not affect your medical or psychological care. All information that you provide will be anonymous and kept strictly confidential.

If you are interested in taking part, please fill out the enclosed form and give it to a member of staff that is responsible for your care (e.g. Psychologist, Psychiatrist, Nurse etc.), or post it using the stamp addressed envelope to the address below. You will then be contacted to arrange a suitable time to meet with myself.

Please keep this form in a safe place so that if you feel distressed by the research you can contact the following individuals for support: Wendy Prentice or James Dickinson on 01236 712564, or David Gillanders on 0131 6513946. In addition, if you have concerns about the manner in which the research is being carried out you can contact Karen McKenzie on 0131 6513953.

Thank you for considering taking part in this research. I look forward to meeting with you if you decide to participate.

Yours sincerely,

Wendy Prentice

Wendy Prentice
Trainee Clinical Psychologist

NHS
Lanarkshire

Participation form

I would like to participate in the research outlined. ☐ (please tick)

Name:_____ Date of Birth:_____

Contact Details:

Telephone number:_____

e-mail address:_____

Address/Ward/Hospital:_____

_____

_____

Please indicate who told you about this research?

_____

Please return this form to your Doctor/Nurse. Alternatively you can return the form in the stamp addressed envelope or to:

Wendy Prentice
Trainee Clinical Psychologist
Department of Clinical and Counselling Psychology
Monklands Hospital
Monkscourt Avenue
Airdrie
ML6 0JS

APPENDIX 4

Ethical approval

Scotland A Research Ethics Committee

Secretariat
Deaconess House
148 Pleasance
Edinburgh
EH8 9RS
Telephone 0131 536 9026
Fax 0131 536 9346
www.corec.org.uk

NHS SCOTLAND

Mrs Wendy Prentice
Trainee Clinical Psychologist
NHS Lanarkshire
Monklands Hospital
Monkscourt Avenue
Airdrie
ML6 0JS

Date: 28 May 2007
Your Ref.:
Our Ref.: 07/MRE00/54

Enquiries to: Walter Hunter
Extension: 89026
Direct Line: 0131 536 9026
Email: walter.hunter@lhb.scot.nhs.uk

Dear Mrs Prentice

Study title: **An exploration of interpretations of bodily symptoms between people who experience psychosis, anxiety and healthy controls**
REC reference: **07/MRE00/54**

The Scotland A Research Ethics Committee reviewed the above application at the meeting held on 24 May 2007. Thank you for attending to discuss the study.

Ethical opinion

The Committee noted that this application had been submitted to Lanarkshire REC but transferred to Committee A because of the potential to recruit incapacitated adults. The Committee confirmed that this study did not require the inclusion of incapacitated adults and agreed with the chief investigator that it could therefore have been reviewed by another committee. Patients who consented to participate but later lost capacity are still considered to have given valid consent. The Committee had no major ethical concerns other than the intention to store data on a home computer and the possibility of accessing records before a potential participant had consented. Mrs Prentice agreed that although she was involved in the treatment of some of the patients she would not approach or access the records of those patients with which she had no clinical relationship. Mrs Prentice also agreed not to store data on a home computer but would look to have access to resources at NHS Lanarkshire. The Committee also agreed that the study should be exempt from site specific assessment.

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

The Committee also the following observations and delegated their Scientific Adviser to consider your response:

1. The participant information sheet should:

NHS
SCOTLAND

Participant Information Sheet *	1	09 March 2007
Participant Consent Form	1	09 March 2007

* to be confirmed

Research governance approval

You should arrange for all relevant NHS care organisations to be notified that the research will be taking place, and provide a copy of the REC application, the protocol and this letter.

All researchers and research collaborators who will be participating in the research at a NHS site must obtain research governance approval from the relevant care organisation before commencing any research procedures. Where a substantive contract is not held with the care 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.

Statement of compliance

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: 07/MRE00/54-Please quote this number on all correspondence

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

Yours sincerely

Professor Kennedy Lees
Chairman

cc: Mrs Marise Bucukoglu
Clinical Trials and Research Governance Manager
Room E1.06, Queen's Medical Research Institute
47 Little France Crescent
Edinburgh EH16 4SA

APPENDIX 5

Homogeneity of variance and normal distribution test results

Test results of homogeneity of variance and normal distribution.

ANOVA assumes that the data are sampled from populations with identical SDs (homogeneity of variance). This assumption is tested using the method of Bartlett. If the test is significant then non-parametric tests should be considered. ANOVA assumes that the data are sampled from populations that follow normal distributions. This assumption is tested using the method of Kolmogorov and Smirnov (KS). If the results are significant then non parametric test should be considered. Results of these tests for all three groups on all dependent variables are shown below (see Table 1).

Table 1. Statistical analyses of homogeneity of variance and normal distribution

Variable	Bartlett statistic (p value)	KS (p value)			Passed normality test?	Statistical tests used
		Delusion group	Panic group	Healthy control group		
State Anxiety	5.973 (0.0501)	0.1188 (>0.10)	0.1882 (>0.10)	0.2149 (0.0607)	Yes but outliers exist	Non-Parametric
Trait Anxiety	3.794 (0.1500)	0.1906 (>0.10)	0.1631 (>0.10)	0.1766 (>0.10)	Yes but outliers exist	Non-Parametric
Psychological interpretations	2.530 (0.2822)	0.1745 (>0.10)	0.2227 (>0.10)	0.1988 (>0.10)	Yes	Parametric
Somatic Interpretations	3.749 (0.1534)	0.1606 (>0.10)	0.1562 (>0.10)	0.1548 (>0.10)	Yes but outliers exist	Non-Parametric
Normal interpretations	0.6960 (0.7061)	0.1740 (>0.10)	0.1616 (>0.10)	0.1320 (>0.10)	Yes	Parametric
No. of Somatic Interpretations in past 3 months	1.320 (0.5168)	0.1658 (>0.10)	0.2658 (0.0288)	0.1639 (>0.10)	No	Non-Parametric
Metacognitions	2.053 (0.3582)	0.1505 (>0.10)	0.2637 (0.0313)	0.2202 (0.0487)	No	Non-Parametric
Metacognitions subscale positive beliefs about worry	4.298 (0.1166)	0.1622 (>0.10)	0.2165 (>0.10)	0.3147 (0.0003)	No	Non-Parametric
Metacognitions subscale Cognitive confidence	1.474 (0.4784)	0.1205 >0.10	0.1605 >0.10	0.2607 (0.0072)	No	Non-Parametric
Metacognitions subscale uncontrollability and danger	2.590 (0.2739)	0.1625 (>0.10)	0.1806 (>0.10)	0.2607 (0.0072)	No	Non-Parametric

Metacognitions subscale need to control thoughts	0.8051 (0.6686)	0.2288 (0.0248)	0.2423 (0.0703)	0.2735 (0.0036)	No	Non-Parametric
Metacognitions subscale cognitive self consciousness	1.979 (0.3718)	0.08763 (>0.10)	0.2500 (0.0531)	0.1640 (>0.10)	Yes	Parametric
Self Esteem	3.527 (0.1715)	0.1217 >0.10	0.1809 >0.10	0.1358 >0.10	Yes but outliers exist	Non-Parametric
State emotionality	5.724 (0.0572)	0.1130 (>0.10)	0.1423 (>0.10)	0.1622 (>0.10)	Yes	Parametric
Trait Emotionality	11.190 (0.0037)	0.1622 >0.10	0.2274 >0.10	0.1610 >0.10	No	Non-Parametric
Experiential Avoidance	8.594 (0.0136)	0.1975 0.0956	0.1694 >0.10	0.1290 >0.10	No	Non-Parametric
Delusional Ideation	19.328 (<.0001)	0.1300 (>0.10)	0.1515 (>0.10)	0.2108 (0.0716)	No	Non-Parametric
PDI Yes/No scores	6.000 (0.0498)	0.1367 (>0.10)	0.1422 (>0.10)	0.2270 (0.0364)	No	Non-Parametric
PDI subscale Delusional distress	20.890 (<0.0001)	0.1420 (>0.10)	0.1563 (>0.10)	0.2545 (0.0098)	No	Non-Parametric
PDI subscale Delusional conviction	20.380 (<.0001)	0.1482 >0.10	0.1620 >0.10	0.2152 0.0600	No	Non-Parametric
PDI subscale Delusional preoccupation	20.776 (<.0001)	0.1509 >0.10	0.1512 >0.10	0.2032 0.0963	No	Non-Parametric

APPENDIX 6

Raw data of 'other' interpretations

Raw data of 'Other' Interpretations

Delusion Group (9)

Participant 4

If my stomach was upset, I would probably think that it is because:

"woman's troubles"

Normal attribution = 1

Participant 5

If I had a prolonged headache, I would probably think that it is because:

"As I have a sore head"

If I had a hard time catching my breath, I would probably think it is because:

"Because I am not fit"

Normal attribution =1

Participant 8

If I had a prolonged headache, I would probably think that it is because:

"Stress"

If I felt fatigued, I would probably think that it is because:

"Lack of sleep"

If I noticed my hand trembling, I would probably think that it is because:

"Cold"

If I lost my appetite, I would probably think that it is because:

"Stress"

If I had a hard time catching my breath, I would probably think it is because:

"Asthma"

If I noticed numbness or tingling in my hands or feet, I would probably think that it is because:

"Fear"

If I was constipated or irregular, I would probably think that it is because:

"Not enough food in general"

Psychological attribution = 3

Normal attribution = 3

Somatic = 1

Participant 9

If I lost my appetite, I would probably think that it is because:

"Thinking too much about physical illness"

Psychological attribution = 1

Participant 10

If I was sweating a lot, I would think it is because:

"Maybe outside forces"

If I got dizzy all of a sudden, I would probably think it is because:

"Maybe I'm just weak"

Ambiguous=2

Participant 11

If I noticed my mouth was dry, I would probably think that it is because:

"due to drug I'm on"

If I lost my appetite, I would probably think that it is because:

"Could be due to cancer or some other illness"

If I had a hard time catching my breath, I would probably think it is because:

"Exertion"

If I noticed numbness or tingling in my hands or feet, I would probably think that it is because:

"Drug side effects"

Normal = 3

Somatic = 1

Participant 12

If I had a prolonged headache, I would probably think that it is because:

"Lack of sleep"

If I was sweating a lot, I would think it is because:

"Blood pressure"

If I noticed my mouth was dry, I would probably think that it is because:

"Medication"

If I felt fatigued, I would probably think that it is because:

"Lack of sleep"

If I noticed my hand trembling, I would probably think that it is because:

"Lack of sleep"

If I had trouble sleeping, I would probably think it was because:

"Hearing voices, threats"

If my stomach was upset, I would probably think that it is because:

"Diurnal ulcer"

If I had a hard time catching my breath, I would probably think that it is because:

"Smoking"

If I was constipated or irregular, I would probably think that it is because:

"Eating too much"

Normal =6

Somatic=2

Psychological = 1

Participant 13

If I had a prolonged headache, I would probably think that it is because:

"Too much on my mind"

If I noticed my mouth was dry, I would probably think that it is because:

"Medication"

If I lost my appetite, I would probably think that it is because:

"don't like food"

If I got dizzy all of a sudden, I would probably think it is because:

"Medicine"

Psychological = 1

Normal = 3

Participant 16

If I noticed my mouth was dry, I would probably think that it is because:

"Side effect of medication"

If I felt my heart pounding in my chest, I would probably think that it is because:

"Gentle exercise"

If I felt fatigued, I would probably think that it is because:

"Medication"

If I was constipated or irregular, I would probably think that it is because:

"Medication"

Normal = 4

Healthy control group (3)

Participant 4

If I got dizzy all of a sudden, I would probably think it is because:

"Viral infection symptom"

If I had trouble sleeping, I would probably think it was because:

"Baby on the way, tests to come"

Somatic = 1

Psychological = 1

Participant 8

If I was sweating a lot, I would think it is because:

"Hormonal problems"

Somatic = 1

Participant 12

If I had a prolonged headache, I would probably think that it is because:

"Tension-bad posture"

If I felt fatigued, I would probably think that it is because:

"Not sleeping enough"

If I lost my appetite, I would probably think that it is because:

"Not enough choice of food"

Normal = 2

Psychological = 1

Panic group (5)

Participant 1

If I felt my heart pounding in my chest, I would probably think that it is because:

"If I panic in a situation and have stabbing pains in my chest would perhaps think there might be something wrong" (This was beside an asterisk linked to the 'There must be something wrong with my heart' option).

Somatic = 1

Participant 2

If I was constipated or irregular, I would probably think that it is because:

"Problem due to operation 2 years ago"

Somatic = 1

Participant 3

If I lost my appetite, I would probably think that it is because:

"Anxious"

If I had a hard time catching my breath, I would probably think that it is because:

"Asthmatic"

Psychological = 1

Somatic = 1

Participant 4

If I had a prolonged headache, I would probably think that it is because:

"Medication and migraine"

If I got dizzy all of a sudden, I would probably think it is because:

"Result of medication"

If I noticed my mouth was dry, I would probably think that it is because:

"Also as a result of medication"

If I felt my heart pounding in my chest, I would probably think that it is because:

"Prone to panic attacks"

If I noticed my hand trembling, I would probably think that it is because:

"Again as a result of medication"

If I had trouble sleeping, I would probably think it was because:

"Have always had difficulty sleeping"

If my stomach was upset, I would probably think that it is because:

"Again medication"

If I lost my appetite, I would probably think that it is because:

"Just don't feel like eating"

If I noticed numbness or tingling in my hands or feet, I would probably think that it is because:

"Have arthritis in neck"

If I was constipated or irregular, I would probably think that it is because:

"Have nerve damage to my bowel after cancer operation 19 years ago (Gyn cancer)"

Normal= 7

Somatic = 3

Participant 9

If I had a prolonged headache, I would probably think that it is because:

"Lack of sleep"

If I was sweating a lot, I would think it is because:

"Medication"

If I noticed my mouth was dry, I would probably think that it is because:

"Diabetes"

If I felt fatigued, I would probably think that it is because:

"Not sleeping"

If I had trouble sleeping, I would probably think it was because:

"Child not sleeping"

If my stomach was upset, I would probably think that it is because:

"Eaten too much"

If I had a hard time catching my breath, I would probably think that it is because:

"Asthma"

If I noticed numbness or tingling in my hands or feet, I would probably think that it is because:

"Sciatica"

Normal = 5

Somatic = 3