

Thesis:

**The effects of paranoid and or persecutory delusions
on feelings of social inclusion and exclusion**

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Abstract

Background: Current psychological theories of persecutory delusions appear limited in being able to explain their interpersonal nature. Unanswered questions include why the content of delusions mostly involves persecution by other people. Research into rejection including rejection sensitivity may provide a rationale for delusion personalisation and also may indicate how rejection may be implicated in the maintenance of delusions. The aim of this study was to investigate responses to rejection for individuals with a psychosis that includes persecutory delusions compared with controls.

Methodology: Participants (22 with psychosis with persecutory delusions, 18 with an anxiety disorder and 19 healthy individuals) played a computerised game of catch (Cyberball). Half of each group was either included or excluded, inducing a mood change in those rejected. Questionnaires were completed to measure mood change, indicating rejection sensitivity. A second task was completed enabling participants to react either antisocially or neutrally towards the game characters. Measures of psychological and demographic variables were also collected.

Results: There was a large effect between the excluded and included participants. There was a null finding for the hypothesis that the psychotic group would have higher levels of rejection sensitivity than the anxious and healthy groups. There was also a null finding for the hypothesis that the psychosis group will be more likely to respond antisocially after rejection and make more negative attributions about the game character's personalities. However, there was a trend for the psychotic group to be more antisocial after inclusion.

Conclusions: The results obtained in the study were contrary to those expected. Rejection appears to be a similarly negative experience for all participants, but differences may be observed behavioural responses with those with psychosis appearing ambivalent to inclusion or exclusion.

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Chapter 1: Introduction

1.1 Overview

Interest in conducting psychological research into persecutory delusions and paranoia has increased over the last twenty years. It has, as a consequence, generated a foundation of knowledge that has informed both the medical and psychological treatment of these symptoms (for reviews see Bentall, Corcoran, Howard, Blackwood & Kinderman, 2001; Bell, Halligan & Elis, 2006; Freeman, 2007).

A particularly valuable result of the research efforts has been to provide potential insights into the development and maintenance of these delusions. On the whole, current psychological research has been focussed upon cognitive processes such as reasoning and perception, and the implications of negative emotional states as important components of persecutory delusions (Freeman, 2007). However, there are still a number of factors that are not particularly well understood. One factor is the interpersonal nature of these delusions and how this may integrate with current knowledge. A natural consequence of existing in a social milieu and hence a common aspect of our social experience is either being made to feel included or rejected by others. Of these experiences, the most unpleasant one is normally rejection. Rejection is thought to be an event that involves being physically removed from a situation or the experience of being ignored or derogated in the presence of others. All forms of rejection are thought to elicit powerful and negative reactions (Zadro & Williams, 2005). Rejection has however, also been implicated as a significant risk factor for the development of psychosis (Selten & Cantor-Graae, 2005) and hence subsequently potentially persecutory delusions. It is thought that the study of rejection in people experiencing persecutory delusions may add to the knowledge of the interpersonal nature of the phenomenon. The following chapter will provide an introduction to current psychological investigations into persecutory delusions and will develop the argument for the investigation into the rejection

experience. It will particularly focus on the phenomena of rejection sensitivity, a potentially significant transdiagnostic factor. It will then propose a method of studying this aspect of the phenomena with persecutory delusions.

1.2 Definition of Persecutory Delusions and Paranoia

Before the specific nature of persecutory delusions can be defined it may be useful to define delusions in general. The modern definition of delusions has largely been influenced by the observations of Karl Jaspers. In a review of Jaspers by Walker (1991), it was summarised that he defined delusions as beliefs that tend to be impervious to experiences or argument and that have bizarre or impossible content. Delusions are deemed proper if it is impossible to empathise with the holder, or to explain them in terms of the holder's background or personality. More recently, however, delusions have been defined as dimensional constructs. Oltmanns' (1988) model proposes that deluded beliefs exist on a continuum by which they are implausible, unfounded, not shared by others, distressing and preoccupying. In addition to these dimensions, Freeman (2007) has added the degrees by which they are firmly held, resistant to change, involve personal reference and interfere with social functioning. When including the persecutory nature of the delusion this has been further defined. Persecutory delusions involve the delusion holder believing that harm is occurring, or is going to occur to them and that the persecutor has the intention to cause the harm (Freeman & Garety, 2000).

Paranoia is a term that is often used interchangeably with persecutory delusions; however they are not thought to be the same thing (Freeman, 2007). Paranoid thinking is best considered as beliefs about the potential of threat occurring which itself exists as a hierarchy of distress. At the bottom of the hierarchy may be social evaluatory concerns, such as fear of negative judgement in social phobia and at the top may be clinically relevant persecutory delusions (Freeman, Garety, Bebbington, Smith, Rollinson, Fowler, Kuipers, Ray & Dunn, 2005). However, in this study the term persecutory delusions will also pertain to individuals who have clinically

relevant levels of paranoia and most likely a diagnosed psychotic disorder. This is a convention that appears to be common to much writing about the phenomena (Freeman, 2007).

1.3 Epidemiology of Persecutory Delusions

The identification of persecutory delusions as an important area of research focus seems to have been motivated by the realisation of its high prevalence. For instance, Sartorius, Jablensky, Korten, Ernberg, Anker, Cooper & Day (1986) demonstrated in a prospective study that 50% of individuals with signs of schizophrenia making first contact with services experienced persecutory delusions or paranoia and that this was their most common symptom. Its presence has also been identified in other disorders including in 15% of cases of depression (Johnson, Horwath & Weissman, 1991), 28% of cases of bipolar disorder, occurring in manic episodes (Goodwin & Jamison, 1990) and in 30% of cases of post traumatic stress disorder (Hamner, Freuch, Ulmer & Arana, 1999). Furthermore, approximately 1–3% of the non-clinical population have been found to have persecutory delusions of a severity comparable to clinical cases. A further 5–6% of the non-clinical population have a delusion of less severity and 10-15% has some degree of paranoid thinking (Freeman, 2006).

1.4 Current Theories of Persecutory Delusion

Recent research into the processes underlying persecutory delusions has concentrated on differences in how those with the delusions make sense of the world around them, compared to those without. This has included losing the ability to infer the intentions of others, or what is more formally known as a 'theory of mind' deficit. Due to this they are thought to more easily conclude that they are being conspired against by others, as true intentions seem unfathomable (Frith 2004; Brune, 2005). However, this process has been contested, as feelings of persecution may not be the only conclusion to be drawn from others behaviour (Walston, Blennerhassett & Charlton, 2000). Furthermore, this type of deficit has also been thought to be more associated with other symptoms of psychosis, such as thought disorder and negative

symptoms (Greig, Bryson & Bell, 2004). It is suggested therefore, that theory of mind deficits are not necessarily involved in the development of persecutory beliefs.

A further type of deficit proposed has been in reasoning processes. Individuals with delusions have been found to make decisions very quickly by 'jumping to conclusions' or by making decisions before all of the facts have been provided (Fear, Sharp & Healy, 1996; Dudley, John, Young & Over, 1997; Garety & Freeman, 1999). 'Jumping to conclusions' has been found to be one of the most successfully replicated findings involving reasoning in delusions (Freeman, 2007). It involves an experimental probabilistic reasoning task where individuals are required to decide whether coloured beads are being drawn from one or other of two hidden jars. Each jar contains beads of two colours but the proportion of each colour is reversed in the two jars. It was found that individuals with delusions request fewer pieces of information before deciding which jar the experimenter is pulling beads from. However, it is important to note that this is a finding not based on delusional content and that this evidence is not consistent for all sub-types of delusions; including persecutory delusions (Freeman, 2007).

In addition to these deficits, there is also reported to be a failure to generate or consider alternative explanations for experience. This is thought to underpin the conviction that is seen in the holders of delusions. In a study involving one hundred participants, three quarters were unable to provide alternative explanations for their delusions (Freeman, Garety, Fowler, Kuipers, Bebbington & Dun, 2004). Interestingly when there was a doubt in the delusional explanation this was correlated with low self-esteem. Furthermore, a strong confirmatory reasoning bias or the tendency to ignore disconfirming information has also been identified in some individuals with delusions (Freeman, Garety, McGuire, & Kuipers, 2005).

Alongside reasoning deficits, there has also been an identified difference in attribution styles. This is based upon a theory of attribution that people make sense of their surroundings on the basis of what they consider is the cause and effect of a phenomenon. In those with persecutory delusions this is manifested as an exaggerated 'self-serving bias' (Bentall, et al, 2001). The self-serving bias is a common phenomenon seen in most individuals. In healthy individuals this includes taking personal credit for positive events and externalising blame to environmental factors for negative events. In individuals with depression this has been seen to change with negative events often seemingly attributed to themselves and positive events to other people (Abramson, Seligman & Teasdale, 1978). The bias in those with persecutory delusions involves taking credit for positive events and externalising responsibility for negative events, as in typically healthy attributions. Yet in this case, these externalised attributions tend to show a personalising bias, i.e. blaming others for negative events (Kinderman & Bentall, 1996, 1997). Interestingly though, studies found that paranoia does not appear to be correlated with the frequency of personalised externalising attributions. In addition, such biases have not been identified in all persons with paranoia; although sample sizes in these studies have been relatively low (Martin & Penn, 2002). In a thorough case study of 25 individuals it was also concluded that some may have a tendency to blame themselves (Freeman, Garety, & Kuipers, 2001).

Of additional interest to the study of persecutory delusions has been research into perceptual processes. Maher (1974) posited that delusions originate from unusual or anomalous internal experiences, including not only perceptual and reasoning differences but hallucinations, thought insertion and confusing states of arousal. This has also received some support in more recent studies (Thewissen, Myin-Germeys, Bentall, de Graaf, Volleybergh & van Os, 2005; Murray, Grech, Phillips & Johnson, 2003). However, it is important to add that such experiences may not be exclusive to individuals with psychosis, for instance paranoia has been implicated in the experience of hearing

impairment (Thewissen et al., 2005) and altered states due to illicit drugs (D'Souza, Perry, MacDoudall, Ammerman, Cooper, Wu, Braley, Gueorguieva & Krystal, 2004). However, Bunney, Hetrick, Garland-Bunney, Patterson, Jin, Potkin & Sandman (1999) found that a sizable number of people with a diagnosis of schizophrenia reported significantly more perceptual anomalies, particularly in visual and auditory experiences than the nonclinical controls. More recently, Freeman, Gittins, Pugh, Antley, Slater & Dunn (2008) identified, in a sample of 200 nonclinical individuals, that those with high levels of paranoia were differentiated from people with high levels of anxiety in a task that induced thoughts of suspiciousness through their greater propensity for anomalous perceptions. This was an interesting study that used virtual reality to create a situation involving social interaction, where the behaviour of the confederates in the experiment can be preselected, controlling the social experience for the participant.

1.5 Models of Persecutory Delusion

1.5.1 The Self-Esteem Model

Despite the progress made through the identification of cognitive deficits, biased attributions and anomalous perceptual experiences; they cannot provide insights into 'how' or 'why' persecutory delusions are formed when they stand alone without integration. Bentall et al (2001) offered to answer the 'why' with their 'attribution/self-representation cycle'. This model predicts that persecutory delusions may result from an individual trying to keep actual-self/'ideal-self' discrepancies to a minimum through making excessive external-personalised attributions, through the exaggerated self-serving bias. An experience that is also mediated by effects of the deficits previously noted. Such attributions defend against hidden or latent negative beliefs about the self. These beliefs negatively impact implicit self-esteem but explicitly self-esteem is rated as high or normal. Implicit self-esteem being defined as evaluatory beliefs about ones self that would not be voiced with conscious volition. In practice the model has been elusive to replicate and some

researchers have suggested that it is not yet comprehensively tested (Kinderman, Prince, Waller & Peters, 2003).

Self-esteem and its relationship with persecutory delusions has also been studied by other researchers. For instance Trower & Chadwick (1995) have suggested that there are two experiences of paranoia, 'poor me' and 'bad me'. Experiencing the 'poor me' type leaves individuals perceiving themselves as victims and whereas those with 'bad me' tend to perceive that they are being justly punished. More recently, Melo, Taylor & Bentall, (2006) in an interesting study demonstrated that both the 'poor me' or 'bad me' classifications were unstable over time. They proposed that the attribution/ self-representation cycle may help to explain this. Furthermore they posit that this discovery may also provide an explanation as to why replicating findings for the model has proved to be difficult. They believed the instability measured was due to the individual moving between the two types of paranoia after daily events occurring. This movement between types of paranoia affects the ability for them to make stable attributions. Therefore, the delusion acting as a defense of self-esteem or 'poor me' paranoia is not consistently held, leading to 'bad me' paranoia and most likely a fall in explicit self-esteem. Recently, Thewissen, Bentall, Lecomte, van Os & Myin-Germeys (2008) in a study of 158 participants also reported that there was a temporal relationship between state paranoia and self-esteem. Low self-esteem was associated with an immediate increase in paranoia. Also those high in paranoia had overall lower self-esteem and greater self-esteem fluctuations. This is consistent with the hypothesis that paranoia may be associated with dysfunctional strategies of self-esteem regulation and may be context specific. The findings of this study and other self-esteem studies are limited by the difficulty found in measuring self-esteem as a single construct and not a more complicated multi-factorial phenomenon.

Previous to these findings, 'self-esteem' models for persecutory delusions had come under some criticism. Green, Garety, Freeman, Fowler, Bebbington,

Dunn & Kuipers (2006) highlighted that persecutory delusions are beliefs concerning severe threat which is personally significant and involves one or more persecutors. They also reported that individuals are often more depressed the more powerful the persecutors were felt to be. They concluded that this will most likely have negative implications for their self-esteem. As a consequence of their research they proposed a cognitive model where emotional distress is central. They suggest that in the context of belief appraisal it plays a more significant role in formation and maintenance of the delusions than self-esteem.

1.5.2 The Threat Model

The 'Threat Anticipation Model' (Freeman, Garety, Kulpers Fowler & Bebbington, 2002) is a cognitive model of persecutory delusions although it more specifically comprises of two models. It comprises of a model describing the processes involved in the formation of the delusion (figure 1.1) and a model describing the processes involved in the maintenance of the delusion (figure 1.2). It proposes that the formation of the delusion will begin with a precipitator, such as a life-event causing autonomic anxious arousal. This is often thought to have occurred against the backdrop of long-term anxiety and depression, indicating a link between affective disorders and the development of a psychosis. This arousal is thought to initiate inner-outer confusion, causing anomalous experiences (e.g. perceptual anomalies (Garety & Hemsley, 1994)). The presence of anomalous experiences are thought to be particularly important and are thought to interact with cognitive deficits to in turn, drive a search for meaning. This search for meaning is guided by existing beliefs about the self, the world and others. The inner-outer confusion and the anomalous experiences may be exacerbated by the types of psychological dysfunction previously described, such as reasoning deficits and theory of mind problems.

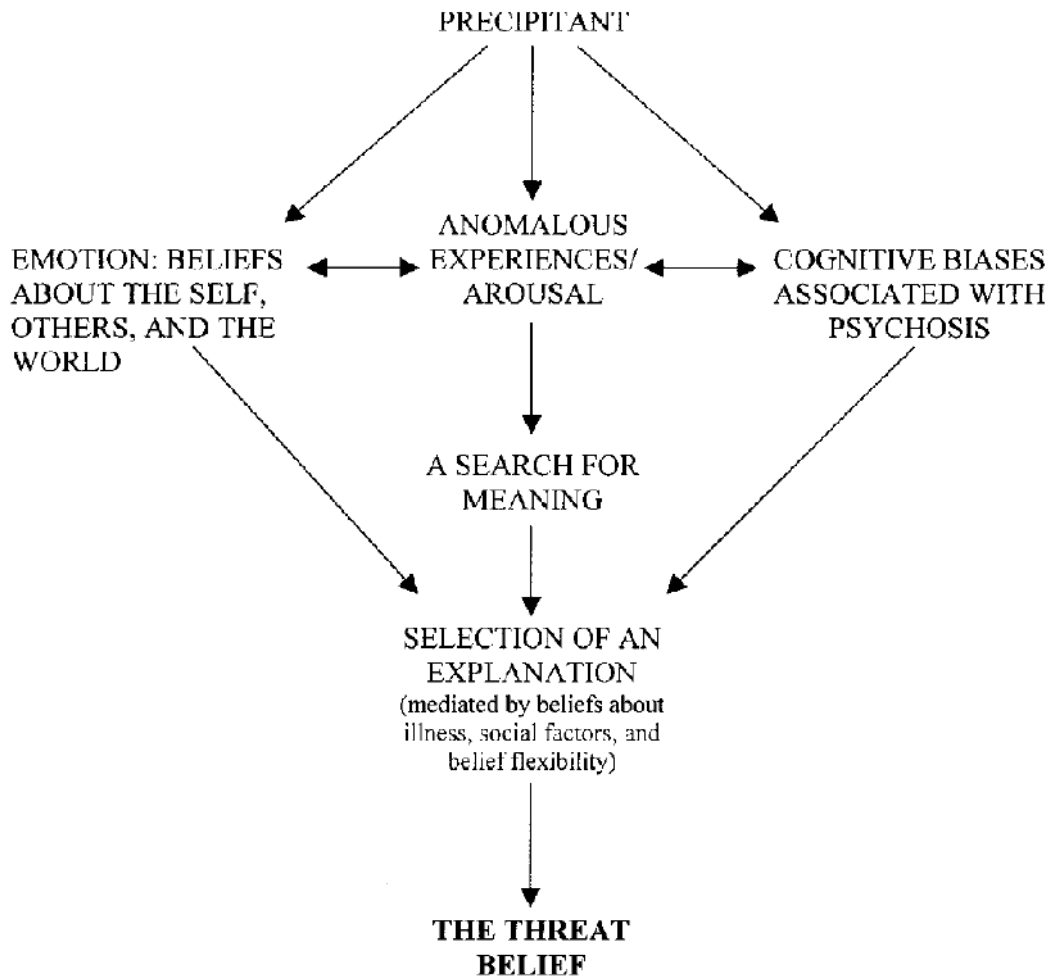


Figure 1.1: Formation of Persecutory Delusions reproduced from Freeman et al, (2002) pg. 334.

High levels of anxiety are thought to be particularly significant as the cognitive component is concerned with thoughts about impending danger. It is then expected that the ‘threat belief’ is formed and that this significantly influences the individual’s behaviour. As described by the maintaining model, safety behaviours are a common reaction to persecutory delusions. These behaviours have the consequence that they are likely to prevent the processing of disconfirmatory evidence and will therefore contribute to delusion persistence (Freeman, Garety, Kuipers, Fowler, Bebbington & Dunn, 2007). The high level of anxiety is therefore thought to be maintained by the threat beliefs and the safety behaviours in a similar fashion to anxiety

disorders (Clark, 1999). However, unique to this model is the reinforcing belief that the strange experiences are caused by external factors and are therefore not all in the mind.

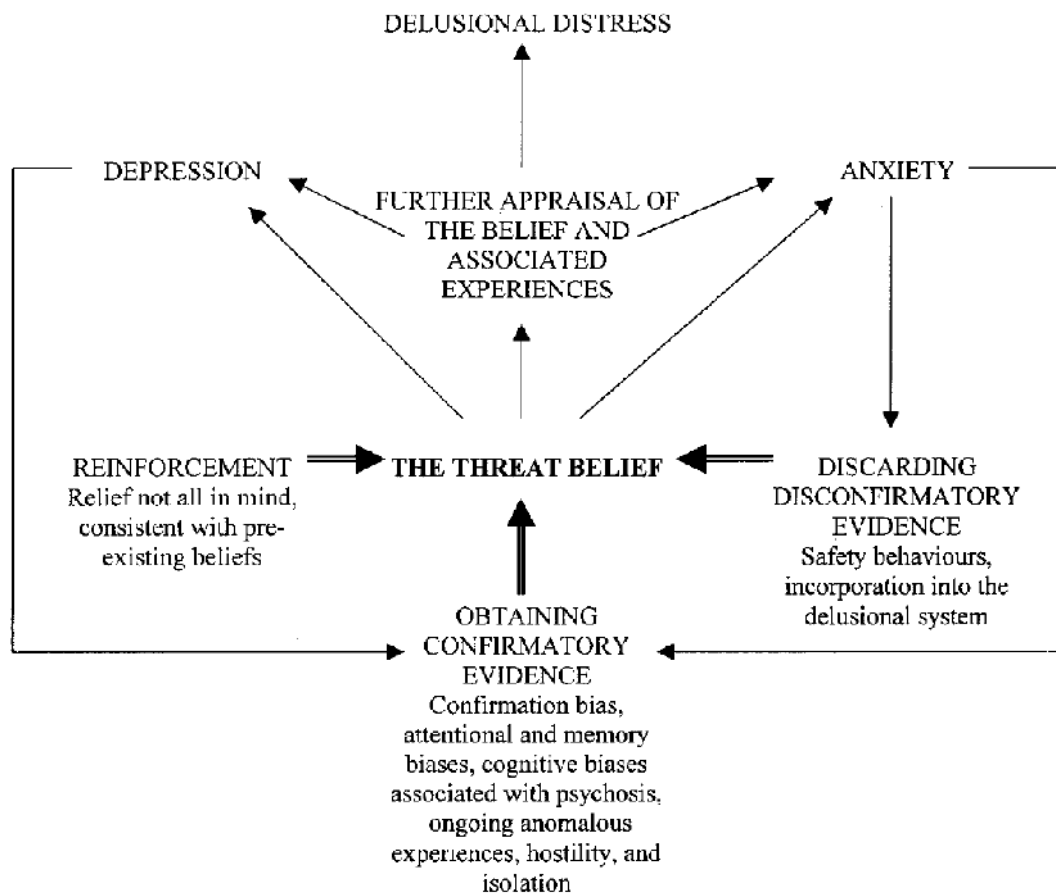


Figure 1.2: Maintenance of Persecutory Delusions reproduced from Freeman et al, (2002) pg. 338.

The 'Threat Anticipation Model' in summary proposes that negative affect, in particular anxiety and subsequent autonomic arousal is central to the development and maintenance of persecutory delusions. It may also be possible to speculate that this arousal is implicated in the generation of the cognitive deficits previously mentioned, however more research is required that explores states of emotion and cognitive functioning in this area (Freeman, 2007). The importance of considering negative emotional states on thinking has particular implications for individuals with psychosis as they have

been found to be more sensitive to the effects of stress (Myin-Germeys, Delespaul, & van Os, 2005).

Taking into account the research that has been discussed, there is seemingly a great deal that has been discovered that may help to explain the nature of persecutory delusions. However, a full understanding of the phenomenon is far from achieved. This is particularly the case for understanding more about the social nature of persecutory delusions. Such research is for instance, founded on the evidence that the common experience with psychosis is an altered social perception, where the actual perception of people around the sufferers is changed, potentially leading to frightening experiences (Rhodes & Jakes, 2004).

One particular feature of persecutory delusions that has not been adequately understood is why the content, for the majority involves persecution by other people and not other animate beings or inanimate objects. Green et al, (2006) identified this in 82% of the seventy individuals with persecutory delusions that they interviewed. The remaining 18% felt that their persecutors were paranormal or religious, such as the devil or wizards and witches; yet interestingly still human like in nature. The detail of the content of delusions was also interesting. The types of harm that participants felt they were at risk from included: social 13%, psychological 64%, death 55% and physical harm 73%. Social harm included making people think badly of them and psychological harm included people wanting to confuse or upset the participant. Such a study underlines the personal nature of these delusions however it also poses the question why? Why would a 'threat belief' most likely constitute a threat from a person or why attributions for negative events be made against external persons rather than environmental causes?

1.6 Rejection Sensitivity

One area of research that may help in finding an explanation for the personalisation of persecutory delusions is that into the experience of social rejection. It is possible that findings in this area may also add to the current models of the generation and maintenance of the delusions. In this area there is research that has investigated how the impact of rejection may be implicated across many psychological disorders as a transdiagnostic factor. In particular has been the study of interpersonal sensitivity and rejection sensitivity. There is also research that has studied the experience of being rejected and how this may also be mediated by the presence of rejection sensitivity.

It is thought that people perceive their social reality through a cognitive-emotional information processing framework (Downey & Feldman, 1996). Furthermore, individuals who readily perceive themselves to be rejected by others are said to have a high level of rejection sensitivity (Boyce & Parker, 1989). Rejection sensitivity has been defined as:

'...a cognitive-affective processing dynamic or disposition to anxiously expect, readily perceive and react in an exaggerated manner to cues of rejection in the behaviour of others' (excerpt from Downey & Feldman, (1996) pg.1327).

Individuals high in rejection sensitivity are reported to approach social situations hyper-vigilant for potential signs of rejection. This may lead to the misinterpretation of even benign signals in others behaviour or a hyper-sensitivity to actual rejection, if it occurs. This generates an affective or behavioural response that in some cases may be an 'over-reaction'; including hostility or socially inappropriate behaviour. This may then serve to elicit real or further rejection. This experience in turn, then adds to previous memories of rejection, perpetuating future expectations of it occurring again; in a dysfunctional circular process (Ayduk, Mendoza-Denton, Mischel, Downey,

Peake & Rodriguez, 2000). The consequence of this is often to lower interpersonal efficacy and confidence in future social interactions (Butler, Doherty & Potter, 2007).

Being socially rejected can occur in many guises, such as being ostracised, abandoned or given the 'cold shoulder'. Despite its pretext, rejection is thought to take the form of either a physical or social format. Physical rejection involves being removed from a situation and social rejection involves being ignored or derogated, whilst still in the presence of others. Both forms of rejection are thought to elicit powerful and negative reactions (Zadro & Williams, 2005). A theoretical understanding of this is that these are thought to occur due to evolutionary processes that motivate individuals to maintain interpersonal relationships. The belief is that these evolved as a defense against being left on ones own and the vulnerability that that may have meant in early human environments (Panskepp, 1998). However, naturally this is impossible to verify empirically. Despite this, it is possible that the study of rejection and rejection sensitivity may have important implications for understanding psychological disorders such as persecutory delusions. This is particularly significant as the evidence suggests that rejection is universally painful and that rejection sensitivity may accentuate this. However, it is also possible that this may have significance beyond this psychological symptom. Romero-Canyas & Downey (2005) reported that individuals with rejection sensitivity, when faced with rejection, are more likely to develop both internalising and externalising psychological disorders, suggesting that a breadth of disorders are related to the phenomenon.

An understanding of the current research into the relationship between rejection and psychological problems, along with current theory on the development of rejection sensitivity, may therefore be useful. Furthermore, current approaches to investigating the experience of being rejected should be considered as well as the implications for individuals with rejection sensitivity. For the purpose of this introduction, rejection sensitivity will be considered as

a broad definition of a complex phenomenon. In a number of the studies this has been referred to as interpersonal sensitivity (Boyce & Parker, 1989). This includes a sense of personal inadequacy, inferiority, poor morale, high sensitivity to ridicule and negative expectations of others. It is proposed here that these attitudes and expectation may also be understood as rejection sensitivity.

1.6.1 Antecedents to Rejection Sensitivity

Much research has also occurred outside the area of rejection sensitivity that may demonstrate a link between rejection and psychological problems. For instance, it has long been acknowledged that a toxic social environment, such as deprived urban living may significantly increase the risk of people developing psychological problems (Paykel, Abbott, Jenkins, Brugha & Meltzer, 2000). A point though, that has not always been corroborated (Parikh, Wasylenki, Goering & Wong, 1996). However, potential causal factors include the fact that urban dwellers are more likely to be younger, members of a deprived social group, and to have less perceived social support (Paykel et al, 2000). They are also more likely to be exposed to crime, poverty, insecure housing and social isolation (Horwitz & Scheid, 1999; Thornicroft, Bisoffi, De Salva & Tansella, 1993). Membership to a minority ethnic group, especially migrant groups has also been demonstrated to be a significant risk factor (Boydell, van Os & McKenzie et al, 2001; van Os, Takei, Castle, et al, 1996; Lloyd, Kennedy, Fearon, et al, 2005). Furthermore, this risk increases for second generation migrants (Cantor-Graae & Selten, 2005). In addition, risk also increases due to problems other than ethnicity and socioeconomics, including levels of IQ (<126) (David, Malmberg & Brandt, 1997), and exposure to trauma, such as sexual, emotional and physical abuse (Greenfield, Strakowski, Tohen, Batson & Kolbrene, 1994; Ucok & Bikmaz, 2007). Selten & Cantor-Graae (2005) has proposed a unifying mechanism for the causation of serious psychological problems due to these factors called 'social defeat'. Underpinning this potential mechanism to generating psychological disorders problems is the subordination or alienation of individuals in their social

context. It is possible to suggest that these may occur in the format of either social or physical rejection. Justification for this rests upon animal studies demonstrating sensitisation of the mesolimbic system in rats following social defeat. This has in turn been likened to neurological mechanisms for psychosis such as that proposed in the dopamine hypothesis (Kapur & Mamo, 2003).

Despite evidence implying that 'social defeat' factors are involved in the generation of psychological problems, it is unlikely to adequately explain causation. It is possible that these toxic social factors interact with an individual's level of rejection sensitivity (Romero-Canyas & Downey, 2005). As previously reported there may be a circular relationship between rejection and rejection sensitivity. It is proposed here that this interaction may play a role in the development of psychological problems and in particular may be implicated in psychosis and the development of persecutory delusions.

Like other psychological phenomena rejection sensitivity is thought to be a product of multiple factors (Butler, Doherty & Potter, 2007). This includes for instance, a genetic predisposition (Gillespie, Johnstone, Boyce, Heath, & Martin, 2001). It is also thought to occur due to developmental factors related to early childhood experiences, such as teasing by peers (Butler et al, 2007). McDougall, Hymel, Vaillancourt, & Mercer (2001), in a detailed overview of the subject, highlighted the negative effects of childhood peer rejection, noting its association with feelings of anger, loneliness, anxiety and depression. Harb, Heimberg, Fresco, Schneier, & Leibowitz, (2002) also demonstrated a large positive correlation between peer rejection and the development of rejection sensitivity. Butler et al (2007) proposed that level of rejection sensitivity developed in childhood is related to adult interpersonal competence. This is consistent with theories that purport the developmental importance of peer groups in socialisation (Harris, 1999).

Researchers in the area have also proposed that rejection sensitivity may stem from early attachment and parental rejection experiences. Wilhelm, Boyce & Brownhill (2004), identified in a five year follow up of some 156 community psychiatric patients associations of rejection sensitivity with poor parental bonding and parental insensitivity. But in a separate study, Luty, Joyce, Mulder, Sullivan, & McKenzie, (2002) found these to be non-significant. In addition, Otani, Suzuki, Matsumoto, Kamata (2009), very recently found that high levels of rejection sensitivity can also be the result of over-protective parenting, after assessing a very large sample of 469 Japanese volunteers.

In the area of parenting experiences it is also important to consider the attachment literature. It has been described that children who experience rejection by their parents through neglect or abuse will very likely develop insecure attachment styles (Prior & Glaser, 2006). In this area, Romero-Canyas & Downey (2005) have also commented that individuals with anxious-avoidant or anxious-ambivalent attachments have higher rates of psychological problems than securely attached individuals. In concordance with this Feldman & Downey (1994), through assessing a sample of college students, identified that participants who reported being exposed to high levels of family violence and discord were likely to have an insecure attachment style and high levels of rejection sensitivity. Downey & Feldman, (1996) have also noted the deleterious effect of high levels of rejection sensitivity in adult relationships. They found that individuals with high levels when entering romantic relationships had anxious expectations of rejection and readily perceived rejection in their partners. Through a longitudinal study it has also been shown that the relationships for participants with high rejection sensitivity were more likely to break up (Downey, Freitas, Michaelis, & Khouri, 1998).

In summary, those who readily perceive themselves as rejected by others are said to have a high level of rejection sensitivity. It is thought that a significant component of this is acquired through childhood developmental processes affecting adult social competency. It has been suggested that environmental

factors leading to social defeat may interact with rejection sensitivity in the development of psychological problems. It is thought that this may be implicated in psychosis and the development of persecutory delusions. However, in order to support any speculation that rejection sensitivity is a factor it may also be useful to explore its presence in other psychological disorders.

1.6.2 Transdiagnostic Nature of Rejection Sensitivity

Transdiagnostic perspectives on phenomena do not necessarily remove the importance of looking at specific symptoms for specific disorder. They do however, demonstrate the commonality of some psychologically dysfunctional processes. See Harvey, Watkins, Mansel & Shafran (2006) for a review of the benefits of a transdiagnostic approach.

It appears that constructs such as rejection sensitivity have long been associated with many psychological disorders. For instance it has particularly been associated with unipolar depression (Boyce & Mason, 1996; Davidson, Zisook, Giller, & Helms, 1989) and subtypes of depression; especially atypical depression and non-melancholic depression (Otani, Suzuki, Ishii, Matsumoto & Kamata, 2008). Davidson et al (1989) proposed that high rejection sensitivity predisposed individuals to have an earlier age of onset of depression, higher levels of guilt and they were more likely to have suicidal thinking.

In another study in this area, Harb et al (2002) identified a strong positive association between rejection sensitivity and symptoms of depression and social anxiety. They concluded that both conditions include being sensitive to signals of disapproval, fear of rejection, feelings of inferiority and misinterpretation of behaviour. In a more recent study, Gilbert, Irons, Olsen, Gilbert and McEwan (2006) described a similar pattern, this time with strong positive associations between rejection sensitivity and increased distress and self-blame. They concluded that this indicated an internal self-blaming style

that is associated with high levels of rejection sensitivity. Gilboa-Schechtman, Foa, Vaknin, Marom & Hermesh, (2008) with a large sample size and a controlled study explored reactions to ambiguous facial expressions of individuals. Using cognitive measures they also suggested that sensitivity to signals of rejection is a factor common to both depression and social anxiety. Furthermore, in a comparison between bipolar and unipolar depression Benazzi (2000) demonstrated a higher prevalence of rejection sensitivity in bipolar patients with an odds ratio of 2.3. Although the results of the study was limited due to methodological issues such as measuring in a non-blind method by a single person rejection sensitivity as only present or absent.

A relationship has also been found between rejection sensitivity and anxiety disorders. Although a relationship with social anxiety disorder has already been mentioned, other relationships have been identified (Harb et al, 2002; Gilboa-Schechtman et al, 2008). For instance, in a factor analysis of a mixed phobic population, rejection sensitivity was found to be the largest predicting factor for phobias, especially agoraphobia and social phobia (Stravynski, Basoglu, Marks, Sengun, & Marks, 1995).

Wilhelm et al (2004), in a longitudinal study, looked at rejection sensitivity in anxious clinical participants and nonclinical participants. They reported that this was higher in individuals diagnosed with agoraphobia, panic disorder, simple phobia and generalised anxiety disorder. Interestingly this was not found to be the case for social phobia, suggesting similar levels of rejection sensitivity in the clinical and the nonclinical group. Shear (1997) had also in a previous study reported high levels of rejection sensitivity in sufferers of panic disorder. Silove, Parker, Hadzi-Pavlovic, Manicavasagar, & Blaszczynski, (1991) reported similar findings during an exploration of the relationship between parental care and generalised anxiety disorder. Studies also found high levels rejection sensitivity in people with an obsessive-compulsive disorder. For instance, Oppen, Hoekstra & Emmelkamp (1995) found a strong correlation between a measure of obsessive compulsive symptoms and

interpersonal sensitivity. In addition, Hoehn-Saric & Barksdale (1983) found that there was a greater degree of rejection sensitivity in people with an impulsive type obsessive compulsive disorder than a non-impulsive type. Furthermore, O'Connor, Fuller & Fell (2004) suggest that being aware of interpersonal sensitivity in this group is of clinical importance.

In addition to these anxiety disorders, rejection sensitivity has also been found to be a common feature in many categories of eating disorders. For instance, in a study of individuals with bulimia, over-reactions to negative interpersonal experiences were common (Downey & Feldman, 1996; Steiger, Jabalpurwala, Gauvin, Seguin & Stotland, 1999). Such individuals have also been found to be high in levels of sociotropy, a construct that encompasses the need for approval and dependency on others (Benjamin & Wulfert, 2003). Atlas, (2004) discriminated between interpersonal and appearance sensitivity. She suggested that despite both being related to striving for thinness; appearance sensitivity was the stronger relationship. Yet when interpersonal sensitivity was correlated along with expectancies of dieting it was more strongly associated with an over generalised sense of self-improvement. In a further study it was concluded that general psychopathology, in particular rejection sensitivity was even more indicative of clinical 'caseness' than the eating pathology in anorexia, bulimia, binge eating disorder and eating disorders not otherwise specified (Fletcher, Kupshik, Uprichard, Shah & Nash, 2007).

Despite the number of studies that have investigated rejection sensitivity with psychological disorders, little could be found that explored this with psychosis. However, a large number of studies that have been conducted have looked at related constructs. For instance, in a study exploring the relationship between 'expressed emotion' and schizophrenia, Cutting, Aakre & Docherty (2006) identified that high levels of sensitivity to criticism, along with high levels of actual criticism by influential others was commonly present.

In addition, as previously mentioned, a number of recent studies exploring paranoia have been performed using virtual reality to investigate the reactions of people when they meet benign virtual characters. Freeman et al (2008) found that nonclinical participants high in social anxiety or high in feelings of paranoia had similarly high levels of perceptivity of rejection. In a separate study, Camino (2008) found clinical participants with either anxiety or psychosis expressed almost equally high levels of perceived threat and perceived hostility from benign virtual characters when compared to nonclinical control; also possibly related to feelings of rejection.

Additionally, a number of researchers have studied verbal hallucinations in psychosis as an interpersonal experience. It is proposed that distress may be related to the person's relationship to the voice (Gilbert, Birchwood, Glilbert, Trower, Hay, Murray, Meaden, Olsen & Miles, 2001; Pérez-Álvarez, García-Montes, Perona-Garcelán & Vallina-Fernández, 2008). Birchwood, Meaden, Trower, Gilbert & Plaistow (2000) reported that distress may be due to involuntary subordination by voices often seen as malevolent and omnipotent. This perception is thought to be informed by existing interpersonal cognitive schemas constructed through current and historical relationships. It is possible that individuals with high levels of rejection sensitivity may be more inclined to feel distress when exposed to rejecting dialogue from their voices; although this hypothesis requires investigation.

The proposed transdiagnostic nature of rejection sensitivity may be further supported by the high levels of comorbidity seen between disorders. For instance, anxiety and depression in 80% of sufferers (Judd, Kessler, Paulua, Zeller, Wittchen & Kunovac, 1998), eating disorders and anxiety in 70-80% (Schwalberg, Barlow, Alger & Howard, 1992), bipolar and another disorder in 61% (Taman & Ozpoyraz (2002) and schizophrenia and another disorder in 32% (Goodwin, Amador, Malaspina, Yale, Goetz & Gorman, 2003).

Despite the importance of considering the transdiagnostic nature of phenomena, it is still important to investigate its implications for specific experiences. Research in this area cannot be found that has specifically investigated the rejection sensitivity construct with individuals who experience psychosis, let alone the symptoms of persecutory delusions or paranoia. However, due to the interpersonal nature of these symptoms it is thought likely that rejection experiences may be implicated (Green et al, 2006). Therefore, it will be only through new research in this area that any connection will be identified. In order for this to be considered it may be important to have an understanding of current theoretical and experimental methods that have been used to understand rejection.

1.7 The Rejection Experience

The approach to measuring rejection sensitivity in the research previously presented has mostly been through using self-report measures such as the Interpersonal Sensitivity Measure (Boyce & Parker, 1989). This measure involves asking participants to rate themselves against five subscales of interpersonal awareness: need for approval, separation anxiety, timidity and fragile inner-self. This involves participants making generalised self-evaluations.

Such measures have provided useful information about the relationship between rejection sensitivity and different types of psychopathology. However, it is difficult to identify the processes involved using correlation studies. The active experience of being rejected by individuals with psychological problems appears to be an understudied area. However, much research has occurred on the experience of rejection in nonclinical populations. Research paradigms using experimental designs in order to model the rejection experience have recently evolved in this area.

Experimental approaches to studying responses to rejection have utilised many creative methods. These include, participants believing that they have

been voted out of a group, that others did not want to know them, or that experimental confederates prefer another person. A rejection response has also been generated through participants being left out of games either in reality or computer based. In order to measure the effects of rejection participants responses are compared against participants who have been included (for a review see Richman & Leary, 2009).

An alternative method to creating an actual rejecting situation and then quantifying the experience has been to measure automatic reflex reactions. A startle probe paradigm has been used to measure differences between people with high levels of rejection sensitivity and without. This involves measuring the magnitude of eye blinking when participants are presented with pictures of rejecting or accepting scenes and also given an unexpected blast of noise (Downey, Mougios, Ayduk, London & Shoda (2004). It is suggested that the startle reflex is an aspect of normal physiological defensive reactions previously described. This reaction is mediated by emotion and hence is stronger when experienced whilst feeling anxious or other aversive emotional states (Vrana, Spence, & Lang, 1988).

1.7.1 The Stages of Rejection

An area of research that may provide a foundation for investigating the implication of rejection and rejection sensitivity is that into 'social pain' theory. This is a theory generated out of research into social rejection that may underpin the 'social defeat' theory previously mentioned. Such research has been integrated into a model of rejection called the 'model of ostracism' (ostracism being a term for rejection) (see figure 1) (Williams, 2001). This model predicts that the immediate experience of rejection occurs across two stages; a reflex response and a reactive response. A third stage occurs if rejection becomes a chronic experience. This stage may also mirror the experience of social defeat or the process of acquiring rejection sensitivity. For the sake of this introduction however, it is the responses post rejection that are to be the main focus.

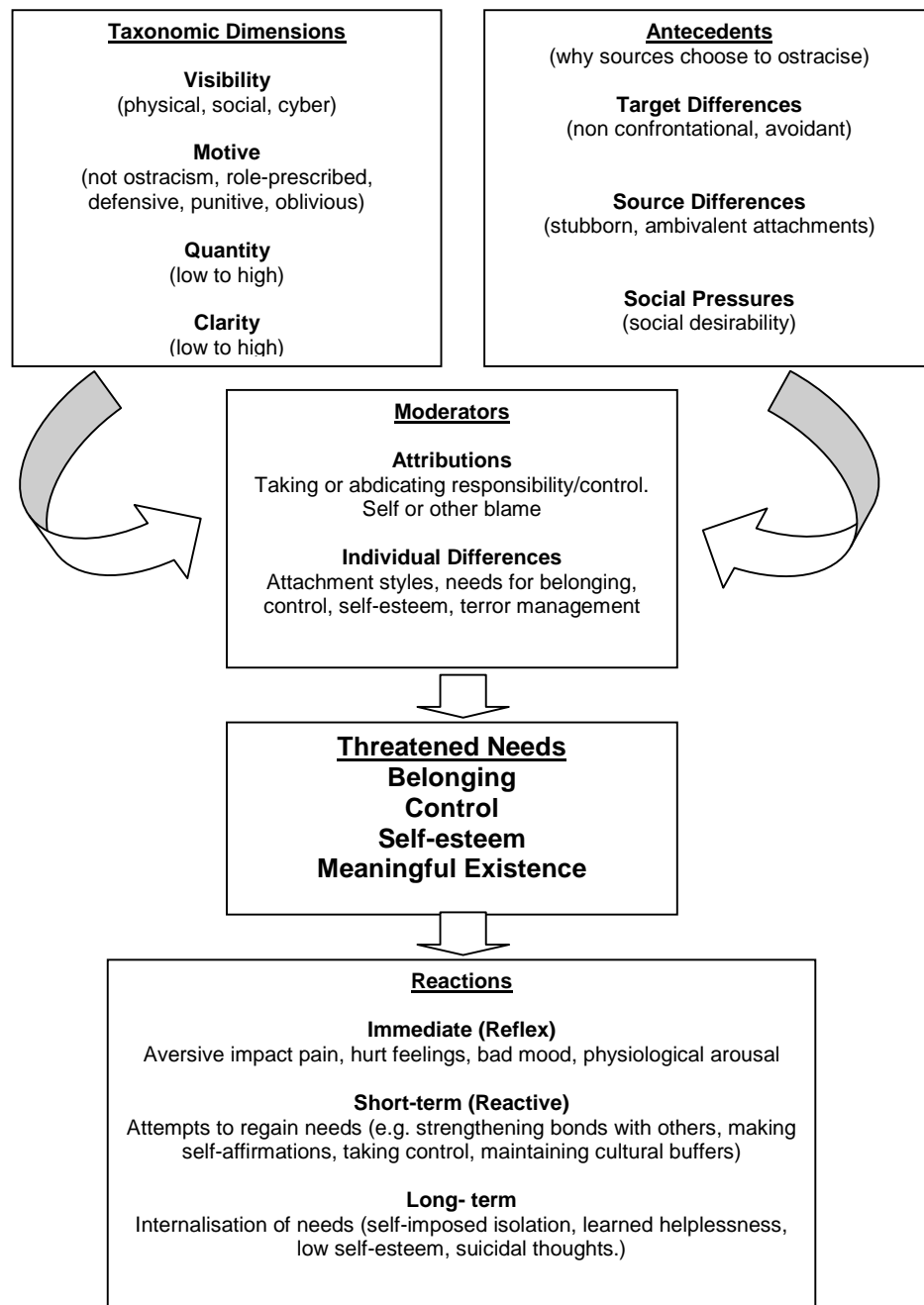


Figure 1.3: Model of Ostracism (Williams, 2001) reproduced from Zadro & Williams (2005) pg 21.

Reflex Response

Immediately after rejection is perceived an automatic reflex reaction is elicited (Williams, 2001). In a study exploring this model in action Williams, Cheung and Choi (2000) asked participants to play a simple computer game of tossing

a ball to virtual players over the internet. The virtual players were imagined to be controlled by other people elsewhere via the computer network. Overall 1,400 participants took part from 67 countries. Players were either included in the game or excluded. Those who were excluded or rejected reported a marked decrease in what they describe as primary needs or in other words social motives. The four primary needs implicated in the model comprise of belonging, self-esteem, control and meaningful existence. Belonging describes the sense of being connected with others and is thought to be instrumentally affected by rejection (Baumeister & Leary, 1995). Self-esteem, in the context of a primary need is included as a result of the 'sociometer theory'. This proposes that self-esteem acts as a gauge for inclusion and belonging, although it is also thought to be more than that in that it involves self-appraisal and an affective response (Leary, Tambor, Terdal & Downs, 1995). The next need implicated is that of control. It is thought important and healthy for an individual to have a sense of control over their social environment (Seligman, 1975). Particularly, as often following a rejection an individual has lost control over their environment. The final need is that of 'meaningful existence'. This is a construct that seeks to encapsulate the need for humans to contain the terror that they may feel when contemplating their mortality and existential insignificance (Solomon, Greenberg, & Pyszczynski, 1991). It is reported that even fleeting and unconscious exposure to cues that remind people of their mortality may cause some distress. Taken together, the primary needs provide an assessment of the subjective quality of the social experience for the participant.

Since the internet study was conducted, Cyberball has been used in the laboratory on many more occasions and has yielded effect sizes of between 1.0 and 2.0 in rejection lowering primary needs (Zadro & Williams, 2005). This reaction to rejection has been demonstrated even when individuals are told that they are only playing a computer and were randomly rejected (Zadro, Williams & Richardson, 2004). In addition, even being rejected by a despised group could still elicit a large effect, such as a liberal group believing they

were being rejected by a right wing group (Gonsalkorale & Williams, 2003). It is proposed here however that the Cyberball paradigm provides an ethical yet effective procedure for investigating reactions to rejection. As described by its creator Kipling Williams, the game provides a decontextualised social situation (Williams & Jarvis, 2006). This low level of context means that it is less aversive than performing the ball tossing game in real-life and it also enables greater control over the experimental situation.

As previously mentioned, the reaction to rejection is theoretically considered to be an evolutionary adaptation for avoiding harm due to exclusion from ones group (Panskepp, 1998). It is suggested that the social attachment system in higher animals was built upon more primitive regulation systems, such as the physical pain system. This punishes the individual who does not avoid risking social exclusion, motivating a quick response. The reflex activates the fight, flight and freeze response, showing a strong relationship between the social/physical pain system and the threat-defence systems (MacDonald & Leary, 2005). These findings suggest that exclusion taps into relatively basic systems that are oriented toward response to generalised threat, rather than social threat in particular. A fact potentially indicated by the startle probe paradigm (Vrana et al, 1988). Interestingly, the reaction to rejection has also been explored at a neurological level. fMRI images have demonstrated an increased activity in the anterior cingulate cortex and the right ventral prefrontal cortex regions following rejection using the Cyberball paradigm. These are areas that have previously been shown to be involved in the processing of emotional reactions to physical pain (Eisenberger, Lieberman & Williams, 2003). In fact, Williams (1997) had previously asserted that many people would prefer to be hit than socially rejected.

In consideration of persecutory delusions, it is possible that the autonomic arousal generated by the rejection experience is implicated in the autonomic arousal featured in the 'Threat Anticipation' model. The automatic responses may also indicate as to why the delusions are personalised, as paranoid

individuals become anxious around people as they automatically perceive rejection and search for a meaning for this. This meaning becomes a personalised content of a delusion as a connection is made between the arousal and being in the presence of others. It is speculated that this is also synonymous with the sensitisation of brain structures described in the 'social defeat' theory (Selten & Cantor-Graae, 2005). Exposure to social rejection may then add to, or lead to the generation of rejection sensitivity.

However, in a recent as yet unpublished study, Camino (2008) identified that it was possible to induce, using a computer generated environment, a similar magnitude of threat and suspicion in individuals with persecutory delusions and individuals with clinical levels of anxiety. This magnitude was significantly greater than non-clinical controls. This study may therefore have been picking up the transdiagnostic nature of rejection sensitivity. However, Zadro, Boland & Richardson (2006) using the Cyberball paradigm demonstrated that non-clinical individuals high in social anxiety experienced a similar reduction in primary needs to non-socially anxious individuals, but that it took longer for their primary needs to return to pre-task levels. The explanation provided was that these individuals responded differently to being excluded, in that they appraised the experience differently and ruminated on the change in affect. This study may also be demonstrating that individuals with anxiety have a different experience of rejection.

Reactive Response

Following the immediate response to rejection it is thought that a second stage occurs. This has been found to most likely be either a pro-social or an antisocial reaction (Williams, 2001). A pro-social response is thought to repair relationships or to increase the likelihood of being accepted by another group, such as by working harder or increasing unconscious mimicry (Williams & Sommer, 1997; Lakin & Chartrand, 2003). However, an antisocial response is believed to occur in order to increase control over the threatening situation (Twenge, Baumeister, Tice, & Stucke, 2001). This includes generalised

aggression toward groups similar to the source of rejection, thought to underpin some mass violence (Gaertner & Luzzini, 2005). This may include recent mass school shootings in the USA as suggested by Leary, Kowalski, Smith, & Phillips (2003), following an analysis of witness testimonies and news reports. This was concluded for 13 out of the 15 incidences of shooting that were considered. The activation of an antisocial response is thought to occur through a threat to one's sense of control and meaningful existence. Pro-social responses on the other hand, are thought to be the result of a threat to one's sense of belonging and self-esteem (Williams, 2001; Ayduk, Gyurak & Luerssen, 2008). In a novel study using the Cyberball paradigm where control was either restored or diminished in participants who had been rejected, diminishing significantly led to an antisocial response being generated. This was conducted using blasts of noise played to participants after participating in the game which they were either able to control or not. Participants who were rejected and did not have control were four times more likely to be aggressive than other groups. The aggression was assessed by the size of portion of a hot sauce given to a confederate to eat (Warburton, Kipling, Williams & Cairns, 2006). The authors do hasten to add that aggression is probably a context related issue and that larger portions of hot sauce do not necessarily correspond to other acts of violence. In consideration of this study, it may be possible to imagine that if individuals with psychosis may experience a loss of control and that this may impact their reactive responses to rejection. Their potential lack of control may occur due to for instance an increased risk of depression and hopelessness (White, McCleery, Gumley, Mulholland, 2007); a phenomenon that may be less acute in individuals with anxiety.

Furthermore, a recent study was conducted by Ayduk et al (2008) who sought to explore rejection in those with high levels of sensitivity to rejection and their subsequent response. They identified that rejected individuals were more likely than those not rejected to respond anti-socially but that this was mediated by their sensitivity to rejection. Individuals high in sensitivity to

rejection were more likely to respond antisocially. Such research further highlights the potential importance of investigating rejection in individuals with persecutory delusions and identifying their reactive responses. It is possible that to imagine that if individuals with persecutory delusion react with an antisocial response, this may in turn lead to further social rejection and a further sensitisation of the social pain mechanism; perpetuating any subsequent social isolation and potentially delusional beliefs.

In addition to this, Ayduk et al (2000) found that people high in rejection sensitivity were able to moderate their response to rejection if they were also high in an ability to self-regulate. Effective self-regulation involves being able to moderate ones emotional arousal in stressful situations through diverting attention away from threat stimuli, such as by self-distraction. Individuals high in rejection sensitivity and also high in self-regulation ability were less likely to respond to rejection in a negative reactive manner. Instead it is thought that they were able to delay their reaction. This delay enabled more balance appraisal of the situation, taking in to account any long term consequences of reacting. This paper also involved the replication of the same study across different ethnic and socio-economic groups yielding similar results.

However, it is also worth noting that most studies that have used the Cyberball game have recruited participants from university student populations. It is also worth noting that these students often take part in the research in order to gain credits for their courses. Therefore, these issues need to be considered when generalising the findings to non-student populations such as non-student clinical populations. This is particularly significant when considering that the socio-demographic characteristics of these groups may be very different, which may confound comparisons.

Long- term Effects

In the ostracism model of rejection, long-term effects of repeated exposure to rejection are also considered (Williams, 2001). The long term effects are

thought to involve the internalisation of rejecting experiences leading to a depletion of resources. Depletion of resources has been likened to the learned helplessness that has been identified in individuals with depression (Seligman, 1975). This is characterised by a lowered threshold for feeling rejected and hence hyper-sensitivity, but may also appear as resignation to the rejection (Williams, Forgas, von Hippel & Zadro, 2005). This hyper-sensitivity to rejection is suspected to be the same as processes involved in developing rejection sensitivity. This may also demonstrate the additive nature of the development of 'social defeat' (Selten & Cantor-Graae, 2005).

1.8 Summary

In summary, this introduction has discussed current research findings and models of persecutory delusions. These have indicated that persecutory delusions may be formed and maintained by a complex interaction between stressful events, existing levels of stress, cognitive deficits, attribution styles, safety behaviours, self beliefs and the propensity to have anomalous experiences (Freeman, 2007). However, it has been suggested here that these findings do not adequately explain the interpersonal nature of persecutory delusions. This includes why delusions are predominantly about other people causing persecution (Green et al, 2006) and that individuals with psychosis often experience an altered social perception (Rhodes & Jakes, 2004).

It has been hypothesised that these aspects of persecutory delusions may be explained through theories derived from research into social exclusion and social rejection. Theories such as the 'social defeat' theory propose that the relationship between psychosis and toxic social contexts such as poverty are based upon a unifying mechanism. This is based upon the chronic stress of facing social alienation and subordination. This identifies a social path towards severe mental illness. Of further consequence is thought to be the psychological factor of rejection sensitivity. That is sensitivity to perceiving and reacting excessively to rejection (Downey & Feldman, 1996). This has been

implicated in many psychological disorders. It is hypothesised that due to its transdiagnostic nature, rejection sensitivity when combined with social defeating contexts may be implicated in the development of psychosis. It is also hypothesised that this is particularly the case for the symptom of persecutory delusions.

Fundamental to this hypothesis is the evidence provided by research into social pain and ostracism, in particular the 'model of ostracism' (Williams, 2001). This research identifies that rejection produces an immediate automatic negative reflex response. It has also been identified that this is stronger for individuals high in rejection sensitivity. Therefore it is hypothesised that as high levels of rejection sensitivity are speculated to exist for those with persecutory delusions this might be seen in the strength of the reflex reaction elicited by rejection. A strong reaction is therefore expected and it is thought that this might underpin as to why the content of these delusions are personalised. Specifically, as negative emotional change occurs around others due to perceived rejection this is externalised to be the fault of others through the delusion. Especially when externalised personal attributions are active in those with persecutory delusions (Bentall et al, 2001).

In the ostracism model there is a second level of reaction to rejection in the form of a behavioural response. It has been demonstrated that individuals high in rejection sensitivity often respond to rejection in an antisocial manner (Ayduk et al, 2008). Therefore it is predicted that individuals with persecutory delusions may more likely be antisocial following rejection. Furthermore, an antisocial reaction is also seen when individuals feel a threat to their sense of control over their social environment. It is also thought that this is prevalent in individuals with persecutory delusions, due to the prevalence of depression and hopelessness in this group (White et al, 2007). There has also been found to be an increased risk of aggression in those with psychosis (Swanson, Swartz, van Dorn, Elbogen & Wagner et al, 2006) that may also contribute to rationale for this hypothesis.

1.9 The Present Study

Responses to rejection as proposed by the ostracism model may be explored using the mood manipulation from the Cyberball game. As already noted no research studies could be found that investigated rejection sensitivity in individuals with clinical levels of persecutory delusions or paranoia using experimental paradigms that manipulate mood. However, as alluded to in this introduction, such research may prove useful in improving the understanding the interpersonal nature of persecutory delusions.

It has also been noted that individuals with anxiety disorders may share similar experiences to those with persecutory delusions, including the generation of suspiciousness (Camino, 2008). Furthermore, as previously discussed the 'Threat Anticipation Model' places anxiety as a central component to formation and maintenance of persecutory delusions (Freemans et al 2002). Although, the experience between the paranoid and the anxious is thought to be delineated through differences in perception of anomalous experiences (Freeman et al, 2008). However, in order to investigate the experience of those with persecutory delusions effectively, it may be important to be able to compare this group with individuals who have an anxiety disorder with no delusions, as well as healthy individuals. This comparison will help to establish whether differences in rejection sensitivity in those with psychosis are different due to paranoia or to anxiety from healthy individuals.

1.91 Reflex Response and Sensitivity to Rejection

This study will aim to investigate whether individuals with a diagnosed psychotic disorder who experience persecutory delusions or paranoia have a greater reflex reaction to rejection when compared to those with an anxiety disorder and healthy controls. The psychological disorder seen in psychosis is thought to be more severe than an anxiety disorder. This conclusion is drawn from the research that has identified that anxiety is a predictive precursor of persecutory delusions and that persecutory delusions are thought to build upon anxious concerns (Freeman & Garety, 2003). Therefore higher levels of

rejection sensitivity are expected, over and above any difference between the anxious and healthy groups. Furthermore, Zadro et al (2006) did not record differences in reflex responses between socially anxious and non-socially anxious groups. This response will be measured using the Cyberball experimental paradigm as a tool for mood induction (Williams, et al, 2000). Through using this game it will be possible to compare responses across the three groups to the experience of being made to feel included and excluded from the task. Through measuring this response under experimental conditions, it will be possible to compare clinical groups with healthy controls to establish the degree to which they have rejection sensitivity.

1.9.2 Reactive Response

Following the induction of mood through the Cyberball game it is also possible to assess the reactive response. As previously mentioned it is believed that an antisocial response may be indicated by high levels of rejection sensitivity and lack of control which is thought to be the case for those with psychosis (White et al 2007; Ayduk et al, 2008). In addition to a behavioural response it is possible to ask participants to rate personality characteristics towards the game characters that may have excluded them. This will provide a second measure of reactive response. It is also expected that the attributions made about the game characters or confederates will be more negative by those with persecutory delusions. This is based upon reasoning that as the content of delusions are negative about the persecutor (Freeman, 2007). This may also indicate the types of attributions that may be made following the game.

It is thought that this study will be the first to use this experimental rejection paradigm with clinical participants, in order to explore rejection. It is therefore thought to be the first to investigate the impact of rejection on individuals with persecutory delusions.

1.9.3 Research Question

Is there a difference in the experience of being rejected between individuals with a psychotic disorder with persecutory delusions (psychotic group) compared to individuals with an anxiety disorder (anxious group) or healthy controls (healthy group)?

Experimental Hypothesis 1

There will be higher levels of rejection sensitivity for participants in the psychotic group than the anxious group and the healthy group following exclusion.

Experimental Hypothesis 2

Participants in the psychotic group will be more likely to respond with an antisocial reactive response after being excluded than participants in the anxious group or healthy group.

Experimental Hypothesis 3

Participants in the psychotic group will respond with more negative personality attributions towards the confederates than participants in the anxious groups or the healthy group following exclusion.

Chapter 2: Methodology

2.1 Design

The design used was a non-randomised experimental design with three groups and two conditions with pre-test and post-test measures and a mood manipulation. Randomisation was used between conditions. This was non-blind to the researcher but blind to participants. The conditions were either to be *included* or *excluded* in mood manipulation task. Within and between subjects comparisons were made in order to investigate differences between conditions in each group and between groups.

2.1.1 Power Calculation

A priori power calculations were calculated using G*Power software (Faul, Erdfelder, Lang & Buchner, 2007) for all hypotheses in order to establish the required sample size.

To calculate the sample size for the first hypothesis, a recent study which elicited paranoid ideation using a computerised environment was consulted. The study reported a similar effect between individuals with persecutory delusions and those with clinical anxiety but an effect of 0.8 between clinical groups and healthy participants (Camino, 2008). Assuming an effect size of 0.8 at 95% power and alpha at 0.05 for expected F-Ratio within and between statistical analyses, a total sample size of 42 participants was required to meet statistical significance.

For the reactive response hypotheses (hypothesis 2 & 3) an effect size of 0.8 at 95% power and an alpha of 0.05 were also assumed for expected F-Ratio within and between statistical groups analysis. A total sample size of 42 participants was also required. The effect size was assumed due to evidence of the increased risk of antisocial reactions of individuals with persecutory delusions, for instance see Walsh, Buchanan & Fahy (2002).

2.2 Ethics

Ethical approval for this study was received through the South East England Research Ethics Committee (See appendix 1). Research and Development approval was gained from Hertfordshire Partnerships NHS Foundation Trust and North Essex Partnership NHS. (See appendix 2).

The process of gaining ethical approval for this study involved a number of stages, due to the ethical issues inherent in the study design. In the first stage ethical approval was not given for this study and the committee asked for greater reassurance over matters such as the deception of participants and the risks to the investigator and the participants. This led to a second application being made that included important information detailing how ethical issues were to be managed. It was important to demonstrate that deception was kept to a minimum and was only used when necessary and that there was no risk of the study leading to a worsening of a participant's condition. Following this more thorough application, ethical approval was obtained. As a consequence of two applications for ethical approval a thorough peer review was conducted for the study.

2.2.1 Deception of Participants

The deception of participants was deemed to be a necessary aspect of the experimental procedure. British Psychological Society Guidelines (BPS) (British Psychological Society, 1992) for conducting research with human participants was consulted and followed.

The guidelines propose that if deception is necessary then a consultation process must be followed to determine whether it is deemed appropriate for the research participants. Consultation was conducted with academic and clinical supervisors who have extensive experience of conducting both/ either clinical work and research with the client groups to be investigated. Consultation was also sought from a Consultant Psychiatrist who works with

these client groups. Following the consultation process it was concluded that it would be possible to use deception with the participant groups.

It is also written in guidelines that intentional deception of the participants should be avoided whenever possible and participants should never be deliberately misled without extremely strong scientific or medical justification. It was concluded that the level of deception used within the methodology was required in order to ensure that a real measurable effect was generated. This is because the experiment sought to investigate the participants' experience of an automatic reaction generated through the game experience. It was believed that this reaction may not occur if participants are able to anticipate the game experience. Participants were given as much information as possible so that levels of deception were kept to a minimum, but the effect was still generated.

Furthermore, as per the University of Hertfordshire School of Psychology guidelines on deception, which also fully encompasses the BPS guidelines, an additional condition was complied with: 'Where deception or the withholding of information has been necessary, full revelation, after the completion of the investigation, should occur as a matter of course'.

The issue of informed consent was also considered as this would be compromised by the use of deception. In order to manage this, informed consent was sought for all information disclosed to the participant. Participants were also asked to provide authorised consent to be deceived about certain information and for that information to be disclosed at the end of the procedure.

2.2.2 Risk to Participants

The risk of relapse of psychotic disorder or anxiety disorder following participation in the study was considered. It was acknowledged that as the experiment involved creating mood changes in participants for those who

have been excluded from the Cyberball game, there was a risk that the participants' condition may worsen. In order to manage the risk, inclusion criteria required participants to be stable for six months or more (based upon non-hospitalisation, compliance with medication and no existence of any signs that may predict relapse). Participants were also included who were not expected to experience significant levels of distress from the tasks. This included individuals who did not have computers or the internet implicated in delusions. This also included those or who were not experiencing relationship problems with significant others, or any other significant and acute life stress, such as divorce or being made unemployed. Finally only participants who were believed to be capable of giving informed consent were approached for the study.

In addition the tasks used in the experiment were chosen because they had been demonstrated to induce mild effects in previous research and have not been known to produce distress, either immediately after the task or in the time proceeding. It was therefore anticipated that the task would not provide an increased risk of causing a relapse. The effect produced by the task was not deemed to be any more significant than would be experienced in the participant's daily life, as per British Psychological Society guidelines.

2.2.3 Issues of Confidentiality

Issues of confidentiality were managed with the following procedures. Only the researcher had access to information that identified participants and this was shredded after data collection. All data held either electronically or on paper was subsequently coded. Participants were informed that information disclosed would neither be entered into their medical notes nor lead to a change in either their medication or their usual care. With their permission, the participants' key workers were informed of their participation. The data was stored on a University of Hertfordshire computer and was password protected. All hard copies of data were locked in a filing cabinet to which only the

researcher had access. The data would be held up to a maximum of 15 years and then shredded.

2.2.4 Risk to Investigator

The risk to investigator was also considered with regards to experiencing violence by participants, particularly with participants who are currently psychotic. A literature search was conducted in order to assess the degree of this risk. The risk of experiencing violence from individuals with a psychotic disorder is known to be greater than those without psychosis, however violence is still the exception to the rule. One large study in the U.S.A of 1,400 participants concluded that symptoms of persecutory delusions did increase the risk of violence by 1.5 times. Although over 80% of participants did not commit any violence acts and only 3.6% committed a serious violent act. In all violent acts the risk of violence was largely connected with additional factors of substance abuse, homelessness and childhood conduct problems or recent arrests for violence (Swanson et al, 2006); all of which were exclusion criteria in this study. Similar findings were also identified in the Epidemiologic Catchment Area Study between 1981 and 1985 of 10,059 participants with 8% individuals with schizophrenia identified as violent compared with 2% of those without mental health problems. Comorbidity with substance abuse increased the risk from 8% to 30% (Eaton & Kessler, 1985). In conclusion, although the risk of violence appears increased with this diagnostic group, it is still exhibited by a minority. Knowledge of the risk factors informed the exclusion criteria. This included the exclusion of participants known to be misusing substances and known to have a history of violence. An inclusion criterion also chosen was to include a minimum of 6 months of stability for the clinical participants. This was thought to exclude the possibility of other risk factors being in place such as homelessness.

During recruitment procedures the investigator enquired with clinical team about potential risk issues and teams were reminded that this was an exclusion criterion. During any home visits the investigator also followed lone

worker policies in order to reduce risk; as recommended by the Research Ethics Committee.

2.3 Participant Recruitment

All groups were recruited within the same time frame and all participants and professionals gave their time free of charge to the study. Expenses were offered to all participants who took part, however no claims were made.

2.3.1 Recruitment Procedure

Clinical participants were recruited through their psychiatrists and care-coordinators in their clinical teams; based upon the selection criteria.

Approaches were made by clinical staff and the information sheets and consent forms were given to the identified patients to read (See appendix 3).

Separate information sheets and consent forms were constructed for non-clinical participants (See appendix 4). Patients were given one week to consider whether to take part and were given the opportunity to ask questions. Following the week they were contacted by the investigator and if they agreed to participate an appointment to conduct the study was made and the consent form was signed. Patient's care-coordinators were informed whether they agreed or did not agree to take part in the study.

Non-clinical participants were recruited from service staff at the University of Hertfordshire, following a direct approach by the investigator. Permission was received from the section managers before approaches were made. The departments approached included catering staff and maintenance staff.

All participants were informed that their participation was voluntary and that they could decide to remove themselves from the study at any time. They were also informed that this would not influence their clinical care or position at the university.

2.3.2 Groups Selection Criteria

An opportunity sampling method was used in order to ensure sufficient recruitment in the limited time frame. Alternative sampling methods, such as stratified sampling procedures may have improved validity but were deemed impractical due to limited time and resources. Psychotic participants were recruited from Hertfordshire Partnerships NHS Foundation Trust Early Intervention in Psychosis Service and North Essex Partnership NHS Foundation Trust Early Intervention in Psychosis Service. Psychotic participants were known to be in their first episode of psychosis and were known to be with the team for between one to three years. It is not possible however to define the time of onset for their symptoms. Anxious participants were recruited from North Essex Community Mental Health Teams. Attempts were made to match participant recruitment as closely as possible for age, gender and demographic factors.

Satisfaction of selection criteria was required for participants to be recruited into one of the three experimental groups. The 'Psychotic Group' required clinical levels of paranoia and an ICD- 10 diagnosis of a psychotic disorder (Including: schizophrenia, schizoaffective disorder or delusional disorder) (World Health Organisation, 2005). Participants were also required to have paranoid or persecutory delusions. The 'Anxious Group' were required to have clinical levels of anxiety including an ICD -10 diagnosis of an anxiety disorder (Including: generalised anxiety disorder, social anxiety disorder or panic disorder). The 'Healthy Group' required no current or previous diagnosis of a psychological disorder as per ICD-10 criteria.

2.3.3 Inclusion Criteria

The following inclusion criteria were followed for all experimental groups. They were required to be aged between 18 and 65 years, have a good grasp of the English language and have any level of intellectual functioning as long as they were able to provide consent. They could be of any gender and any sexual orientation, race or ethnicity and of any religious orientation. Participants were

required to be stable on a therapeutic dose of medication for 6 months or more (based upon non-hospitalisation, compliance with medication and no existence of any signs that may predict relapse).

2.3.4 Exclusion Criteria

The following exclusion criteria were followed for all experimental groups: evidence of current substance/ alcohol abuse or evidence of brain injury and evidence of a history of violence. Participants were also excluded if computers were implicated in their persecutory delusions or if they had concerns with using the internet or a bad experience using the internet.

2.3.5 Randomisation to Condition Procedure

The experiment conducted involved allocation to two conditions; to receive the mood induction or not (*Included vs. Excluded*). Participants in the included condition will receive more virtual throws of a ball from confederates than the excluded participants. Participants in all three groups were randomly assigned in equal numbers to either condition. Allocation to condition was made by the investigator and was therefore non-blind. However, in order to minimise allocation bias assignment was conducted at an early stage when only name and gender were known to the investigator. Care was taken to allocated similar levels of males and females to each condition in order to minimise the effects of gender.

2.4 Experimental Procedure

2.4.1 Procedure

Non-clinical participants were seen at their place of work. Clinical participants were seen at a place of their choice in order to minimise inconvenience. The majority of clinical participants were seen in their own home. One session was required with each participant to collect data. The session involved the following stages:

1. Initial Briefing

The session began with an initial briefing. Participants were reminded of the information provided on the information sheet explaining the experimental procedure and were offered another chance to withdraw. Participants were then told that they will be playing a computer game which is a virtual game of catch (Cyberball, Version 3.0, released October 4, 2004, Williams, 2004) and completing a second task. They were also told that before the game and during the session they will be completing a number of questionnaires.

2. Pre-task Questionnaires

Before the task participants were asked to complete a battery of questionnaires, including demographic information.

3. Cyberball Game Task

Participants were then shown pictures of the confederates they believe that they would be playing against (See appendix 5). They were told that these individuals are connected to the Cyberball game via the internet at the University of Hertfordshire, although in reality confederate reactions were controlled by the computer game. Participants then played the Cyberball game and following this, completed a second battery of post-task questionnaires. During the game participants were either included or excluded.

4. Antisocial Reaction Task

Participants were then asked to complete a second task which measured a reaction by participants to the confederates that they played with in the Cyberball game. Participants were told that the confederates were to be taking part in a second experiment at the university and that their help was needed to set it up. This task was to involve the confederates attempting a difficult mathematical problem whilst being exposed to distracting music. Participants were then asked

to choose the volume that this music is to be played at and hence the degree of distraction that the confederates will be exposed to.

5. Confederate Personality Questionnaires

Following this, participants completed a final questionnaire which recorded personality attributions that participants made about the imaginary confederates.

6. Positive Mood Induction

As a final task, before debriefing, individuals who were excluded were given the option of repeating the Cyberball game but this time to be included. The aim is to induce a positive mood, neutralising the previous negative mood induction.

7. Debriefing

Participants were then fully debriefed about the exercise. The debrief included informing them that the confederates were not real people and that they were created for the experiment.

2.4.2 Cyberball Game

Cyberball (Version 3.0, released October 4, 2004, see figure 2.1) is a program that allows the creation of various interactive scenarios using a simple ball-tossing game. In this game, the real participant plays ball with two other players who are thought to be real and connected through a network. These other players are in fact computerised confederates. Confederates can be programmed to include or exclude any other player at any time. The game provides an accurate simulation as the player can choose who to throw the ball to and the confederates will not always follow the same pattern, appearing natural. The game produces a rejection experience that is benign, in that it does not involve being rejected in real life through actual contact with a human beings, nor is it a significantly unpleasant event (Williams & Jarvis, 2006). This game has been used with thousands of participants across many studies and

has consistently produced effects sizes Cohen's d between 1.0 and 2.0. The Cyberball game was downloaded from the author's internet page at <http://www2.psych.purdue.edu/~kip/cyberball/> (Williams, 2004). For this study the Cyberball game was programmed to interact with the participant differently depending upon their experimental condition. Participants in the *included* condition received the ball the same amount as the two confederates. Participants in the *excluded* condition received the ball only twice in the first few seconds of the game. They then proceed to watch the ball being thrown between the confederates, anticipating that it may return to them. In both conditions that game lasts approximately 5 minutes.



Figure 2.1: Cyberball (reproduced from Williams & Jarvis, 2006, pg 176)

2.4.3 Antisocial Reaction Task

The antisocial reaction task was developed for this study. This task involved the participant being informed about a fictitious experiment that the confederates will be taking part in. The participant is asked to be part of setting the experiment up by choosing the volume of an excerpt of music. They were told that confederates will be taking part in a separate study that is investigating how people function under pressure. They are told that the

confederates will be asked to complete difficult mathematical problems and whilst they are doing this they will be exposed to distracting music. The participant was then played a 10 second clip of the music. Electronic music was chosen that had no vocals and was hectic and had a high number of beats per minute. The participant is asked to choose a level of volume from an arbitrary scale (See Appendix 6). The scale was separated into four levels, not distracting, slightly distracting, distracting and very distracting. Responses were deemed to be antisocial if distracting or very distracting were chosen. The task was designed so that an antisocial reaction was available to the participants, yet it was one that would not involve any direct physical aggression.

2.4.4 Measures

The following questionnaires were used in the study.

Demographic and Matching Questionnaires:

- **Demographic Information Assessment**

This measure was constructed for the study and sought to collect information across the following demographic categories: age, relationship status, level of education, ethnicity and occupation. Exact occupation was collected and reduced to three categories, employed, unemployed and student (See appendix 7)

- **Positive and Negative Syndrome Scale (PANSS)** (Kay, Fiszbein & Opler, 1987). The Positive and Negative Syndrome Scale is a clinical rating tool assessed using a structured interview schedule of individual psychotic symptoms. It is a widely used screening tool for assessing for symptoms of psychosis. For this study an abbreviated scale was used that comprised of six items (delusions, unusual thought content, suspiciousness/persecution, passive/apathetic social withdrawal, active social avoidance and poor impulse control. This was designed for use

in this study and has therefore not been validated. The total abbreviated score was computed for participants as a measure of psychotic symptoms which had a range of between 1 and 42 and was used as a screening tool. (See appendix 8)

- **Wechsler Test of Adult Reading (WTAR)** (Wechsler, 2001)
This provides an estimate of intellectual functioning and is comprised of 50 words that have atypical grapheme to phoneme translations. It is typically used clinically to assess for pre-morbid intellectual levels based upon the stability of reading recognition despite any presence of cognitive decline. This measure is normed to UK population and demonstrates good reliability and construct validity (See appendix 9).
- **Beck Depression Inventory II (BDI- II)** (Beck, Steer, Brown, 1996)
This is a 21-item self-report instrument intended to assess the existence and severity of symptoms of depression as listed in the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders Fourth Edition (American Psychiatric Association, 1994). It assesses symptoms for the last 2 weeks. Score ranges indicating the severity of depression have been developed for clinical use: minimal depression 0-13, mild depression 14-19, moderate depression 20-28 and severe depression 29-63. It has good internal consistency (Cronbach's alpha 0.93). It also has good test-retest reliability and construct and content validity (See appendix 10).
- **Beck Anxiety Inventory (BAI)** (Beck, Epstein, Brown & Steer, 1988)
The BAI is used to identify anxiety and somatic symptoms, giving an overall severity scale. It is a 21-item self-report instrument measuring symptoms of anxiety during the last 7 days. Score ranges indicating the severity of depression have been developed for clinical use: minimal anxiety 0-14, mild anxiety 8-15, moderate anxiety 16-25 and severe anxiety 26-63. It has high internal consistency (Cronbach's alpha 0.92)

and above average test-retest reliability over the course of one week (Beck et al, 1988). In addition, it has adequate concurrent, convergent, and discriminate validity. (Fydrich, Dowdall, & Chambless, 1992) (See appendix 11).

- **Worry About Others (WAO) (Paranoia Scale)** (Fenigstein & Vanable, 1992). This is a measure of paranoia designed initially to assess paranoid thought in college students. The Paranoia Scale's items are based upon measures of paranoia that have been utilised in clinical research by the creators of the Minnesota Multiphasic Personality Inventory (MMPI) (. It has good internal consistency (Cronbach's alpha 0.83). Construct validity is assumed by the authors to be high due to the source the scale was derived from. Validity of the scale has also been established for use with clinical subjects (Smari, Stefansson, Thorgilsson, 1994). In the study this was renamed as the 'worry about others' questionnaire. During data analysis twenty points were subtracted from all total scores so that the scale began at zero. (See appendix 12)
- **Rosenberg Self- Esteem Scale (Rosenberg SE)** (Rosenberg, 1965) This is a measure of global self-esteem as a uni-dimensional construct. It is a widely used scale thought to have high levels of reliability and validity (Gray-Little, Williams & Hancock, 1997; Robins, Hendon & Trzesniewski, 2001) (See appendix 13).
- **Need to Belong (nBelong)** (Leary, Kelly, Cottrell, & Schreindorfer, 2007). This is a 10 item measure that assesses individual differences in their need to belong. The need to belong is defined as the degree that individuals desire and worry about social acceptance, irrespective of their current status. Higher scores represented higher levels of needing to belong. During data analysis ten points were subtracted from all total scores so that the scale began at zero (See appendix 14).

Experimental Task Questionnaires:

- **Primary Needs Questionnaire (PNQ)** (Williams et al, 2005).
This measure consists of four sub-scales each with three items. All items are rated on the same five point likert scale. Scales are: Belonging, Self- esteem, Control and Meaningful Existence. This measure assesses the experience of a social interaction. These items have been used in previous studies demonstrating good internal validity (Cronbach's alpha 0.91), including Eisenberger et al. (2003), Williams et al. (2000), and Zadro et al. (2006). Two versions of this measure were used. The first to be completed before the Cyberball game (PrePNQ) and the second to be used after the task (PostPNQ). The PostPNQ measure also included a manipulation check. Two checks were used to ascertain whether the manipulation worked. The first was a statement rated on a five point likert scale from 1= not at all to 5= very much. This participant rates how much they felt ignored and excluded. Participants also rated how much they believed they received the ball as a percentage equal to or below 33% in comparison to the confederates. (Zadro et al, 2006) (See appendix 15).
- **Volume Scale**
In order to assess for antisocial reaction an arbitrary volume scale was designed. This comprised of a scale ranging from 0 to 100. Above the scale were four evenly spaced categories, indicating level of distraction from not distracting to very distracting (See appendix 6).
- **Personality Attribution Questionnaire (PAQ)**
Participants complete five semantic differential scales, each using a 5-point scale to describe each character. This was based upon a scale developed to assess explicit attitudes towards characters in a study comparing explicit and implicit attitudes. It included: good/bad, pleasant/mean, caring/ uncaring and kind/cruel (Rydell & McConnell,

2006). Additional scales of harmful/ unhelpful, trustworthy/ untrustworthy, friendly /unfriendly, fearful/ unfearful and dangerous/ undangerous were included. The additional scales were added in order to capture threat related attributions (See appendix 16).

2.5 Analysis of Data

2.5.1 Calculation of the Main Dependent Variable

The main dependent variable measured in this study was change in primary needs (i.e. Pre-PNQ – Post-PNQ). The product of this calculation was termed Primary Needs Questionnaire Difference (PNQ-D). This score represented a measure of rejection sensitivity. The lower scores corresponded to a higher level of rejection sensitivity. It is necessary to add that in using PNQ-D this may hide the amount of variance obtained in the pre-PNQ and post-PNQ measures. However, this method was thought to provide a robust measure of rejection sensitivity.

2.5.2 Creation of the Antisocial Reactive Response Variable

The antisocial reactive response variable was created by collapsing the first two categories (not distracting/slightly distracting) and the last two categories (distracting/ very distracting) on the volume scale to make two categories. These categories were labelled as neutral and antisocial responses respectively.

2.5.3 Statistical Software

Data was analysed using SPSS v16. A factorial ANOVA was used to analyse variation of the main dependent variables between group and condition factors. Chi-squared analysis was used to explore reactive responses and a factorial ANOVA was used to explore personality attributions made for confederates.

2.6 Participant Information

Data was collected from twenty two participants diagnosed with a psychotic disorder with delusions of persecution or paranoid ideation that comprised the psychotic group. This comprised of ten individuals diagnosed with Paranoid Schizophrenia (ICD- 10, F20), ten diagnosed with Brief Psychotic Disorder (ICD-10, F23) and two were diagnosed with Delusional Disorder (ICD- 10, F22). Data was also collected from eighteen participants diagnosed with an anxiety disorder that comprised the anxious group. This comprised of eight individuals diagnosed with Generalised Anxiety Disorder (ICD-10, F41.1), seven diagnosed with Social Phobia (ICD-10, F40.1), two diagnosed with Obsessive Compulsive Disorder (ICD-10, F42) and one diagnosed with Agoraphobia (ICD-10, F40). Finally data was collected from nineteen participants with no diagnosed mental health problem that comprised the healthy group.

2.6.1 Abbreviated Positive and Negative Syndrome Scale (PANSS)

Abbreviated PANSS scores were collected for all participants through the structured interview in order to screen for relevant symptoms of psychosis (Table 2.1).

Group	N	Mean	S.D	Skewness
Psychotic	22	24.00	4.49	-0.34
Anxious	18	8.33	1.57	-0.14
Healthy	19	7.37	1.26	0.52

Table 2.1: Abbreviated PANNS scores

A 3X1 factorial ANOVA was used to compare levels of symptoms of psychosis by abbreviated PANSS scores for psychotic, anxious and healthy groups. The three groups differed significantly in abbreviated PANNS scores ($F(2, 56) = 204.58, p < 0.05$). Fisher's protected t-tests showed that the psychotic group was significantly higher than the anxious group ($t(38) = 14.08, p < 0.05$) and the healthy group ($t(39) = 15.59, p < 0.05$) on the abbreviated PANNS. The

anxious group scored significantly higher than the healthy group ($t(35) = 2.07$, $p < 0.05$) on the abbreviated PANSS. These results demonstrated that the psychotic group had significantly higher levels of symptoms of psychosis compared to the non-psychotic groups confirming accurate group allocation.

2.6.2 Demographic Data

The demographic data collected for all participants was collated (table 2.2 & 2.3). Statistical analysis was conducted in order to investigate differences between psychotic, anxious and healthy groups.

		Psychotic	Anxious	Healthy
Gender	Male	19	12	10
	Female	3	6	9
Ethnicity	White	20	16	14
	Non-White	2	2	5
Relationship Status	Yes	2	7	14
	No	20	11	5
Educational Attainment	GCSE	15	13	12
	A-Level	5	3	5
	Higher-Ed	2	2	2
Occupational Status	Employed	2	5	16
	Unemployed	17	10	2
	Student	3	3	1

Table 2.2: Table of demographic data

	Group	N	Mean	S.D.	Skewness
Age	Psychosis	22	25.64	6.12	1.82
	Anxious	18	32.00	8.72	0.23
	Healthy	19	40.21	13.99	-0.20

Table 2.3: Table of age data

Groups did not differ across gender ($p > 0.05$ Fisher's Exact test), ethnicity ($p > 0.05$ Fisher's Exact Test) or educational attainment ($p > 0.05$ Fisher's Exact Test). The healthy group was a significantly more likely to be in a relationship ($X^2(2) = 17.88, p < 0.05$) and employed ($X^2(4) = 26.16, p < 0.05$).

A 3X1 factorial ANOVA was then used to compare age for psychotic, anxious and healthy groups. The three groups differed significantly in age ($F(2, 56) = 10.83, p < 0.05$). Fisher's protected t-tests showed that both the healthy group ($t(39) = 4.21, p > 0.05$) and the anxious group ($t(38) = 2.61, p = 0.05$) were significantly higher than the psychotic group in age. The anxious group ($t(35) = 2.15, p > 0.05$) was not significantly higher than the healthy group in age. A correlation was then conducted to identify whether age was confounding for the dependent variable PNQ-D. There was not a significant correlation between age and PNQ-D ($r(56) = -0.11, p > 0.05$). This indicated that age was not a confounding variable.

2.6.3 Summary of Participant Information

In summary the psychotic group consisted of twenty two participants, the anxious group consisted of eighteen participants and the healthy group consisted of nineteen participants. All clinical participants met relevant ICD-10 criteria. An abbreviated PANSS as a measure of relevant symptoms of psychosis was conducted indicating significantly higher levels of symptoms in the psychotic group than the anxious and healthy group.

Demographic information collected from participants was analysed. There were no significant associations between gender, ethnicity and education with group membership. This indicated that the groups were well matched on these variables. However, significant associations were found for relationship status and occupational status, indicating that the groups were not matched on these variables.

Further analysis of relationships status and occupational status was not conducted despite differences occurring between the groups. This analysis was not pursued as the scope of the study was to focus upon the immediate reaction to the social situation and how this varies with regards to levels of paranoia. However, the differences between the groups in relationship status and occupational status may indicate an area for further investigation. To do this a more detailed measure of relationship status and occupational status would be required. The current study assessed only on whether the participant was in a relationship or in employment rather than on types of relationship or types of employment.

Overall matching was deemed to be thought sufficient for statistical analysis of dependent and other variables to be performed.

Chapter 3: Results

3.1 Overview

The following chapter will provide details of the statistical analysis conducted in order to confirm or disconfirm the three experimental hypotheses. It will begin with a statistical analysis of the manipulation check data, examining the strength of the mood manipulation induced by the Cyberball game. It will then provide a statistical analysis of data pertaining to the first experimental hypothesis involving a comparison of the main dependent variable PNQ-D as a measure of rejection sensitivity between the experimental groups. This will include an analysis of potential confounding psychological variables. The section will then provide details of the statistical analysis of data pertaining to the second and third experimental hypotheses concerning the reactive response and confederate personality attributions.

3.2 Mood Manipulation Check

The internal validity of the mood manipulation was evaluated by analysing data obtained from the manipulation checks.

3.2.1 Manipulation Check Rating (MCR)

The MCR was a subjective rating made by the participants as to how much they believed they were excluded after completing the Cyberball game. This was rated from 1-5 on a Likert scale with the higher the rating indicating the greater the degree of perceived exclusion. A comparison of ratings made by excluded participants to ratings made by included participants indicated whether the mood manipulation was perceived to have occurred (Table 3.1). Analysis was carried out to determine whether skewed values were statistically significant. Although the *excluded* condition rating was negatively skewed it was not significant ($z = -2.15, p > 0.01$). As expected the *included* condition rating was not significantly skewed ($z = 1.44, p > 0.01$). A boxplot was used to examine for extreme scores. None were found (Figure 3.1). These results indicate that it was appropriate for parametric analysis to be used.

	Condition	N	Mean	S.D.	Skewness	Statistic
Manipulation Check Rating	Included	30	1.90	1.03	0.62	p < 0.05
	Excluded	29	3.90	1.26	-0.93	

Table 3.1: MCR ratings by experimental condition

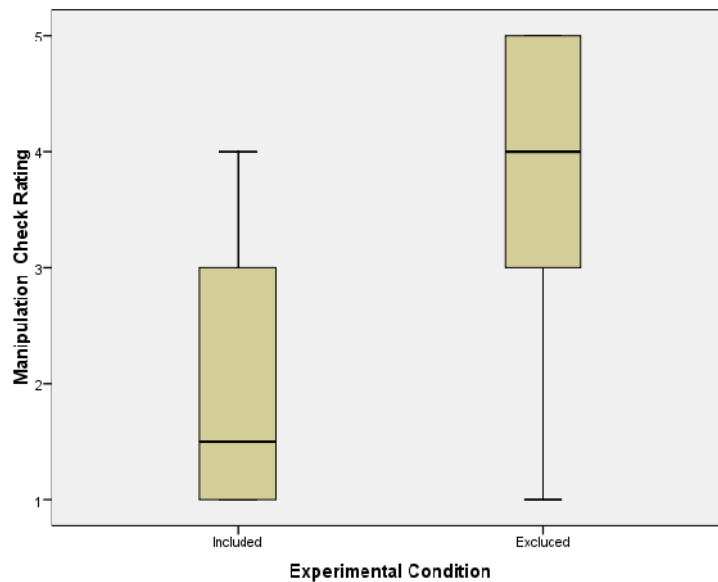


Figure 3.1: Box-plot of MCR by experimental condition

An independent t-test was conducted to compare MCR ratings of included and excluded participants. Excluded participants reported significantly higher ratings of exclusion ($t(57) = -6.67, p < 0.05$). This demonstrated a very large effect size (Cohen's $d = 1.74$) suggesting that the manipulation was highly effective.

3.2.2 Manipulation Check Percentage (MCP)

The MCP was a further subjective rating made by the participants as to how much they believed they were excluded after completing the Cyberball game. The participants were asked to guess how much they received the ball as a percentage of passes (Table 3.2). If they believe they received the ball as much as the two confederates this would be 33%. If they received the ball less than they would guess a percentage of between 0-32%; the lower their rating the greater degree of perceived exclusion. Calculations were carried out to ascertain whether these variables were significantly skewed. The *excluded* condition rating was not significantly positively skewed ($z= 2.34, p>0.01$), however, the *included* condition rating was significantly positively skewed ($z= 2.8, p< 0.01$). An examination of a boxplot (Figure 3.2) indicated that this significantly skewed distribution for the *included* condition rating could be explained by outliers (outlier score= 72 > 3 S.D. from the mean). Although the *excluded* condition rating showed two extreme scores on the boxplot, calculations showed that these were not outliers. The outlier on the *included* condition rating was Winsorized by replacing the outlying score with the value of the next score plus one unit of measurement. Therefore the value of 72 became 51. This was balanced by doing the same from the other end of the distribution even though there were no outliers at this end of the distribution. Skew values were then recalculated and were found to be non-significantly skewed ($z= 0.92, p> 0.01$). The Winsorization process for obtaining an adjusted mean in order to remove outliers was chosen as it would not result in a reduction in sample size.

In an observation of the means for the two conditions (Table 3.2) it appears that participants in the included condition were on average relatively accurate in perceiving their level of inclusion. However, the participants in the excluded condition appeared to over estimate their level of inclusion. The actual percentage of throws received was 6.6% with a total number of 30 throws occurring. This suggests that the level of exclusion was greater than perceived by many of the participants in this condition.

	Condition	N	Mean	S.D.	Skewness	Statistic
Manipulation Check Percentage	Included	29	33.07	12.23	1.22	p < 0.05
	Excluded	29	9.07	7.47	1.02	

Table 3.2: MCP rating by experimental condition (Winsorized mean for Included condition)

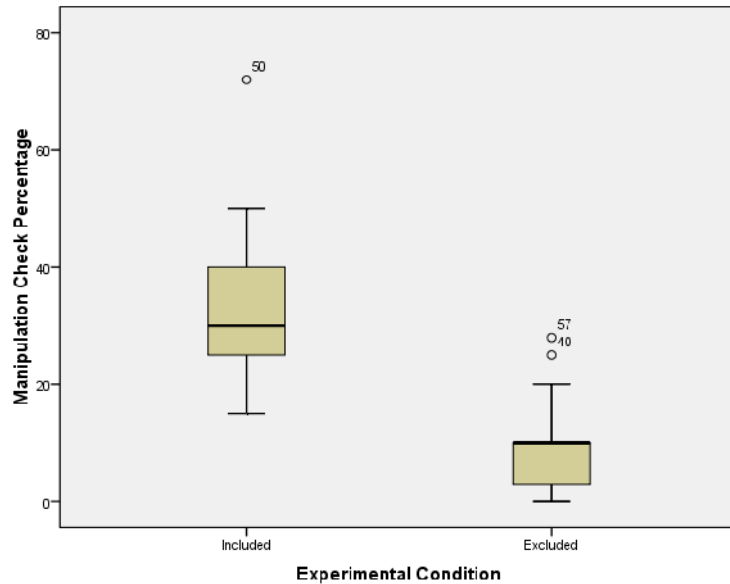


Figure 3.2: Box-plot MCP by experimental condition

An independent t-test was conducted to compare MCP ratings of included and excluded participants. Excluded participants reported a significantly lower frequency of ball passes than included participants ($t(56) = 9.78$, $p < 0.05$). This demonstrated a very large effect size (Cohen's $d = 2.57$) suggesting again that the manipulation was highly effective as indicated by this measure

3.3 –Experimental Hypothesis 1

3.3.1 Experimental Hypothesis 1- Reflex Response

Following the confirmation that the mood manipulation occurred successfully a statistical analysis was conducted on the main dependent variable of PNQ-D as a measure of rejection sensitivity. This analysis was conducted in order to confirm or disconfirm the experimental hypothesis that:

‘There will be higher levels of rejection sensitivity for participants in the psychotic group than the anxious group and the healthy group following exclusion.’

Descriptive statistics were calculated for PNQ-D between the experimental groups and experimental condition (table 3.3). Due to experimental groups being separated by condition relatively small sample sizes were achieved. Distribution appeared to be normal and this was confirmed by z scores which were all non-significant (psychosis group, included $z = 0.46$, $p > 0.01$; psychosis group, excluded $z = 1.07$, $p > 0.01$); anxious group, included $z = 1.83$, $p > 0.05$; anxious group, excluded $z = 0.36$, $p > 0.01$; healthy group, included $z = 0.89$, $p > 0.01$; healthy group, excluded $z = 0.71$, $p > 0.01$). A boxplot (figure 3.3) indicated that there were no outliers. It was concluded that as assumptions of normality were met, parametric analysis could be used.

Group	Condition	N	Mean	S.D.	Skewness
Psychosis	Included	11	-3.36	10.12	-0.30
	Excluded	11	-11.09	13.63	-0.71
Anxious	Included	9	4.44	8.97	1.31
	Excluded	9	-11.22	13.96	-0.26
Healthy	Included	10	-1.30	4.45	0.69
	Excluded	8	-19.25	8.17	-0.54

Table 3.3: PNQ- D scores by group and condition

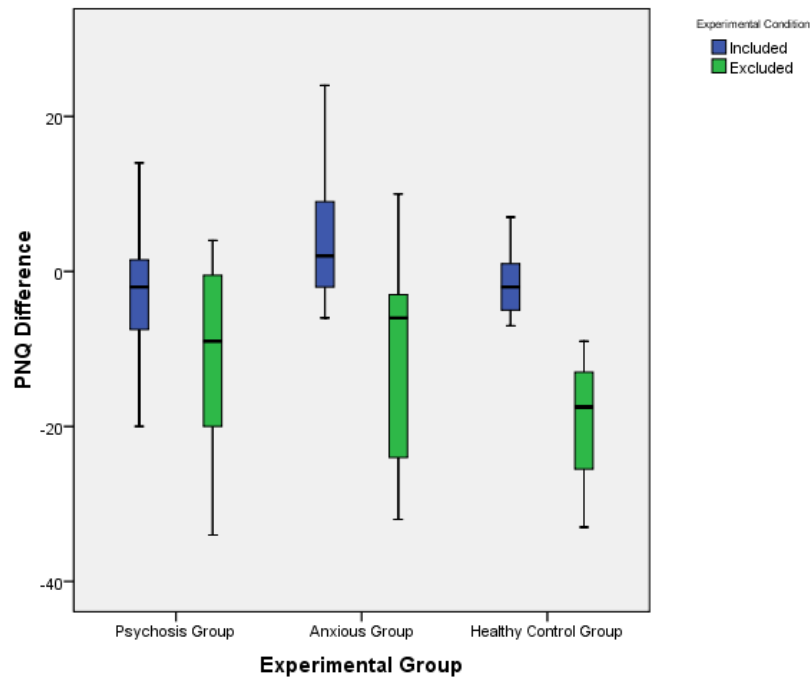


Figure 3.3: Box-plot of PNQ-D by experimental group and experimental condition

A 3X2 factorial ANOVA was used to compare levels of PNQ-D among psychotic, anxious and healthy groups and *included* and *excluded* conditions. There was a main effect of condition, indicating that levels of PNQ-D were significantly lower among participants in the *excluded* than *included* condition ($F(1, 52) = 24.65, p < 0.05, \text{partial } \eta^2 = 0.36$). A very large effect size for condition was achieved with 36% of variance explained (Cohen's $D = 1.22$), confirming high internal validity. There was no moderating effect of group, indicating that levels of PNQ-D did not differ significantly between the psychotic, anxious or healthy groups ($F(2, 52) = 1.93, p > 0.05, \text{partial } \eta^2 = 0.07$). To detect this small effect size (7%) with a significance of $p < 0.01$ may require a much larger sample size or the controlling of any confounding variable effects. The interaction between condition and group was not significant, indicating that levels of PNQ-D did not differ significantly among included and excluded participants in the psychotic, anxious and healthy groups ($F(2, 52) = 1.33, p > 0.05, \text{partial } \eta^2 = 0.05$). The effect size for interaction was negligible. A Levene's test of homogeneity indicated that

variance was homogenous ($F(5, 52) = 2.33, p > 0.05$). Although at $p = 0.06$, the variance was close to not meeting assumptions of homogeneity. However, due to the strength of effect for condition it is possible to conclude that the ANOVA was robust.

Although significant effects were not found, an observation of the results indicates that the direction of the effect was opposite to that predicted by the hypothesis. A lower level of PNQ-D was observed in the excluded participants than in the healthy group compared those in the psychotic and anxious groups (figure 3.3). There was also a larger difference between included and excluded participants in the healthy group with the range of the excluded scores not overlapping the range of the included scores on the bloxplot. This indicated that the healthy group appeared to have higher levels of rejection sensitivity. However, this observation may be an artefact of the design or due to error.

Null Finding

Change in 'primary needs' was induced with a large effect size indicating high internal validity. The results indicate a null finding for the experimental hypothesis (1). The psychotic group was not significantly higher in sensitivity to rejection than the psychotic, the anxious and the healthy group after being excluded.

3.3.2 Analysis of Individual Primary Need Differences

The Primary needs subscales of belonging, self-esteem, meaningful existence and control were then analysed to investigate the data further. Differences indicating sensitivity amongst these measures was calculated in the same manner as PNQ-D by subtracting pre-scores from post-scores. From conducting an analysis of skewness it was possible to assume that all subscales met required assumptions of normality.

For belonging differences there was a large statistically significant effect of condition ($F(1,53) = 22.48, p < 0.05, \text{partial } \eta^2 = 0.30$), no statistically significant effect of group ($F(2, 53) = 1.14, p > 0.05$) and no statistically significant effect of interaction between group and condition ($F(2, 52) = 1.15, p > 0.05$). For self-esteem difference, there was a statistically significant effect for condition ($F(1,52) = 112.7, p < 0.05, \text{partial } \eta^2 = 0.16$), no statistically significant effect for group ($F(2, 52) = 1.72, p > 0.05$) and no statistically significant effect for the interaction ($F(2, 52) = 0.82, p > 0.05$). For meaningful existence difference there was also a statistically significant effect of condition ($F(1,52) = 157.83, p < 0.05, \text{partial } \eta^2 = 0.14$), no statistically significant effect of group ($F(2, 52) = 0.88, p > 0.05$) and no statistically significant effect of interaction ($F(2, 52) = 1.86, p > 0.05$). Finally, for control difference there was again a statistically significant effect of condition ($F(1,52) = 53.99, p < 0.05, \text{partial } \eta^2 = 0.10$), no statistically significant effect of group ($F(2, 52) = 0.62, p > 0.05$) and no statistically significant effect of interaction ($F(2, 52) = 0.45, p > 0.05$). From these results it was concluded that the overall effect of lower scores of PNQ-D for the excluded compared to the included participants was due to a lowering of all of the 'primary needs'.

3.3.3 Psychological Measures as Confounding Variables

The measures of psychological factors were also examined (table 3.4). Psychological variables relating to emotional states were examined to investigate difference between groups. From an analysis of skewness, it was concluded that the data met assumptions of normality, therefore parametric statistical analysis was used. Differences in measures for anxiety, depression, self-esteem and paranoia by group were assessed. This was considered in terms of expected differences between the groups, establishing correctness of group membership. The difference between groups for predicted intelligence and 'need to belong' was also analysed in order to assess the degree of matching of these variables.

Psychological measures were also correlated with the main dependant variable PNQ-D to assess whether they are confounding variables for rejection sensitivity.

Measure	Descriptive	Psychotic (N= 22)	Anxious (N= 18)	Healthy (N= 19)
Predicted Int.	Mean	102.41	106.67	105.05
	S.D.	14.92	12.15	4.47
	Skewness	-0.29	-0.09	1.05
Anxiety	Mean	23.41	25.28	10.00
	S.D.	13.85	10.36	5.88
	Skewness	0.50	0.73	-0.12
Depression	Mean	23.41	14.72	10.37
	S.D.	12.57	10.47	8.14
	Skewness	0.19	-0.04	1.28
Self-Esteem	Mean	13.05	14.39	19.53
	S.D.	4.26	6.19	3.73
	Skewness	-0.48	0.75	-0.08
Belonging	Mean	23.45	22.11	23.05
	S.D.	5.90	8.03	5.15
	Skewness	0.88	0.33	0.44
Paranoia	Mean	35.68	16.61	17.26
	S.D.	17.16	11.49	11.62
	Skewness	0.08	0.50	0.44

Table 3.4: Table of psychological measures

Predicted Intelligence

A 3X1 factorial ANOVA was used to compare predicted intelligence for psychotic, anxious and healthy groups. The three groups did not differ statistically significantly in predicted intelligence ($F(2, 56) = 0.69, p > 0.05$). A correlation was then conducted to identify whether predicted intelligence was confounding for the dependent variable PNQ-D. There was not a statistical significant correlation between predicted intelligence and PNQ-D ($r(56) = 0.20, p > 0.05$). This indicated that predicted intelligence was not a confounding variable for rejection sensitivity.

Levels of Anxiety

A 3X1 factorial ANOVA was used to compare levels of anxiety measured by BAI scores for psychotic, the anxious and the healthy groups. The three groups differed statistically significantly in BAI scores ($F(2, 56) = 11.46, p < 0.05$). Fisher's protected t-tests showed that both the psychotic group ($t(39) = 4.13, p < 0.05$) and the anxious group ($t(35) = 5.48, p < 0.05$) scored significantly higher than the healthy group on the BAI. The anxious group did not score statistically significantly higher than the psychotic group ($t(38) = 0.49, p > 0.05$) on the BAI. The significant difference between clinical groups and the healthy group was expected and confirmed participant group allocation as per the cognitive model of persecutory delusion (Freeman, 2007). Mean scores for the clinical groups were in the moderate anxiety range and the mean score for the healthy group was in the mild range (see methodology, section 2.4.4).

A correlation was then conducted to identify whether levels of anxiety was confounding for the dependent variable PNQ-D. There was not a statistically significant correlation between BAI and PNQ-D ($r(56) = -0.10, p > 0.05$). This indicated that anxiety was not a confounding variable for rejection sensitivity.

Levels of Depression

A 3X1 factorial ANOVA was used to compare levels of depression measured by BDI-II scores for psychotic, anxious and healthy groups. The three groups differed significantly in BDI-II scores ($F(2, 56) = 8.00, p < 0.05$). Fisher's protected t-tests showed that the psychotic group ($t(39) = 3.99, p < 0.05$) scored significantly higher than the healthy group on the BDI-II. The anxious group ($t(35) = 1.41, p > 0.05$) did not score significantly higher than the healthy group. The psychotic group did not score significantly higher than the anxious group ($t(38) = 2.39, p > 0.05$) on the BDI-II. Statistically significantly higher levels of depression in the psychotic group than the healthy group met expectations for group allocation. The non-significant difference in levels of depression between the anxious group and the healthy group was contrary to

expectations (Harvey et al, 2006). The mean score for the psychotic group was in the moderate depression range, the mean score for the anxious group was in the mild range and the mean score for the healthy group was in the minimal range (see methodology, section 2.4.4).

A correlation was then conducted to identify whether levels of depression was confounding for the dependent variable PNQ-D. There was not a statistically significant correlation between BDI-II and PNQ-D ($r(56) = 0.01, p > 0.05$). This indicated that depression was not a confounding variable for rejection sensitivity.

Levels of Self-esteem

A 3X1 factorial ANOVA was used to compare levels of self-esteem measured by Rosenberg SE scores for the psychotic, the anxious and the healthy group. The three groups differed significantly on Rosenberg SE scores ($F(2, 56) = 10.11, p < 0.05$). Fisher's protected t-tests showed that the healthy group was statistically significantly higher than both the psychotic ($t(39) = 5.12, p < 0.05$) and the anxious group ($t(35) = 3.04, p < 0.05$) on the Rosenberg SE. The anxious group did not score significantly higher than the psychotic group ($t(38) = 0.78, p > 0.05$) on the Rosenberg SE. These results met expectation for the group with higher levels of self-esteem expected for healthy participants than those with a clinical diagnosis (Vracotas, Schmitz, Joobar & Malla, 2007).

A correlation was conducted to identify whether levels of self-esteem was confounding for the dependent variable PNQ-D. There was not a significant correlation between Rosenberg SE and PNQ-D ($r(56) = -0.18, p > 0.05$). This indicated that self-esteem was not a confounding variable for rejection sensitivity.

Levels of 'Need to Belong'

A 3X1 factorial ANOVA was used to compare 'need to belong' measured by the nBelong scores for the psychotic, the anxious and the healthy group. The

three groups did not differ significantly in nBelong scores ($F(2, 56) = 0.22, p > 0.05$). A correlation was then conducted to identify whether levels of 'need to belong' were confounding for the dependent variable PNQ-D. There was not a statistically significant correlation between nBelong and PNQ-D ($r(56) = -0.12, p > 0.05$). This indicated that 'need to belong' was not a confounding variable for rejection sensitivity.

Levels of Paranoia

A 3X1 factorial ANOVA was used to compare levels of paranoia measured by the WAO scores for the psychotic, the anxious and the healthy group. The three groups differed statistically significantly on WAO scores as a measure of paranoia ($F(2, 56) = 12.50, p < 0.05$). Fisher's protected t-tests showed that the psychotic group was significantly higher than the anxiety group ($t(38) = 4.19, p < 0.05$) and the healthy group ($t(39) = 4.07, p < 0.05$) on the WAO. The healthy group was not significantly higher than the anxious group ($t(35) = 0.17, p > 0.05$) on the WAO. This meets the expectation that participants in the psychotic group would have higher levels of paranoia than those in the anxious and the healthy group, confirming accurate group allocation.

A correlation was then conducted to identify whether levels of paranoia were confounding for the dependent variable PNQ-D. There was not a statistically significant correlation between WAO and PNQ-D ($r(56) = -0.07, p > 0.05$). This indicated that levels of paranoia were not a confounding variable for rejection sensitivity. This result corroborates the null finding identified in the factorial analysis of PNQ-D between groups.

3.3.4 Summary of Reflex Response Results

In summary a factorial ANOVA was conducted and a significant difference was found in rejection sensitivity between the *included* and *excluded* conditions. However, no significant difference was found in rejection sensitivity between the psychotic, anxious and healthy groups indicating a null finding for the experimental hypothesis (1). No interaction effects were noted. Although

not significant, the direction of the effect for the excluded participants in the healthy group was opposite to that predicted by the hypothesis. The healthy group demonstrated higher levels of rejection sensitivity than the clinical groups. Factorial ANOVAs were also used to analyse subscales of PNQ-D. Significant differences were found between conditions for self-esteem difference, meaningful existence difference, control difference and belonging difference. No significant differences were found for subscales between groups.

Psychological variables also were statistically analysed for difference between groups and for whether they were confounding for rejection sensitivity. Predicted intelligence was matched between the groups as was the 'need to belong'. Expected differences between the groups were found for measures of emotional factors. No psychological variables were found to be confounding for rejection sensitivity. Therefore it was concluded that the previous factorial analysis of the dependant variable was valid.

3.4 Experimental Hypotheses 2 and 3

Following analysis of the reflex response the results of the reactive responses were statistically analysed in order to confirm or disconfirm the second and third experimental hypothesis.

3.4.1 Reactive Response- Antisocial Reaction

The antisocial reaction was statistically analysed for differences between groups and conditions in order to either confirm or disconfirm the second experimental hypothesis (2):

'Psychotic participants will be more likely to respond with an antisocial reactive response to being socially rejected than anxious or healthy participants.'

Data from the anxious group and the healthy group were collapsed together in order to increase the power of the analysis and meet statistical assumption of

minimum cell frequencies. This still maintained congruence with the hypothesis to be tested. This created the non-psychotic group. As a check the likelihood of providing an antisocial response was compared between the anxious and healthy group which was not statistically significant ($p > 0.05$ Fisher's Exact Test). A crosstabulation table of reactive response by experimental group by experimental condition was then constructed (see table 3.5).

Reactive Response		Antisocial	Neutral
Included	Psychotic	5 45.5%	6 54.5%
	Non-Psychotic	3 15.8%	16 84.2%
Excluded	Psychotic	5 45.5%	6 54.5%
	Non-Psychotic	9 52.9%	8 47.1%

Table 3.5: Frequency Table for Condition*Group* Reactive Response

Hierarchical loglinear analysis with backward elimination was conducted on the three categorical variables (table 3.6). This is an extension of the Chi Square for when there are more than two categorical variables (Field, 2005).

	K	df	Likelihood Ratio		Pearson		Number of Iterations
			Chi-Square	Sig.	Chi-Square	Sig.	
K-way and Higher Order Effects	1	7	13.530	.060	15.379	.031	0
	2	4	6.636	.156	6.200	.185	2
	3	1	2.408	.121	2.408	.121	3
K-way Effects	1	3	6.895	.075	9.179	.027	0
	2	3	4.228	.238	3.792	.285	0
	3	1	2.408	.121	2.408	.121	0

Table 3.6: Loglinear analysis Group*Condition*Reactive Response

In this analysis a saturated model of the data was constructed. A test of the effects on the model of removing highest order terms (K=3 ; the 3 way interaction) nearly reached criterion ($p < \text{or} = 0.05$), i.e. $p=0.121$. Therefore, the 3-way interaction, although not significant should be acknowledged. Next the second order, or two-way interactions and anything higher were removed and the effect on the model tested (i.e. including the removal of the 3-way and 2-way (K=2) interactions). However, this did not improve the fit relative to K=3 $p=0.285$. This was then followed by removal of the main effect and anything higher (i.e. assuming a random distribution across all cells). As the removal of all main effects and interactions reduced the fit of the model this indicated that one or more of the main effects were important.

Following this the main effects were tested to see which were important. This included the removal of group ($X^2(1) = 3.41, p = 0.07$), removal of condition ($X^2(1) = 0.07, p = 0.79$) and removal of react response ($X^2(1) = 3.41, p = 0.07$). It was considered that these main effects were dubious in the light of the interaction, previously mentioned. It was thought likely that removal of group and condition simply reflected the design of the experiment with the uneven distribution and balanced in cells for excluded and included participants. The removal of the reactive response was thought to reduce fit, because there were more neutral responses than antisocial ones.

The results of this analysis did not support the hypothesis of a greater likelihood in the psychotic group to become antisocial following exclusion. There was no statistically significant 3-way interaction with no greater tendency for the psychotic group to react antisocially when excluded compared to the non-psychotic group. The $p=0.12$ finding was in the opposite direction to that predicted as there was a more balanced distribution of antisocial vs. neutral responses for excluded and included in the psychotics compared to the non-psychotics.

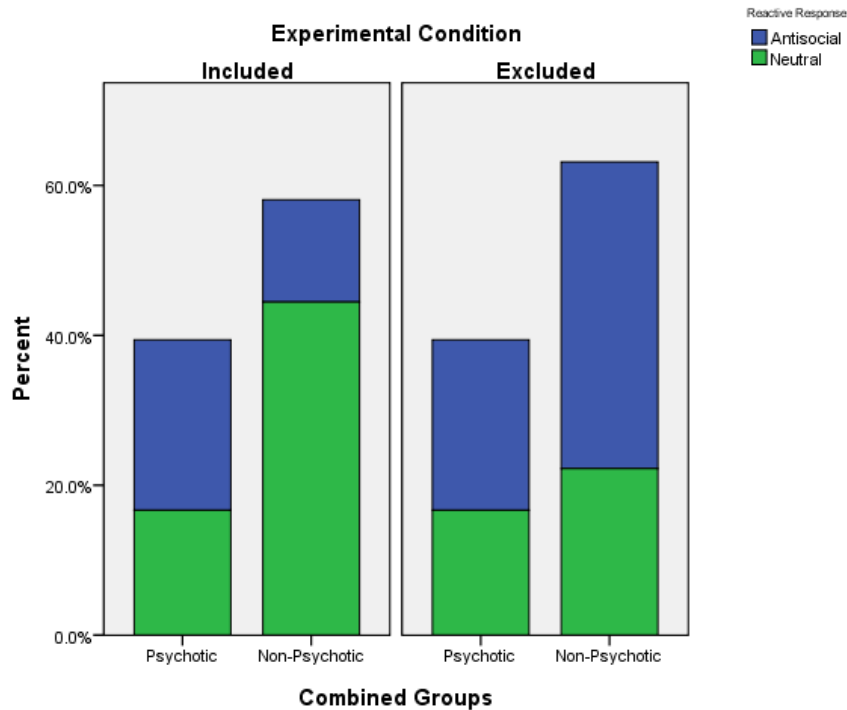


Figure 3.4: Percentage of reactive response for *included* and *excluded* conditions

Although the 3-way interaction did not meet the criterion level for statistical significance ($p < \text{or} = 0.05$), it was nevertheless concluded to be borderline. This was possible due to statistical power. It was however, thought acceptable to investigate the results further therefore, tests for associations were then conducted within the groups between reactive response and condition. There was a non-significant difference between excluded and included participants in the psychotic group ($X^2(1) = 0.00, p > 0.05$). There was a statistically significant difference between the exclude and included participants in the non-psychotic group ($X^2(1) = 5.57, p < 0.05$). Excluded participants were 5.92 times more likely to respond antisocially than include participants in this group.

Tests for associations between reactive responses between groups for included and excluded participants were then conducted (Figure 3.4). In the *excluded* condition there was a non-significant difference in the likelihood of reacting with either an antisocial response for the psychotic group compared with the non-psychotic groups ($X^2(1) = 0.15, p > 0.05$). The odds-ratio however

indicated that the non-psychotic group was 1.35 times more likely to respond with an anti-social response than the psychotic group after rejection. This was opposite to the direction predicted by the hypothesis.

In the *included* condition a Fisher's exact test was conducted as one cell frequency was below 5. There was again no significant difference in the likelihood of the reacting with an antisocial response in the psychotic group compared with the non-psychotic groups ($p > 0.05$ Fisher's Exact Test) although at $p = 0.09$ this was approaching significance. The odds-ratio however, indicated that the psychotic group was 4.39 times more likely to respond with an anti-social response than the non-psychotic group after inclusion, congruent with the direction predicted.

Null Finding

The results indicate a null finding for the experimental hypothesis (2). The psychotic group was not significantly more likely to provide an antisocial reactive response following rejection compared to the anxious and healthy groups (non-psychotic).

3.4.2 Reactive Response- Confederate Personality Attributions

Personality attributions made about the confederates were statistically analysed in order to confirm or disconfirm the third experimental hypothesis (3):

'Psychotic participants will respond with more negative personality attributions towards the confederates than anxious and healthy participants.'

The data collected for both confederates was collated to create one measure of confederate personality attributions. A boxplot was constructed and extreme scores were Winsorized to prevent loss of power. Two outlying scores were Winsorized and balancing was used (Figure 3.5). Descriptive statistics were then computed (table 3.7).

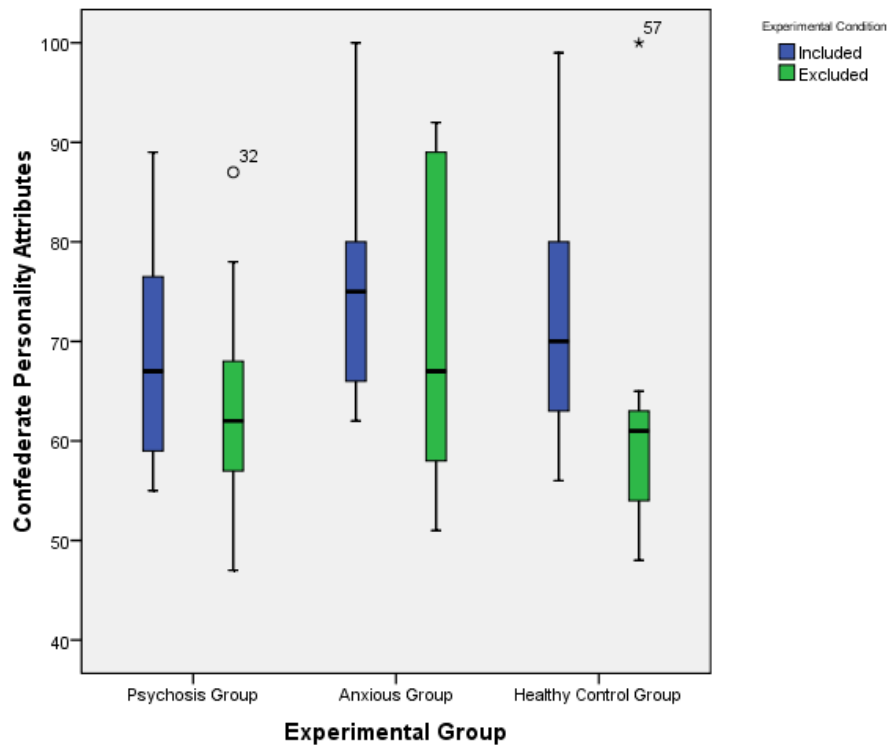


Figure 3.5: Confederate Personality Attribution scores for group and condition

	Psychotic Group		Anxious Group		Healthy Group	
Confederates	Included N=11	Excluded N=11	Included N= 9	Excluded N= 9	Included N= 10	Excluded N= 9
Mean	69.09	63.00	75.44	71.67	71.67	58.67
S.D	12.37	10.24	11.65	16.79	13.14	6.46
Skewness	0.59	0.17	1.14	0.19	1.09	-0.69

Table 3.7: Confederate Personality Attribution scores by experimental group and experimental condition after Winsorization

A factorial ANOVA was used to compare confederate personality attributions between the psychotic, the anxious and the healthy group and the *included* and the *excluded* conditions. There was no significant main effect of group indicating that confederate personality attributions did not differ significantly between the psychotic, anxious and healthy groups ($F(2, 52) = 2.67, p > 0.05$)

although $p = 0.08$ which is approaching significance with a small effect size (partial $\eta^2 = 0.09$). It appears that the anxious group provided more positive attributions than the psychotic and healthy groups irrespective of condition. There was a significant effect of condition in that those who were included gave more positive personality attributions to the confederates than the excluded participants ($F(1, 52) = 5.69, p < 0.05$) with a small effect size (partial $\eta^2 = 0.10$). The interaction of group and condition was not significant indicating that personality attributions did not differ significantly amongst psychotic, anxious and healthy controls by *included* and *excluded* condition ($F(2, 52) = 0.68, p > 0.05$), with a negligible effect size (partial $\eta^2 = 0.03$).

Null Finding

The results indicate a null finding for the experimental hypothesis (3). Psychotic participants did not give more negative personality attributions compared to the anxious and healthy participants when excluded

3.4.3 Summary of Reactive Response Results

A null finding was found for experimental hypothesis (2) and experimental hypothesis (3). Therefore no significant association could be found for reactive responses whether as an antisocial response or as attributions made towards the confederates for excluded participants. In fact, the results of the antisocial reactive response indicated that there was a greater likelihood of the non-psychotic groups to be more antisocial than the psychotic group after exclusion, opposite to that predicted by the hypothesis.

With regards to confederate personality attributions the excluded participants made significantly more negative attributions to confederates than the included participants. Although there was no significant effect for group and overall the anxious group appeared to provide more positive attributions.

(For tables of SPSS analysis refer to appendices 17 to 24)

Chapter 4 Discussion

4.1 Overview

It was posited in the introduction to this study that rejection sensitivity has been found to be a common transdiagnostic factor in psychological disorders, a consensus corroborated by previous research (Romero-Canyas & Downey (2006). It was also posited that rejection sensitivity may interact with life events which constitute 'social defeat' also thought to be associated with the development of serious psychological problems (Selten & Cantor-Graae, 2005). Central to 'social defeat' is the exclusion or rejection of the individual by others. It was thought that 'social pain theory' might be a potential mechanism towards the development of both 'social defeat' and rejection sensitivity. This describes that human beings have evolved immediate unconscious reactions in order to motivate them to correct a social situation that may lead to rejection (Panskepp, 1998). Therefore, being rejected is emotionally painful motivating a behavioural response. The experience of being rejected has been described in the 'ostracism model' (Williams, 2001).

This study sought to investigate this phenomenon with regards to persecutory delusions. It was hypothesised that this mechanism may help explain the personalised nature of these delusions (Green et al, 2006). It may also, for instance, indicate a source of the 'threat' implied as important in the cognitive model of persecutory delusions (Freeman, et al, 2002).

A further aim of the study was to pioneer the use of a research paradigm used to assess rejection and rejection sensitivity with participants from clinical groups. The results obtained from this study will be discussed in this chapter. This will include the relevance of these results to the current literature on persecutory delusions. The limitations to the study and ideas for future research will also be considered and it will finish with final conclusions.

4.2 Main Findings

The main findings from this study will be separated by the experimental hypotheses investigated. These hypotheses are based upon the two immediate responses to rejection presented in the ostracism model (Williams, 2001).

4.2.1 Reflex Response

As described by the ostracism model (Williams, 2001), the first stage of reacting to rejection is a fundamental and automatic reaction called the reflex response. This is measured by the assessment of four 'primary needs'; belonging (Baumeister & Leary, 1995), self-esteem (Leary et al, 1995) control (Seligman, 1975) and meaningful existence (Solomon et al, 1991). In this study the amount that these needs changed from before the task to after the task indicated participants' levels of rejection sensitivity. The greater the decrease in the primary needs the higher the level of rejection sensitivity.

The results confirmed the conclusions made by previous researchers that rejection is painful (Williams, 2001). This was indicated by the lower primary need difference seen in the excluded compared to the included participants. The induction of rejection was confirmed with a large effect size replicating the effect sizes found in other studies that have used the paradigm (Williams & Jarvis, 2006). It was therefore concluded that the mood induction was very effective; indicating high internal validity to the study. The effectiveness of the manipulation increased confidence that any group differences was not due to the manipulation being ineffective.

The first experimental hypothesis stated that:

'There will be higher levels of rejection sensitivity for participants in the psychotic group than the anxious group and the healthy group following exclusion.'

The results from the study indicated that rejection sensitivity was similar between all of the groups, contrary to the hypothesis. Therefore, there was a null finding for this hypothesis as levels of rejection sensitivity were not statistically significantly higher in the psychotic group over the anxious or healthy group for the excluded participants.

In order to interpret the findings further, analysis was carried out separately on the four different 'primary needs', looking for differences between the groups. No significant difference was found between the groups for any of the 'needs'. However, all varied significantly between conditions indicating that rejection negatively impacted all four of the 'need' domains. Therefore, the expectation that the psychotic group might experience a decrease in their sense of control was not found. As previously described, this expectation was based upon research that has shown that higher levels of depression and hopelessness may lead to feelings of reduced control (White et al, 2007). It was originally thought that these feelings of reduced control may be exacerbated by the mood manipulation.

4.2.2 Trend in the Data

In the between group changes in rejection sensitivity an interesting trend in the results was observed, although not statistically significant. After exclusion the healthy group showed a greater reduction in 'primary needs'; suggesting potentially higher levels of rejection sensitivity in this group than the two clinical groups. Within the healthy group there was also a greater distinction, as seen in figure 3.3, between the included and excluded participant scores when compared to the two clinical groups. In addition to this trend, there were also similar levels of rejection sensitivity found between the psychotic and the anxious group. If this is a true trend, then this may confirm the findings seen in other research between these group as posited by Camino, (2008) and Freeman et al (2008).

However, caution must be taken in interpreting this trend, as there was small sample size and hence a lack of power the trends may be an artefact of the design. However, due to the lack of power there is also a danger of making a type II error, in that there is a true effect but this is missed (Field, 2005). It is important to note that these trends were in the opposite direction to the effect predicted in the hypothesis.

If this trend was to be true, then this would have a significant impact on the study of rejection sensitivity, as the trend is contrary to previous research by Zadro et al (2006), which found individuals with high levels of social anxiety had a similar reduction in their primary needs to non-anxious individuals immediately after rejection. Their study concluded that immediate responses to rejection are not affected by moderating variables. When considering the statistical null finding of this study the results are similar to those found by Zadro et al (2006).

4.2.3 Rejection Sensitivity vs. Interpersonal Sensitivity

Although studies such as that by Zadro et al (2006) used the Cyberball paradigm, studies in the area of rejection sensitivity and psychological disorders have used a questionnaire survey paradigm. Such measures include the Interpersonal Sensitivity Questionnaire (Boyce & Parker, 1989). It is thought that the high levels of rejection sensitivity seen in the clinical groups compared to non-clinical group on these measures may be due to the paradigm being used.

In the introduction it was proposed that rejection sensitivity and interpersonal sensitivity may be measuring similar constructs. However, findings from this study indicate that they may not and that they are measuring different aspects of the rejection experience. For instance, it may be possible that interpersonal sensitivity is measuring the result of chronic experiences of rejection. This may be better compared with the third stage in the 'model of ostracism', that proposes the internalisation of ostracism, eventually leading to a depletion of

resources (Williams, 2001). As described by Zadro & Williams (2005) the internalisation of rejection experiences leads to a lowered threshold or a hyper-sensitivity to feeling rejected. Therefore, when individuals with a psychological disorder are assessed, a high score may be found on the Interpersonal Sensitivity Questionnaire. This would be of no surprise as it has long been known that prejudice, discrimination and stigmatisation experienced by those with a serious psychological disorder has a powerful negative effect (Link, Struening, Neese-Todd, et al, 2001). However, this does not indicate how clinical groups would score on measures of impact of rejection, as was measured in this study. As previously mentioned, the results of this study indicate that there is no difference between the clinical and healthy groups in their response at this point of measurement.

4.2.4 Psychological Measures

Psychological measures of anxiety, depression, self-esteem, 'need to belong' and paranoia were also examined. As expected there were significantly higher levels of anxiety in the anxious and the psychotic group than the healthy group, in line with the findings of Freeman et al, (2002). In addition, expected differences in levels of self-esteem were observed, with the healthy group having significantly higher levels than psychotic and the anxious group. Levels of depression were found to be higher in the psychotic group than the healthy group, whereas the anxious group appeared to have slightly higher depression than the healthy group. However, this was not significantly different from either the psychotic or the healthy group.

A stable factor that did not vary between groups was the 'need to belong'. No significant difference was found between the groups suggesting that all groups appeared to value relationships in similar amounts. Differences were found however in the levels of paranoia, with the psychotic group having significantly higher levels than the other two groups. These differences were expected and were thought to confirm participant group allocations.

Correlations were also conducted with the whole data set to investigate whether rejection sensitivity varied with any of the psychological variables. No statistically significant relationships were identified. Therefore, it was concluded that rejection sensitivity was unlikely to be moderated by any of the psychological variables measured. This appeared to confirm the null finding of the experimental hypothesis

An interesting trend is observable in the psychological measure of self-esteem. Higher levels of self-esteem occurred in the healthy group who also demonstrated a trend towards a higher level of rejection sensitivity. This compares to similarly low levels of self-esteem in the clinical groups and similarly lower levels of rejection sensitivity. This observation may be a further product of the depletion of resources following chronic experiences of rejection as described by the 'model of ostracism' (Williams, 2001). This may be a demonstration of self-esteem as a gauge of inclusion as in the 'sociometer theory' (Leary, Tambor, Terdal & Downs, 1995). In this occasion the clinical participant's self-esteem may be low as they now assume a lack of belonging. This may also be interesting in the context that clinical participants were less likely to be in a relationship and in employment, both likely indicators of belonging. Therefore, individuals who have high levels of self-esteem as a product of experiencing belonging in relationships may experience a stronger reaction to rejection as it is unexpected.

4.2.5 Reactive Response- Antisocial reaction

A null finding was also found for the second experimental hypothesis which had stated that:

'Participants in the psychotic group will be more likely to respond with an antisocial reactive response after being excluded than participants in the anxious group or healthy group.'

As previously concluded by Ayduk et al (2000) and Ayduk et al (2008), either high levels of rejection sensitivity or a diminishing of a sense of control may contribute to the enactment of an antisocial behaviour following rejection. Therefore the antisocial reactive response was thought to be more likely in the psychotic group than the anxious or healthy group. However no significant interaction was observed between reactive response, group membership and condition. Groups were not significantly more or less likely to have reacted with an antisocial response than a neutral response following exclusion.

However, despite not being statistically significant, for the *excluded* condition the odds-ratio indicated that non-psychotic participants were 1.35 times more likely to respond with an antisocial response, an effect opposite in direction to the one hypothesised. This effect may be statistically significant if there was greater power. With regards to the *included* condition the difference between the psychotic and non-psychotic group was nearing statistical significance. The odds-ratio indicated that the psychotic group were 4.39 times more likely to enact an antisocial response than the non-psychotic groups. This is a very large effect that may also be statistically significant with greater power.

After testing for associations within the groups, it was concluded that for the psychotic group there was no difference in the likelihood of reacting antisocially between *included* and *excluded* conditions. However, for the non-psychotic group the excluded participants were 5.92 times more likely to be antisocial.

These results, suggest that the non-psychotic participants were more likely to respond with an antisocial response following rejection than psychotic participants. The psychotic participants however, were more likely to respond antisocial after being included than the non-psychotic participants. In fact the response by the psychotic participants appeared to be unaffected by the condition they were in. In other words, it did not matter whether they were included or rejected as to how they responded.

4.2.6 Reactive Response- Confederate Personality Attributions

The measuring of confederate personality attributions was used in order to capture any interpersonal beliefs activated towards the game confederates. A null finding was observed for the third experimental hypothesis which had stated that:

‘Participants in the psychotic group will respond with more negative personality attributions towards the confederates than participants in the anxious groups or the healthy group following exclusion.’

There was a significant difference between conditions with more negative attributions made towards the confederates by the participants who were excluded than those who were included, further highlighting the negative impact of rejection. The difference between groups was approaching significance ($p= 0.08$) with a small effect size but an effect in the opposite direction to that hypothesised. The anxious group appeared to make overall more positive attributions towards the confederates than the psychotic and healthy groups although this was not statistically significant.

Although speculation, it is possible that the lack of observable difference seen between the groups was confounded by social desirability. This may have been particularly acute for the anxious group as they may be concerned about upsetting others (Harb et al, 2002). Social desirability is a bias affecting study validity whereby responses to questionnaires are biased by what is thought to be socially acceptable or favourable (Coolican, 1999). It is possible that it was felt socially undesirable to be too negative when rating someone’s personality. It is possible that social desirability may have had less of a confounding effect on the antisocial reactive response.

4.2.7 Summary of Findings

In summary, the results indicate a null finding for all of the hypotheses. The findings indicate that there is no difference in the reflex response to rejection. However, there appears a non-statistically significant difference in the reactive response to rejection between psychotic, anxious and healthy individuals that was not initially expected. The anxious and healthy groups were more likely to become antisocial following rejection than the psychotic group. It is thought that identifying unexpected findings is an understandable consequence of conducting new types of research.

4.3 Relevance to Theoretical Issues

In consideration of the findings of this study it is possible to conclude that in many ways they are contrary to expectations. In particular it was expected that rejection sensitivity would be higher for individuals with a clinical diagnosis, which was not the case.

4.3.1 Self-esteem Models of Persecutory Delusions

The attribution/self-representation cycle proposed by Bentall et al (2001) predicts that the persecutory delusion will function to defend against low implicit self-esteem, maintaining high or normal levels of explicit self-esteem. It was further posited that this is the case when individuals are in the state of 'poor me' paranoia and not 'bad me' paranoia (Melo et al, 2006). In the state of 'bad me' paranoia, the individual feels that the persecution is justified and this leads to low self-esteem (Trower & Chadwick, 1996). It was found that the psychotic individuals who took part in this study had low levels of self-esteem. It is therefore possible to speculate that they were in 'bad me' paranoia and hence the attribution/self-representation cycle was not active. In consideration of the trends previously mentioned with lower self-esteem and lower rejection sensitivity observed in the clinical groups, this may be further indicative of this.

It may be that when people are in the 'poor me' state and the cycle is active they may react differently to rejection. It is possible that this difference is

expressed behaviourally at the reactive response stage, considering that the groups were statistically similar at the reflex stage. However, if the trends in self-esteem and in rejection sensitivity are considered they may actually vary at the reflex stage. The model suggests that excessive external attributions are made when the cycle is active, which disappears when the cycle is inactive. It is possible that as the cycle may have been inactive for the psychotic group in this study, they were making alternative attributions. These may have been internal as seen in individuals with depression (Abramson et al, 1978), as the psychotic group also had highest levels of depression. If the cycle was active then participants may have been just as likely to be antisocial following rejection as the non-psychotic group, or as indicated by the trends to have similar levels of rejection sensitivity as compared to the healthy group. However, this would need to be specifically investigated.

4.3.2 'Threat Anticipation Model' of Persecutory Delusions

The findings of the study were also considered in relation to the 'Threat Anticipation Model' (Freeman et al, 2002). As participants in this study had experienced their delusions for a period of time it was the maintaining model (figure 1.2) that was thought to be the most relevant to consider. Although this period would be only between under one to three years.

It was initially thought that the expected heightened emotional impact of being rejected may constitute a 'threat' as defined by the model. It was also thought that the automatic reaction of heightened arousal induced by the rejection may be perceived as an anomalous experience. This was thought to provide a rationale as to why the threat is personalised, as reported by Green et al (2006). As the response to rejection appeared to be similar for all groups, this explanation is thought now to be unlikely, especially as anomalous experiences are thought to be related to high levels of arousal (Freeman, 2007).

In term of the reactive response there may be further implications for the model. The tendency for the psychotic group to react with an ambivalent reaction, whether included or not, may provide a rational for the hostility experienced towards them from others, as predicted by the maintaining model. That is antisocial or neutral reactions may be elicited in social situations when they are incongruous to what is expected. For instance, the person with delusions may act antisocially when others are trying to make them feel included.

4.4 Clinical Implications

Despite the null findings for the hypothesis there are a number of clinical implications that can be derived from the study.

4.4.1 Therapeutic Relationship

A significant implication for clinical work is that rejection in general has a negative effect on people. It has long been acknowledged that the therapeutic relationship is important no matter what type of intervention is being used (Krupnick, Sotsky, Elkin, Simmens, Moyer, Watkins & Pilkonis, 1996). The relationship is also thought to be a common factor that helps with intervention success across different psychotherapeutic approaches. As indicated by Lambert & Barley (2001), it represents one of the areas that a clinician could focus on improving to be more effective in providing treatment over and above learning specific techniques.

However, the trends noticed in the results from this study may add a new dimension to considerations of the therapeutic relationship. Furthermore, differences in the reactive responses may also have clinical implications. For instance, the greater tendency for an ambivalent response from individuals with a persecutory delusion may mean that for the clinician, noticing if rejection is being perceived is even more difficult. As noted by Kingdon (1998) a failure to connect with individuals with psychosis in treatment is a success limiting step and no amount of techniques can compensate for this.

4.4.2 Therapeutic Strategies

In addition, a core strategy for Cognitive Behavioural Therapy is to improve self-regulation by helping the patient develop strategies for overcoming impulsive tendencies leading to safety behaviours. The potential incongruence between the reflex and reactive responses elicited from the psychotic group may interfere with this process. As noted by Wells (1997), behavioural responses are often more volitional than thought processes and are an important influence in the maintenance of dysfunction. However, for individuals with persecutory delusions the trend seen in this study suggests this may not be the case. If the individual is unable to connect with the emotions generated by the rejection, then they may not be able to connect their behavioural reaction to the situation. This may mean that they are unable to also notice the consequences of any antisocial reaction that may occur. This could for instance be an issue for conducting behavioural experiments. However, as noted by Glaser, Kazantzis, Deane & Oades (2000) psychotic patients who receive homework as part of their treatment improve by at least 60% more than those who do not. Therefore, perhaps this potential issue is not proving to be a problem for treatment.

4.4.3 Attitudes towards Psychosis and Persecutory Delusions

There are also significant implications for clinical attitudes towards individuals with psychosis. Research has shown that there is a perpetuation of prejudice by clinical professionals about concerns from the wider public (Jorm, Korten, Jacomb, Christensen & Henderson, 1999). Research that demonstrates an increased risk for aggression from those with psychosis, such as by Swanson et al (2006) is thought to influence such attitudes. This study may demonstrate that the reality can be contrary to these expectations. Even with the relatively adverse context of rejection being elicited, there was no greater response to rejection. There was also a lower likelihood of an antisocial reaction from those with psychosis and persecutory delusions when rejection occurred.

Such findings, if replicated in a study with greater power, need to be perpetuated in order to challenge prejudicial attitudes.

4.4.6 Measurement of Rejection

A final clinical implication is that this study has demonstrated that it is possible to measure rejection sensitivity in a clinical group, both simply and objectively. Therefore, it may be possible to propose that the Cyberball paradigm and the 'primary needs' questionnaire may be useful clinical tools. Situations where they may be useful include in vivo exposure to rejection in psychological therapy interventions and assessments of social functioning. The success demonstrated in this study suggests that they may be equally useful across other psychological disorders.

4.5 Limitations

Due to the pioneering nature of this study, it is not surprising that there were many limitations inherent in its design, some of which were not clear before the study was conducted.

4.5.1 Sample Size

Due to the null findings post-hoc power calculations were not conducted. However, despite the null findings a number of interesting trends were observed in the data. However, these trends were not statistically significant and this may be due to a lack of power or design artefacts. The design of the study meant that as six groups were created with the three experimental groups each being separated into two experimental conditions, power was reduced.

Sample sizes were based upon the effects found in similar studies involving inducing mood between psychotic, anxious and healthy groups. However, sample sizes were based upon medium effects between groups and did not adequately take into account the size of effects for the interaction between

group and experimental condition. Larger sample sizes may have meant that trends seen in the data were statistically significant.

4.5.2 Selection Bias

Although the study may have suffered from a lack of power there were also potential selection biases that need to be acknowledged. This was due to the opportunistic sampling method employed. Using this method meant that there may have been a bias in the type of participants that would consent to the study and this may have affected the internal validity (Coolican, 1999). The sampling method meant that only individuals who were available were able to take part. This availability was dependent upon a positive relationship with a clinician for the clinical group, as well as a willingness to take part in studies. For the healthy group, their participation was also contingent on them being willing to take part and also on their availability. Although all participants met the selection criteria, greater validity would be reached through a stratified selection procedure. The type of selection procedure used may have meant that individuals who may be higher in rejection sensitivity were not included. These individuals may have been less likely to consent to the study or may not have the quality of relationship with their clinician and hence would not be asked.

A further issue that occurred due to the selection procedure was with matching the groups for age and demographic criteria. The three groups did differ significantly in age in particular with the healthy and the anxious group being on average older than the psychotic group. This was thought to be indicative of the young age of participants seen by an Early Intervention in Psychosis Team (limited to ages 14 to 35) compared to Community Mental Health Teams (ages 18 to 65). Furthermore, the age range of individuals most likely engaged with Community Mental Health Teams is between the ages of 30 and 44 (Commander, Sasha-Dharan, Odell & Surtees, 1997).

Differences were also seen in relationships and occupational status between the groups, particularly in terms of the healthy group being more likely to be in a romantic relationship and in an occupation. This is also indicative of the general pattern of demographics for individuals in mental health services (Commander et al, 1997). However the groups appeared to be well matched for gender, ethnicity and educational attainment. Despite there being an over representation of the male gender in the psychotic group, this was not statistically significant. The issue of a male bias in psychosis research is a well known one (Wahl, 1977). In this research the over representation of males in the psychotic group may have meant that gender was a confounding variable that was not accounted for.

4.5.3 Measurement Bias

There may also have been biases in the data which occurred through the measurement of the dependent variable. The non-significant difference observed between the groups in rejection sensitivity may be due to poor sensitivity in the measure of primary needs. Research has only been published where the primary needs questionnaire is used with a nonclinical population (Zadro & Williams, 2005). Therefore the primary needs questionnaire has not been validated for a clinical population. It is possible that the discriminatory power of the measure was not sensitive enough to capture the full emotional impact of being rejected, when also suffering from a psychological disorder. Discriminatory power describes how well a measure is able to separate people along a scoring dimension (Coolican, 1999). If the discriminatory power of the measure is a problem, but is then improved, then it may be able to detect a difference between the clinical groups as well as a larger difference between clinical and non-clinical participants. Despite these concerns, it is necessary to note that there was identified a high level of internal validity in the study in the mood induction of rejection as measured by the 'primary needs' questionnaire.

As previously described, it was thought possible that answers given on the confederate personality attributes measure may have been biased by social desirability. However, not previously mentioned was that this may also have been the case for choices of the reactive response. It is thought here that social desirability may be a particularly difficult issue to overcome. However, the procedure used to provide an option for the participants to respond antisocially and to rate the personality of the confederates was chosen carefully. They were chosen so that the response would be mild i.e. not involving any pain or humiliation but still indicative of intention. Therefore it was hoped that responses could be chosen as honestly as possible.

4.5.4 Medication

A further issue that has important implications for conducting research with individuals receiving treatment for a psychosis is the impact of their medication. For instance, it has been described by Blanchard & Neale (1992) that the powerful effects of antipsychotic medication can bias research that is measuring cognitive and emotional factors. This includes the arousal retarding effects that this type of medication may induce. Therefore it may be reasonable to be concerned that the responses provided by the psychotic group, all of whom were at a therapeutic dose of antipsychotic medication, were confounded by this. It may also therefore be possible to speculate that if they were medication naive then they may have actually had higher levels of rejection sensitivity.

However, this speculation is less likely when the levels of rejection sensitivity for the anxious group are noted, particularly as the anxious group were not taking antipsychotic medication. As levels were very similar between the anxious and psychotic group it is likely that the potential confound of antipsychotic medication was not of any significant magnitude.

4.5.6 Levels of Wellness

Although it is thought that medication did not confound the results in any significant manner the wellness of the participants may have. There may have been a further selection bias occurring with the recruitment of individuals who have reached a level of wellness in their psychological disorder. This would translate into lower levels of anxiety or paranoia and less intensity of persecutory delusions in the clinical groups.

Freeman (2007) has reported that individuals with persecutory delusions that are strongly held and distressing are probably the least likely to participate in research. In this study, although clear evidence of persecutory delusions was established, this was most likely mediated by the degree of conviction and the level of distress caused by the delusion. The participants in the psychotic group were willing to consent to the study and had engaged well with their treatment. This may therefore indicate a level of insight into their diagnosis. This would most likely be different for someone who has no insight and is therefore an issue affecting the external validity of the study.

The same issue may also pertain to the anxious group as they may also not have participated if levels of anxiety were very high. As a measure of clinical casesness, the level of anxiety from both the psychotic and the anxious group was in the moderate range of the BAI with relatively large standard deviations; indicating a wide spread. Therefore, just taking this measure alone it may be possible to consider high levels of wellness may have been present for some of the participants; confounding the results. It is in consideration of this issue that Freeman (2007) proposes that it is easier to recruit from non-clinical populations. However, this leaves the issue of the relevance of the findings for clinical groups.

4.6 Future Research

Due to the unexpected trends found, it is suggested that this study needs to be replicated with 2-tail hypotheses tested. It would also be important that a larger sample size is recruited to improve the power of the study.

However, in consideration of the trends that have been identified more specific areas also require further investigation. For instance, as previously noted measuring rejection sensitivity does not indicate the threshold where rejection is perceived. Studies using the Cyberball paradigm can be designed where subtle differences are made in levels of inclusion (Williams & Jarvis, 2006). Therefore it would be possible to gradually change exclusion and note when rejection is perceived. This study may provide more information about the differences between individuals with paranoia and persecutory delusions and anxious and healthy controls. It will indicate whether thresholds for perceiving rejection as predicted by the ostracism model are evident in those with persecutory delusions (Zadro & Williams, 2005). Furthermore, research into this area may be useful from a longitudinal perspective. As previously speculated it may be possible that rejection sensitivity may gradually reduce as exposure to rejection becomes a chronic experience. This may provide an opportunity to investigate at what stage in a person's psychosis or delusion development that this may occur.

However, these projects have a number of issues inherent with their design. For instance longitudinal studies are very expensive and difficult to implement. In addition, the ethical issues that were faced by conducting this study would be greatly increased if individuals were recruited who were more unwell in their stage of illness.

Furthermore, it may also be beneficial to investigate whether the impact of rejection is moderated by the incidence of 'theory of mind' deficits (Frith, 2004) or reasoning deficits such as jumping to conclusions (Garety & Freeman, 1999). It is possible that these cognitive deficits may have an impact on the

perception of rejection and also on the reactive response following rejection. Of further benefit may be the study of whether rejection responses vary between 'poor me' and 'bad me' paranoia (Trower & Chadwick, 1995) and whether this may vary with levels of self-esteem. Such research may identify whether in 'poor me' states individuals, when rejected, express exaggerated external attributions thus protecting impact self-esteem as posited by Bentall, et al (2001).

In addition, it may be beneficial to investigate particular aspects inherent to the 'Threat Anticipation Model'. For instance, in addition to researching the impact of rejection at different stages of illness, it may be beneficial to include measures of arousal levels and measures of anomalous experience. This may therefore provide more clues as to whether initially the automatic response to rejection is causative of an anomalous experience that may add to delusion formation. However, in terms of the maintenance of delusions, it may also be beneficial to investigate whether safety behaviours are implicated in how an individual with a persecutory delusion navigates the rejection experience. This may provide further information regarding the trend towards ambivalent reactive responses.

In terms of further studies of rejection with individuals with persecutory delusions it may also be beneficial consider the taxonomic dimension and antecedents to rejection that are detailed in the 'model of ostracism' (Williams, 2001). For instance, it may also be beneficial to study whether changing the degree of visibility, the motive, the quantity and the clarity of the rejection will produce different levels of rejection sensitivity and reactive responses. For instance the rejection experience may be very different depending upon who is doing the rejecting and why. Also it may be beneficial to study the different mediums in which rejection can occur and whether this also has an effect. All of these variables may have implication in the rejection experience of individuals with persecutory delusions and may add further to this study.

4.7 Conclusions

In conclusion this study attempted to investigate the experience of inclusion and exclusion and persecutory delusions. It was expected that individuals with a diagnosis of a psychotic disorder who have persecutory delusions will have higher levels of rejection sensitivity than individuals with an anxiety disorder and healthy controls. It was also expected that individuals with persecutory delusions will respond to rejection with a more antisocial reaction and make more negative personality attributions than anxious or healthy individuals.

These expectations were based upon the evidence that concerning 'social defeat' (Selten & Cantor-Graae, 2005), rejection sensitivity (Downey & Feldman, 1996) and 'social pain theory' (Zadro & Williams, 2005). The 'model of ostracism' (Williams, 2001) was used as a basis for understanding the expected reactions to rejection, particularly with regards to reflex and reactive responses. This was investigated using the Cyberball paradigm (Williams & Jarvis, 2006).

Overall the findings of the study confirm that rejection has a negative emotional effect on individuals. This was demonstrated by significant differences across all measures between included and excluded participants. However, there were null findings for all of the hypotheses tested indicating that individuals with psychosis did not have significantly higher levels of rejection sensitivity. Neither were the individuals with psychosis statistically significantly more likely to react with an antisocial reaction. However, interesting trends were found in the data that were not statistically significant. This lack of significance may be due to a lack of power in the study.

An important trend that was identified was the finding that individuals with persecutory delusions appeared to react with ambivalent behavioural response when able to choose between a neutral and antisocial reaction. This was compared with non-psychotic individuals who were more likely to respond

neutrally when included and antisocially when excluded. The ambivalent response from the psychotic group, when in the context of being included, was antisocial in comparison to the control groups. However, it is thought their response is unaffected by the social context.

These findings were discussed in relation to current theories of persecutory delusions. Self-esteem models were considered such as the attribution/self-representation cycle (Bentall et al, 2001) and the states of 'poor me' and 'bad me' paranoia identified by (Trower & Chadwick, 1996). The attribution cycle posits that persecutory delusions may have been formed as a defense against low levels of implicit self-esteem maintaining high explicit self-esteem. However, this is only thought to be the case in the state of 'poor me' paranoia. It was thought that the psychotic individuals who took part in this study may have been in the state of 'bad me' paranoia as self-esteem was explicitly rated as low. It was speculated that internal attributions were made in this study, contrary to the excessive external attributions made if the cycle is successfully working as a defense and this was discussed in terms of the reactive responses.

The findings were also discussed in relation to the 'Threat Anticipation Model' (Freeman et al, 2002), which indicates the central importance of anxiety and threat. It was initially expected that the heightened arousal elicited due to the rejection and high levels of rejection sensitivity might provide a source of the threat central to the model, for the personalisation of delusions (Green et al, 2006). Following the finding that the psychotic group had similar levels of rejection sensitivity to the other groups it was concluded that rejection may not be the source of threat or alone explain personalisation. It was speculated however, that this reaction to rejection may be different for individuals at the beginning of forming a delusions than in the maintenance stage. It was also considered that the ambivalent reactive response that includes a greater likelihood of an antisocial reaction when included may be part of the maintaining cycle for the persecutory delusion.

The clinical implications of the findings were also considered. This focussed upon the significant finding that rejection is a painful experience. This was thought to highlight the importance of the therapeutic relationship (Krupnick et al, 1996) and the difficulties that this might mean for trying to build a relationship with individuals with psychosis (Kingdon, 1998).

The limitations of the study were then considered. Issues with the sample size were discussed in relation to a potential lack of power in the study. It was considered that a larger sample size may have led to significant findings in the trends observed. Other limitations discussed included a selection bias that may have occurred due to the opportunistic sampling method and biases caused by problems in matching between groups for age, relationships and occupational status. There was also a measurement bias considered, including the ability for the main measure to discriminate the rejection experience in the clinical groups and social desirability bias in the antisocial reaction measures. Potential limitations caused by medication and levels of wellness were also considered.

Finally, future research was discussed that may lead to a greater understanding of the rejection experience and persecutory delusions. This included designing research that explores further the trends seen in this study. It was also thought important that studies may be designed that investigated more specific aspects of the models of persecutory delusions such as utilising measures of anomalous experience or measures specific to the internal or external attributions that are made. It was also thought to be beneficial to consider rejection sensitivity in the stages of delusion development and how variations in factors specified by the 'model of ostracism' might affect responses.

As a final conclusion this study has pioneered the use of the Cyberball paradigm with clinical groups. It has demonstrated that this type of research is

possible with individuals with persecutory delusions despite the ethical issues that may exist. It is with great hope that more research will follow this study and that potential benefits to the knowledge base on the formation and maintenance of persecutory delusions will be realised.

Chapter 5 References

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Chapter 6 Appendices

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1. Letters from Research Ethics Committee

South East Research Ethics Committee
South East Coast Strategic Health Authority
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14 July 2008

Mr Neil Ralph
Trainee Clinical Psychologist
Cambridgeshire and Peterborough Mental Health Partnership Trust
D. Clin. Psych. Training Course
University of Hertfordshire
Hatfield
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Dear Mr Ralph

Full title of study: **A study of sensitivity to social rejection, comparing individuals with persecutory delusions to a clinically anxious and non-clinical control group.**

REC reference number: **08/H1102/62**

The Research Ethics Committee reviewed the above application at the meeting held on 09 July 2008. Thank you for attending to discuss the study.

Ethical opinion

The members of the Committee present decided they were unable to give a favourable ethical opinion of the research, for the following reasons:

- a) The Committee commended the applicant on his presentation at the meeting.
- b) The Committee expressed regret that the Supervisor was unable to attend the meeting.
- c) The risks of distress and anger seem to have been underestimated and the dangers have not been acknowledged sufficiently. Confirmation is sought of the process in place to deal with this.
- d) Confirmation is sought as to what would happen if a participant deteriorates.
- e) There were concerns as to the inadequacy of arrangements for the safety of the researcher, who would be giving participants his mobile telephone number and would also be doing home visits. Reassurance is sought that all safety aspects have been considered and an effective strategy is put in place.
- f) The Committee requested to see a copy of the BPS guidelines on when deception is deemed ethical to use.
- g) Clarification is sought as to how the non clinical control group would be recruited.
- h) Justification is sought as to why the inclusion criteria is under age 65.
- i) There is a discrepancy regarding the length of time the data is to be stored. The application form stated less than three months, but the information sheets states 15 years. Clarification is therefore sought.
- j) Clarification is sought as to how long participants have been stabilized and whether there is a risk of a relapse of psychosis.

- k) Clarification is sought as to how the mental integrity would be affected of participants with paranoid psychosis.
- l) If those patients who are known to be violent are excluded, clarification is sought as to how this would affect the results.
- m) Justification is sought as to the exclusion of non-English speakers.
- n) The application to be in lay language.

Participant Information Sheet (PIS)

- o) The title is long and complicated and should be made simpler.
- p) A clear explanation must be given to inform participants what is actually being done and what is being studied.
- q) Randomisation to be clearly explained in lay language.
- r) The possibility of deception is not justified and must be made clearer.
- s) Expenses to be offered.
- t) A separate information sheet and consent form to be given to the control group.
- u) The “white noise” must be explained clearly.

We regret to inform you therefore that the application is not approved.

Options for further ethical review

You may submit a new application for ethical review, taking into account the Committee’s concerns. You should enter details of this application at Question A55 on the application form and include a copy of this letter, together with a covering letter explaining what changes have been made from the previous application. The application should be booked through the Central Allocation System (CAS) and would be allocated for review in the normal way. You should let CAS know if you would like the application to be reviewed again by this Committee.

Alternatively, you may appeal against the decision of the Committee by seeking a second opinion on this application from another Research Ethics Committee. The appeal would be based on the application form and supporting documentation reviewed by this Committee, without amendment. If you wish to appeal, you should notify the Head Office of the National Research Ethics Service in writing within 90 days of the date of this letter. If the appeal is allowed, NRES will appoint another REC to give a second opinion within 60 days and will arrange for the second REC to be provided with a copy of the application, together with this letter and other relevant correspondence on the application. You will be notified of the arrangements for the meeting of the second REC and will be able to attend and/or make written representations if you wish to do so.

The relevant NRES contact point is:

Joan Kirkbride
 Acting Head of Operations, England
 Head of Operations, North, Midlands and East of England
 National Research Ethics Service, National Patient Safety Agency
 Darlington Primary Care Trust, Dr Piper House
 King Street, DARLINGTON, DL3 6JL
 joan.kirkbride@nres.npsa.nhs.uk

Documents reviewed

The documents reviewed at the meeting were:

<i>Document</i>	<i>Version</i>	<i>Date</i>
Application	1	09 June 2008
Investigator CV	1	12 June 2008
Protocol	1	13 June 2008

Covering Letter		13 June 2008
Letter from Sponsor	1	13 June 2008
Compensation Arrangements		01 August 2006
Questionnaire: Personality of Other Questionnaire (Character 2)		13 June 2008
Questionnaire: Pre-task Primary Needs Questionnaire	1	13 June 2008
Questionnaire: Post-task Primary Needs Questionnaire Version 1	1	13 June 2008
Questionnaire: Rosenberg S.E Scale	1	13 June 2008
Questionnaire: BAI	1	13 June 2008
Questionnaire: BDI-II	1	
Participant Information Sheet		12 June 2008
Participant Consent Form	1	12 June 2008
Academic Supervisor C.V		13 June 2008
Questionnaire	1	13 June 2008
Questionnaire	1	13 June 2008
Questionnaire	1	13 June 2008
Questionnaire	1	13 June 2008

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.

After ethical review

Now that you have completed the application process please visit the National Research Ethics Website > After Review

Here you will find links to the following

- a) Providing feedback. You are invited to give your view of the service you have received from the National Research Ethics Service on the application procedure. If you wish to make your views known please use the feedback form available on the website.
- b) Re-submission/Appeal.

We would also like to inform you that we consult regularly with stakeholders to improve our service. If you would like to join our Reference Group please email referencegroup@nationalres.org.uk.

08/H1102/62 **Please quote this number on all correspondence**

Yours sincerely

Dr L. Alan Ruben
Chair

Email: nicki.watts@nhs.net

Enclosures:

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

Copy to:

Professor John Senior

South East Research Ethics Committee

Attendance at Committee meeting on 09 July 2008

Committee Members:

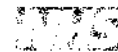
<i>Name</i>	<i>Profession</i>	<i>Present</i>	<i>Notes</i>
Dr Dipti Amin	Physician	No	
Dr A Bhiman	Consultant Psychiatrist	Yes	
Doctor Bob Brecher	Reader in Moral Philosophy	No	
Professor David Caplin	Physicist	Yes	
Professor David Croisdale-Appleby	Professor in Medical Research and Medical Education	No	
Professor John Eastwood	Consultant Renal Physician	Yes	
Dr Alan Fishtal	GP	Yes	
Dr Anne Gallagher	Reader in Social Work (Nurse Member)	Yes	
Mr Guy Gardener	Retired Assistant Chief Constable	Yes	
Dr Ray Godfrey	Educational Statistician	No	
Mrs Vera Hughes	Training Consultant	Yes	
Dr Anton Joseph	Consultant Radiologist	Yes	
Professor Cornelius Katona	Academic Psychiatrist	Yes	
Ms R MacKenzie	Director Medical Law & Ethics	Yes	
Professor Liz Meerabeau	University Professor (Nurse Member)	Yes	
Dr L. Alan Ruben	GP	Yes	
Mr Roy Sinclair	Pharmacist	No	

Also in attendance:

<i>Name</i>	<i>Position (or reason for attending)</i>
Miss Nicki Watts	Co-ordinator

Written comments received from:

<i>Name</i>	<i>Position</i>
Professor David Croisdale-Appleby	Professor in Medical Research and Medical Education
Dr Ray Godfrey	Educational Statistician
Mr Roy Sinclair	Pharmacist



National Research Ethics Service

South East Research Ethics Committee

South East Coast Strategic Health Authority

Preston Hall

Aylesford

Kent

ME20 7NL

Telephone: 01622 713087

Facsimile: 01622 885966

16 September 2008

Mr Neil Ralph
Trainee Clinical Psychologist
Cambridgeshire and Peterborough Mental Health Partnership Trust
D. Clin. Psych. Training Course
University of Hertfordshire
Hatfield
AL10 9AB

Dear Mr Ralph

Full title of study: A study of sensitivity to social rejection, comparing individuals with persecutory delusions to a clinically anxious and non-clinical control group.
REC reference number: 08/H1102/87

The Research Ethics Committee reviewed the above application at the meeting held on 10 September 2008. Thank you for attending to discuss the study.

Ethical opinion

The study was previously been rejected with the main concerns being the safety of the researcher going into participant's homes, some of whom may have a history of violence, substance and/or alcohol abuse.

These concerns were allayed by excluding participants who have a record of such history in their medical records. There were still some concerns that not all participants with a history of violence/abuse can be identified as medical records may not give this data as it is not always known. The Committee were reassured that although there is no way of guaranteeing that all of these participants will be excluded, it will be apparent through discussions with the psychiatrist if there is any evidence of violence/abuse, plus those taking part will be well known by the key worker.

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

Ethical review of research sites

The Committee agreed that all sites in this study should be exempt from site-specific assessment (SSA). There is no need to submit the Site-Specific Information Form to any Research Ethics Committee. The favourable opinion for the study applies to all sites involved in the research.

This Research Ethics Committee is an advisory committee to South East Coast Strategic Health Authority.

Conditions of the favourable opinion

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

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

Management permission at NHS sites ("R&D approval") should be obtained from the relevant care organisation(s) in accordance with NHS research governance arrangements. Guidance on applying for NHS permission is available in the Integrated Research Application System or at <http://www.rdforum.nhs.uk>.

The exclusion of patients with a history of violence/abuse must be written into the results and this must be made clear in any publications.

Approved documents

The documents reviewed and approved at the meeting were:

Document	Version	Date
Application		11 August 2008
Investigator CV	Mr Neil Ralph	08 August 2008
Protocol	2	08 August 2008
Covering Letter		11 August 2008
Letter from Sponsor		11 August 2008
Questionnaire: Second Task Scale	1	11 August 2008
Questionnaire: Personality of Other	1	13 June 2008
Questionnaire: BDI-II	Validated	
Questionnaire: BAI	Validated	
Questionnaire: Rosenberg S.E. Scale	Validated	
Questionnaire: Worry About Others	1	13 June 2008
Questionnaire: In-Belong	1	13 June 2008
Questionnaire: Post-task Primary Needs	1	13 June 2008
Questionnaire: Pre-task Primary Needs	1	13 June 2008
Participant Information Sheet: Non-Clinical	1	07 August 2008
Participant Information Sheet: Clinical	2	07 August 2008
Participant Consent Form: Non Clinical	1	07 August 2008
Participant Consent Form: Clinical	2	07 August 2008
Professional Indemnity		01 August 2008
Employers Liability		01 August 2008
Supervisor CV	D. John Done	08 August 2008
Unfavourable Opinion Letter		14 July 2008
Photographs of game characters	1	11 August 2008
CNWL Lone Worker Policy	1	01 June 2008
BPS Guidelines for conducting research with human participants	1	08 August 2008

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.

After ethical review

Now that you have completed the application process please visit the National Research Ethics Website > After Review

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

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

- Notifying substantial amendments
- Progress and safety reports
- Notifying the end of the study


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

We would also like to inform you that we consult regularly with stakeholders to improve our service. If you would like to join our Reference Group please email referencegroup@nres.npsa.nhs.uk

08/H/102/87	Please quote this number on all correspondence
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With the Committee's best wishes for the success of this project

Yours sincerely



Dr L. Alan Ruben
Chair

Email: ncki.watts@nhs.net

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

Copy to: Professor John Senior

2. Letters from Research and Development Committees



Neil Ralph
Trainee Clinical Psychologist
Doctorate in Clinical Psychology
University of Herts
College Lane
Hatfield
Herts
AL10 9AB

Hertfordshire Partnership



NHS Trust

R&D Office

Dept Psychiatry
QEII Hospital
Howlands
Welwyn Garden City
Herts
AL7 4HQ

Tel: 01707 369058

Email: t.gale@herts.ac.uk

13th October 2008

Dear Neil

Application for research approval: A study of social rejection and the effects of persecutory delusions

Thank-you for sending me the additional documentation for the above study, which you wish to extend into Hertfordshire Partnership NHS Foundation Trust. I am pleased to confirm R&D approval for the study and would also advise you of the following points.

1. As the principal investigator, you will retain responsibility for the conduct of the study and are responsible for ensuring that the study is carried out in accordance with the Research Governance Framework and all Trust policies relating to confidentiality of staff and patient information.

2. I understand that Dr Tim Sharpe will provide access to patients within the EIP Service, and will be the responsible clinician for the study within the Trust. Our standard advice for studies carried out as part of educational or professional qualifications is that service users should be seen on Trust premises, rather than in their own homes. Given that this issue has already been raised by the ethics committee, and subsequently addressed in your reply, we are content to leave the location of the research and the choice of suitable participants to the discretion of Dr Sharpe.

3. In compliance with the Trust's policy on R&D, we will ask you to complete and return a monitoring information sheet after the study has ended. You should also be aware that your study is open to audit by the Trust at any point, up to and including one year after it has been completed. You should therefore ensure that you retain paper copies of all study materials including data capture sheets and consent forms.

I hope your study progresses well and that you are able to meet your recruitment targets within Hertfordshire Partnership NHS Foundation Trust.

With kind regards

Tim M Gale Ph.D.
R&D Manager

Cc Dr Tim Sharpe, EIPS

Letter of confirmation from North Essex NHS Foundation Partnership Trust was not available.

If confirmation of R&D approval is required please contact:

**Ayse Casey
Research & Development Manager
R&D Office, Derwent Centre
Princess Alexandra Hospital
Hamstel Road,
Harlow
Essex, CM20 1QX**

Tel: 01279 827290 (3180 7290)

Mob: 07881 627523

3. Clinical Participant Information Sheet and Consent Form

Clinical Participant Information Sheet

Study Name: Emotional reactions in social situations and the effect of mental health problems

Chief Investigator: Neil Ralph
Trainee Clinical Psychologist
University of Hertfordshire

I am a trainee Clinical Psychologist studying at the University of Hertfordshire and I would like to invite you to take part in a research study that I am conducting. Please read through this information sheet carefully and take as much time as you need in considering whether you would like to take part. Please feel free to ask questions and also to take this away and discuss it with other people (your family for example). If you have any further questions after our meeting, please feel free to contact me on the number provided at the bottom.

What is the purpose of the study?

In this study, I am interested in investigating how people's feelings are affected by social situations and whether this is different when people experience mental health problems. The reason for researching this is to improve our knowledge of how mental health problems affect us in our relationships and our daily interactions. The mental health problems that are being investigated will be those that are described as psychotic disorders, such as schizophrenia, and those that are described as anxiety disorders, such as panic disorder. It is hoped that this study will provide information that is useful in improving the psychological understanding and treatment of these mental health problems.

Why have I been chosen?

You have been asked to take part as someone who may have some mental health difficulties that can be described as fitting the categories under investigation.

Do I have to take part?

You are under no obligation to take part in this study and if you decide you do not want to take part, you do not have to give a reason and this will not affect your care in any way. If you do wish to take part, you will be asked to read and keep this information sheet and to sign a consent form to show you understand what is involved in the study. Once we begin, you are free to withdraw at any time without giving a reason and your care will not be affected if you choose to stop.

What will happen if I take part?

If you decide to take part, a member of the research team (Neil Ralph) can arrange an appointment at a time and place which is convenient to you to continue the study. With your permission your key worker will be notified of your involvement.

The study will involve completing a number of tasks including playing a game on the computer and filling in a number of questionnaires and should take approximately 1 hour and 20 minutes. In the game you will be randomly allocated to one of two groups, who will have slightly different experiences of the same game. Random allocation means that this choice was not based upon any personal information

and that there is an equal chance of being in either group. Throughout the testing process, you are free to take breaks whenever you wish and to withdraw at any time.

Risk and Burdens

Risks and burdens are aspects of the study where there is a possibility of causing discomfort.

During this study there is an element of deception where some information will only be told to you at the end. This information is not about you or anybody you know but about two other people involved in the study. This deception is necessary for the study as it seeks to investigate an automatic reaction. Therefore if the information was provided before hand you may not react automatically. The information should not cause you any distress but may cause you to feel surprised.

During the study, questionnaires will be asking you about your feelings and sometimes answering these types of questions can cause some emotional discomfort. I also need to inform you that when playing the game some individuals have also noticed some mild emotional discomfort but this has not been known to last for very long. However, if any emotional discomfort does occur you will be provided with support from the investigator and your clinical team will be notified with your permission to support you after the study has finished. The investigator is trained and experienced in providing emotional support.

Expenses

If costs are incurred by you due to your inclusion in the study, expenses will be available to cover: travel, telephone calls and postage. These can be claimed though contacting the investigator and may require the presentation of receipts or travel tickets.

Here is a description of what is involved in the study:

At the beginning of the study you will be informed again of the information presented in this information sheet and will have a further opportunity to ask questions.

You will be told about the computer game that you will be asked to play. This will involve playing a ball tossing game with other participants over the internet that are based at the University of Hertfordshire. You do not know these people and they know nothing about you. You will never have any other form of contact with these people except during this study nor will they have any influence over your care or any other aspect of your life. However, there is some information about these people that I can not tell you before you have played the game. The only reason for this is that it may change your reaction to the task, affecting my ability to investigate your experience accurately. However, I will tell you the information at the end of the study and you can ask any questions you have about this then. The information is not expected to cause you any distress; however, some people may experience surprise when they hear the information. The information includes nothing related to you and is the same for all other participants taking part in the study.

At any moment during the study if you decide that you do not want to continue, it is your right to stop, without providing a reason for your decision. Before the game begins you will be asked to fill in some questionnaires about how you have been feeling over the last week. There are no right or wrong answers to these questionnaires and they will not be asking you to provide details of any experiences from your past.

You will then be asked to play the computer game which is very simple and should take approximately 5 minutes. As already mentioned this is a game of ball tossing and involves three characters, i.e. two

controlled by the individuals based at the University of Hertfordshire. They will be represented by two cartoon characters and a picture of their faces and their names will appear, with a third player represented by a cartoon hand that you control. The idea of the game is that the characters throw the ball to each other and to you, just like a real game of catch. When you get the ball you can throw it back to any character you want to by using the mouse to click on their name. During the game different participants may experience a varying degree of inclusion; however, it is not possible to inform you about how many times you will receive the ball. I do need to inform you that people who have played the game before have noticed that their feelings are affected by how much they are included and that some people have experienced mild levels of discomfort when they have felt like they were not receiving the ball very often.

Before playing the game you will be shown copies of photographs of the people you will be playing with. During the game, your ball tossing performance is not important but what you will be asked to do is try to visualise the people you are playing with, whom you have seen in the two photographs as you are playing them.

For example, what sort of people are they? After you have completed playing the game you will be asked to complete another questionnaire about your experience of the game.

Next you will be asked to look at the photos of the two people again and you will be informed that they are going to be taking part in a second study at the university. You will be asked to continue to visualise them, having just finished this game with you. Later on both of the participants will be taking part in a separate study and you will be asked to help set this study up. This study will look into their performance on a difficult mathematical task. However, in a room next door there will be a group of students listening to some music and the wall between the two rooms is to be very thin. Therefore, the music could be very distracting to the participant trying to solve the maths problem. What we would like you to do is to choose the volume of the music that the participants will hear through the wall. The louder it is the more likely it will be distracting, affecting their performance in solving the problem. After hearing this you will be asked to choose the volume from 0 to 100, there are also categories as a guide to help you. Before you start doing this you will be played a 10 second clip of the type of music that will be being played

You will then be asked to choose a number between 0- 100 for the volume of the music for each of the two participants. You will be able to look at a card to help. On the card a scale will be split between 1- 24 = not distracting, 25- 49= slightly distracting, 50- 74= distracting and 75- 100= extremely distracting

In a final task as you have still been visualising the people you have been playing with you will be asked to complete a questionnaire rating the different qualities you believe might represent their personalities.

Following this you will be provided with the information about other participants in the game that was not disclosed to you at the beginning. You will also be provided with full information about the study and will have an opportunity to ask any questions that you may have.

Will taking part in this study be kept confidential?

With your permission, I would like to inform your key worker if you decide to take part in this study. This means that you will be able to discuss the study with them although I will not be telling them anything about what you said during the task or your answers to the questionnaires. In fact your responses will be kept strictly confidential and will only be seen by Neil Ralph. The only situation where confidentiality would be broken is if we were concerned about your safety or anyone else's. In this case, we would be obliged to contact your care team. However, we would inform you of our intention before doing this.

All results of this study will be anonymous so your name will not appear in the reports of the study. Your responses will be stored without your name or any identifying details in a locked filing cabinet at the University of Hertfordshire. The research team will be the only people who have access to the data for the purposes of analysis. The data will be kept securely for up to 5 years and after this time will be destroyed securely.

What if there is a problem?

If some of the questions trigger upsetting memories, I am trained to help you and will assist you in easing any distress caused. You also do not have to answer any questions that make you feel uncomfortable. If you do become upset you will have the option to talk to your key worker about your feelings as they will know that you are taking part. Your key worker will also be instructed to contact you by telephone the next day to enquire about your welfare. You will also have the opportunity to talk about the study with your key worker during your next appointment. If you have a concern about any aspect of this study, you should ask to speak to myself (Neil Ralph) and I will do my best to answer your questions. I can be contacted through leaving a message for me on **07767003781** or by asking your key worker to contact me and organise me to call you. If you remain unhappy and wish to complain formally, you can do this through the NHS Complaints Procedure. Details can be obtained from the hospital.

Who has reviewed the study?

The study has been reviewed by an NHS Ethics Review Board (South East REC) and approval was given on the 17th September 2008

Who should I contact for further information?

If you have any questions you can contact me number provided above. In addition your psychiatrist and key worker will know some details about the study.

I hope that this information sheet has provided you with all the information you may need and that I have answered all your questions about this research. If you would like more information, or wish to discuss anything relating to this study please feel free to contact me. At the end of the study, you will be able to request a copy of the results of this study.

Thank you for reading this information sheet.

Mr Neil Ralph
Trainee Clinical Psychologist
University of Hertfordshire

CONSENT FORM – Clinical Participants

Title of Project: Emotional reactions in social situations and the effect of mental health problems

Name of Researcher: Neil Ralph
Trainee Clinical Psychologist

Please initial box

1. I confirm that I have read and understand the information sheet dated 7th August 2008 for the above study and have had the opportunity to ask questions.
2. I understand that there will be an element of deceit in the study involving the withholding of information and authorise this if I participate.
3. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected.
4. I give permission for Neil Ralph to inform my key worker that I am going to take part in the study.
5. I understand that my responses will be treated in the strictest confidence and that my name will not appear on any questionnaires.
6. I agree to take part in the above study.

_____	_____	_____
Name of Participant	Date	Signature
_____	_____	_____
Researcher	Date	Signature

4. Non-clinical Participant Information Sheet and Consent Form

Non-Clinical Participant Information Sheet

Study Name: Emotional reactions in social situations and the effect of mental health problems

Chief Investigator: **Neil Ralph**
Trainee Clinical Psychologist
University of Hertfordshire

I am a trainee Clinical Psychologist studying at the University of Hertfordshire and I would like to invite you to take part in a research study that I am conducting. Please read through this information sheet carefully and take as much time as you need in considering whether you would like to take part. Please feel free to ask questions and also to take this away and discuss it with other people (your family for example). If you have any further questions after our meeting, please feel free to contact me on the number provided at the bottom.

What is the purpose of the study?

In this study, I am interested in investigating how people's feelings are affected by social situations and whether this is different when people experience mental health problems. The reason for researching this is to improve our knowledge of how mental health problems affect us in our relationships and our daily interactions. The mental health problems that are being investigated will be those that are described as psychotic disorders, such as schizophrenia, and those that are described as anxiety disorders, such as panic disorder. It is hoped that this study will provide information that is useful in improving the psychological understanding and treatment of these mental health problems.

Why have I been chosen?

You have been asked to take part as someone who does not have mental health problems. In a study of this type it is important to investigate the experience of people without mental health problems so that they can be compared with people who do have mental health problems. This enables researchers to be able to identify any unique experiences that may be the result of having mental health problems.

Do I have to take part?

You are under no obligation to take part in this study and if you decide you do not want to take part, you do not have to give a reason. If you do wish to take part, you will be asked to read and keep this information sheet and to sign a consent form to show you understand what is involved in the study. Once we begin, you are free to withdraw at any time without giving a reason.

What will happen if I take part?

If you decide to take part, a member of the research team (Neil Ralph) can arrange an appointment at a time and place which is convenient to you to continue the study. You can contact me to arrange this by leaving a message for me with the secretary at the Doctorate of Clinical Psychology Department (telephone number).

The study will involve completing a number of tasks including playing a game on the computer and filling in a number of questionnaires and should take approximately 1 hour and 20 minutes. In the game you will be randomly allocated to one of two groups, who will have slightly different experiences of the same game. Random allocation means that this choice was not based upon any personal information and that there is an equal chance of being in either group. Throughout the testing process, you are free to take breaks whenever you wish and to withdraw at any time.

Risk and Burdens

Risks and burdens are aspects of the study where there is a possibility of causing discomfort.

During this study there is an element of deception where some information will only be told to you at the end. This information is not about you or anybody you know but about two other people involved in the study. This deception is necessary for the study as it seeks to investigate an automatic reaction. Therefore if the information was provided before hand you may not react automatically. The information should not cause you any distress but may cause you to feel surprised.

During the study, questionnaires will be asking you about your feelings and sometimes answering these types of questions can cause some emotional discomfort. I also need to inform you that when playing the game some individuals have also noticed some mild emotional discomfort but this has not been known to last for very long. However, if any emotional discomfort does occur you will be provided with support from the investigator. The investigator is trained and experienced in providing emotional support. If support is required after the study with your request the investigator will agree to write a letter to your G.P. with details of the study.

Expenses

If costs are incurred by you after your inclusion in the study expenses will be available to cover: travel, telephone calls and postage expenses if they are incurred. These can be claimed though contacting the investigator and may require the presentation of receipts or travel tickets.

Here is a description of what is involved in the study:

At the beginning of the study you will be informed of the information presented in this information sheet and will have a further opportunity to ask questions.

You will be told about the computer game that you will be asked to play. This will involve playing a ball tossing game with other participants over the internet that are based at the University of Hertfordshire. You do not know these people and they know nothing about you. You will never have any other form of contact with these people except during this study nor will they have any influence over your care or any other aspect of your life. However, there is some information about these people that I can not tell you before you have played the game. The only reason for this is that it may change your reaction to the task, affecting my ability to investigate your experience accurately. However, I will tell you this information at the end of the study and you can ask any questions you have about this. This information is not expected to cause you any distress and again this information is not related to yourself and is the same for all other participants taking part in the study.

At any moment during the study you decide that you do not want to continue, it is your right to stop, without providing a reason for your decision. Before the game begins you be asked to fill in some questionnaires about how you have been feeling over the last week. There are no right or wrong answers to these questionnaires and they will not be asking you to provide details of any experiences from your past.

You will then be asked to play the computer game which is very simple and should take approximately 5 minutes. As already mentioned this is a game of ball tossing and involves three characters. Two controlled by the individuals based at the University of Hertfordshire, represented by two cartoon characters and a picture of their faces and their name, and a third player represented by a cartoon hand that you control. The idea of the game is that the characters throw the ball to each other and to you, just like a real game of catch. When you get the ball you can throw it back any character you want to by using the mouse to click on their name. During the game you may experience a varying degree of inclusion; however, it is not possible to inform you about how many times you will receive the ball. I do need to inform you that people who have played the game before have noticed that their feelings are affected by how much they are included and that some people have experienced mild levels of discomfort when they have felt like they were not receiving the ball very often.

Before playing the game you will be given copies of photographs of the people you will be playing with to look at. During the game, your ball tossing performance is not important here, but what you will be asked to do is try to visualise the people you are playing with who you have seen in the two photographs and imagine the faces of the others as you are playing. What sort of people they are? After you have completed playing the game you will be asked to complete another questionnaire about your experience of the game

Next you will be asked to look at the photos of the two people again who you were just playing the game with. You will be informed that they are going to be taking part in a second study at the university. You will be asked to continue to visualise them, having just finished this game with you. Later on both of the participants will be taking part in a separate study and you will be asked to help set this study up. This study will look into their performance on a difficult mathematical task. However, in a room next door there will be a group of students listening to some music and the wall between the two rooms is very thin. Therefore, the music could be very distracting to the participant trying to solve the maths problem. What we would like you to do is to choose the volume of the music that the participants will hear through the wall. The louder it is the more likely it will be distracting, affecting their performance in solving the problem. After hearing this you will be asked to choose the volume from 0 to 100, there are also categories as a guide to help you. Before you doing this you will be played a 10 second clip of the type of music that will be being played

You will then be asked to choose a number between 0- 100 for the volume of the music for each of the two participants. You will be able to look at a card to help. On the card a scale will be split between 1- 25 = not distracting, 25- 49= slightly distracting, 50- 74= distracting and 75- 100= extremely distracting

In a final task as you have still been visualising the people you have been playing with you will be asked to complete a questionnaire rating the different qualities you believe might represent their personalities.

Following this you will be provided with the information about other participants in the game that was not disclosed to you at the beginning. You will also be provided with more information about the study and will have an opportunity to ask any questions that you may have.

Will taking part in this study be kept confidential?

Your responses will be kept strictly confidential and will only be seen by Neil Ralph. The only situation where confidentiality would be broken is if we were concerned about your safety or anyone else's. In this case, we would be obliged to contact any appropriate authorities. However, we would inform you of our intention before doing this.

All results of this study will be anonymous so your name will not appear in the reports of the study. Your responses will be stored without your name or any identifying details in a locked filing cabinet at the University of Hertfordshire. The research team will be the only people who have access to the data for the purposes of analysis. The data will be kept securely for up to 5 years and after this time will be destroyed securely.

What if there is a problem?

If some of the questions trigger upsetting memories, I am trained to help you and will assist you in easing any distress caused. You also do not have to answer any questions that make you feel uncomfortable. If further support is required after the study with your request the investigator will agree to write a letter to your G.P. with details of the study. If you have a concern about any aspect of this study, you should ask to speak to myself (Neil Ralph) and I will do my best to answer your questions. I can be contacted though leaving a message for me with the secretary as above (Telephone no.....). If you remain unhappy and wish to complain formally, you can do this through the NHS Complaints Procedure of the University of Hertfordshire.

Who has reviewed the study?

The study has been reviewed by an NHS Ethics Review Board (South East REC) and approval was given on the ...

Who should I contact for further information?

If you have any questions you can contact me number provided above.

I hope that this information sheet has provided you with all the information you may need and that I have answered all your questions about this research. If you would like more information, or wish to discuss anything relating to this study please feel free to contact me. At the end of the study, you will be able to request a copy of the results of this study.

Thank you for reading this information sheet.

Mr Neil Ralph
Trainee Clinical Psychologist
University of Hertfordshire

CONSENT FORM – Non-Clinical Participants

Title of Project: Emotional reactions in social situations and the effect of mental health problems

Name of Researcher: Neil Ralph
Trainee Clinical Psychologist

Please initial box

1. I confirm that I have read and understand the information sheet dated 7th August 2008 for the above study and have had the opportunity to ask questions.

2. I understand that there will be an element of deceit in the study involving the withholding of information and authorise this if I participate.

3. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.

4. I understand that my responses will be treated in the strictest confidence and that my name will not appear on any questionnaires.

5. I agree to take part in the above study.

Name of Participant

Date

Signature

Researcher

Date

Signature

5. Pictures of Cyberball Game Confederates



Trevor



Cassie

6. Reactive Response Task Volume Scale

Not Distracting	Slightly Distracting	Distracting	Extremely Distracting
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7. Demographic Information Questionnaire

Participant No:

Gender M F

Age Range:

Marital Status:

Single Co-habiting Married
 Separated Divorced Widowed

Education:

GCSE NVQ
 GNVQ HND
 A/AS-Level Dip/ HE
 Other (Please specify).....

Ethnicity:

White

British
 Irish
 Other (Please specify).....

Black or Black British

Caribbean
 African
 Other (Please specify).....

Asian

Indian
 Pakistani
 Bangladeshi
 Other (Please specify).....

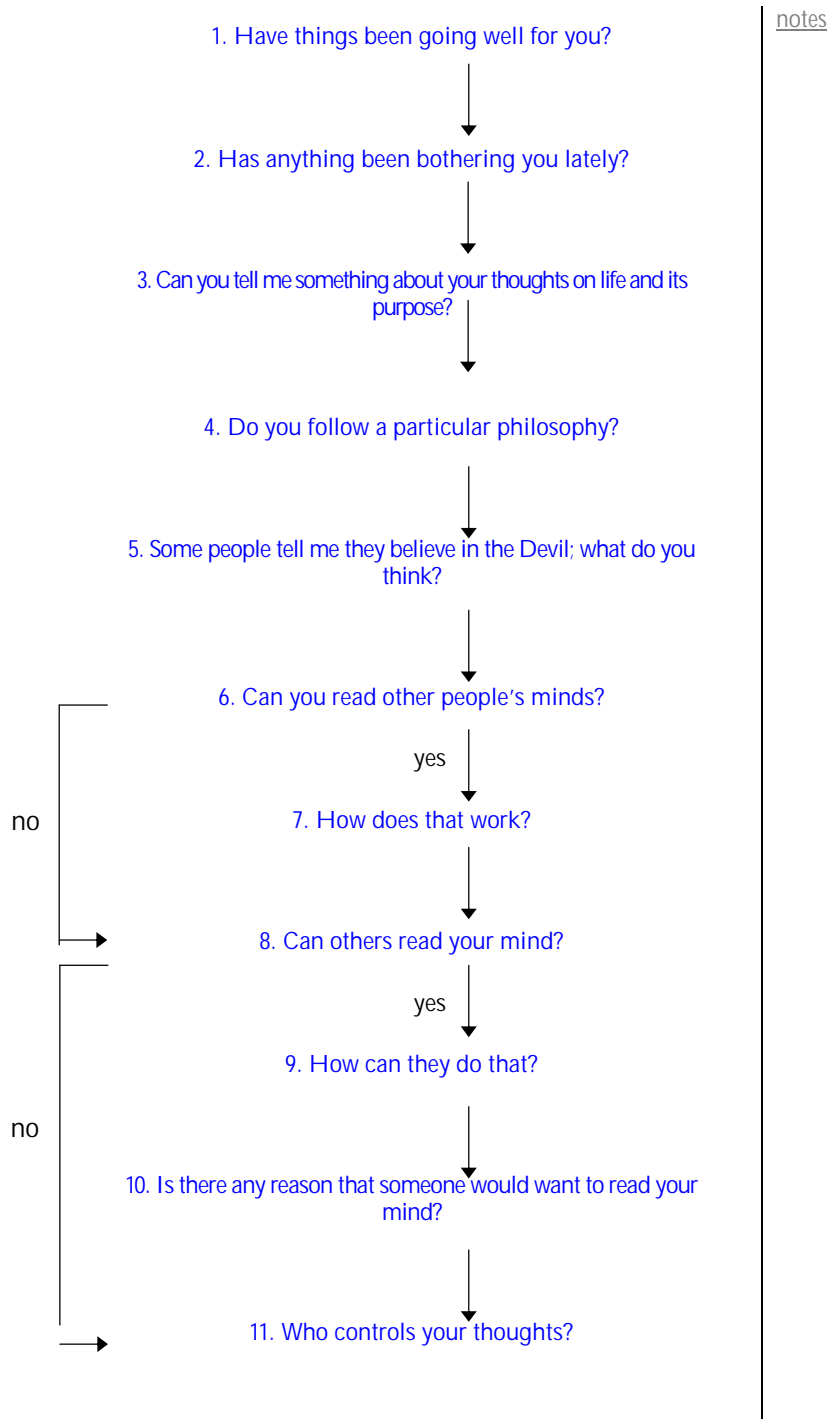
Mixed

White and Black Caribbean
 White and Black African
 White and Asian
 Other (Please specify).....

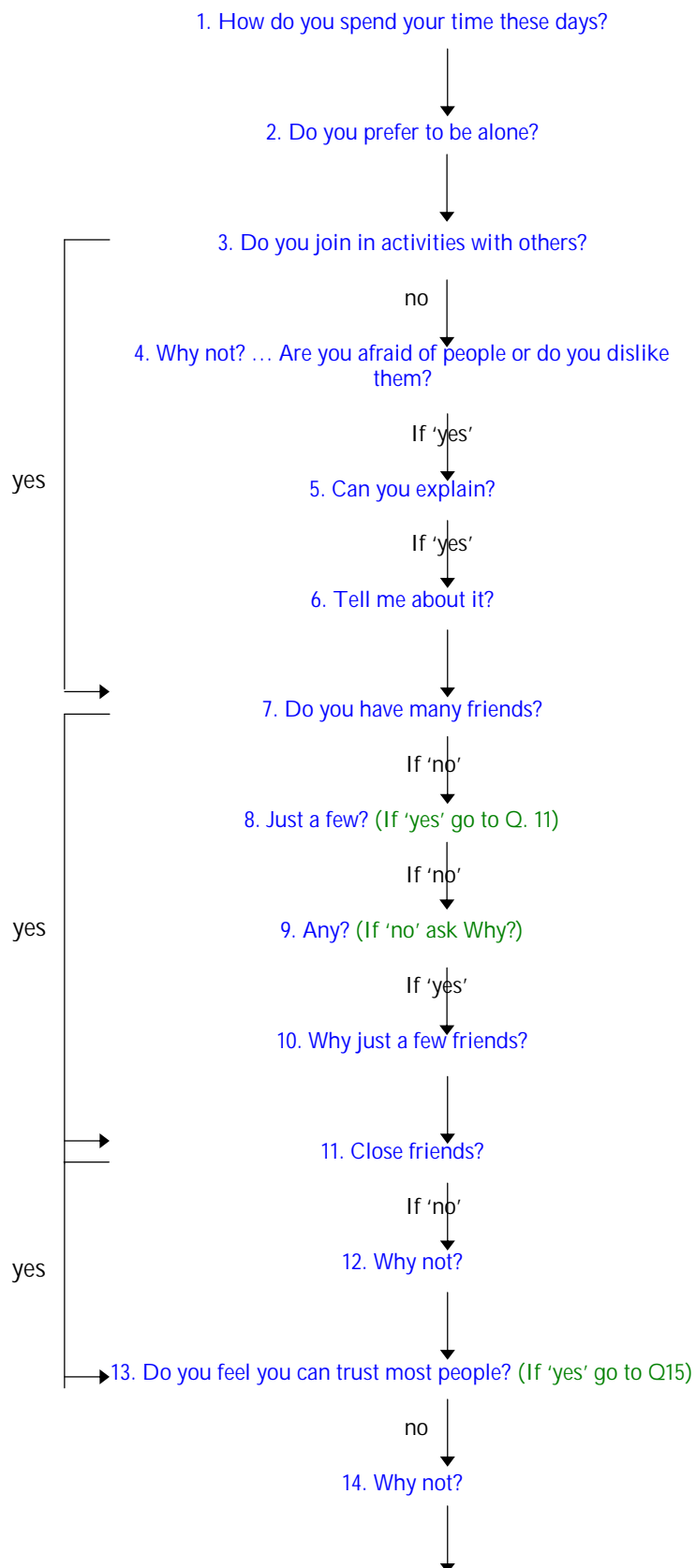
Occupation:

8. Positive and Negative Syndrome Scale (PANSS)

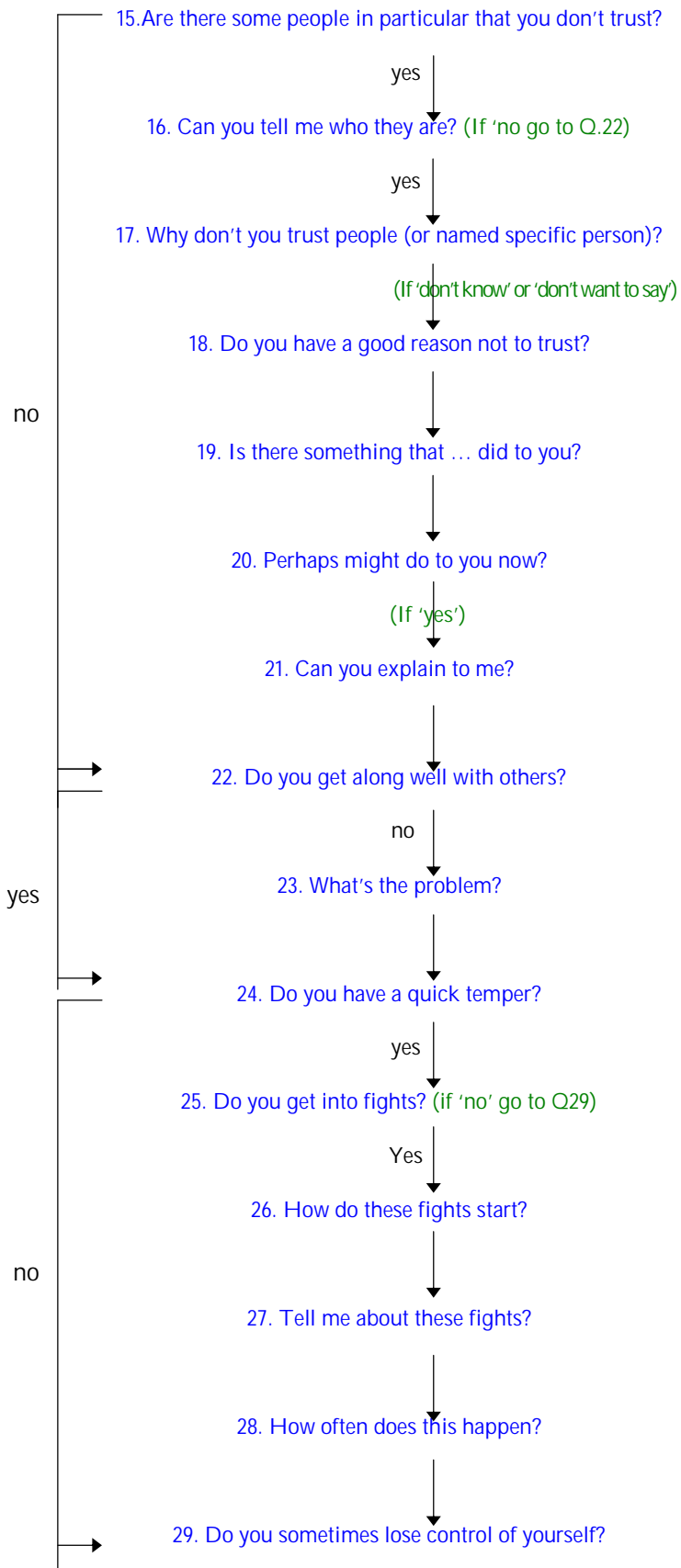
Data on **DELUSIONS (GENERAL)** and **UNUSUAL THOUGHT CONTENT**.

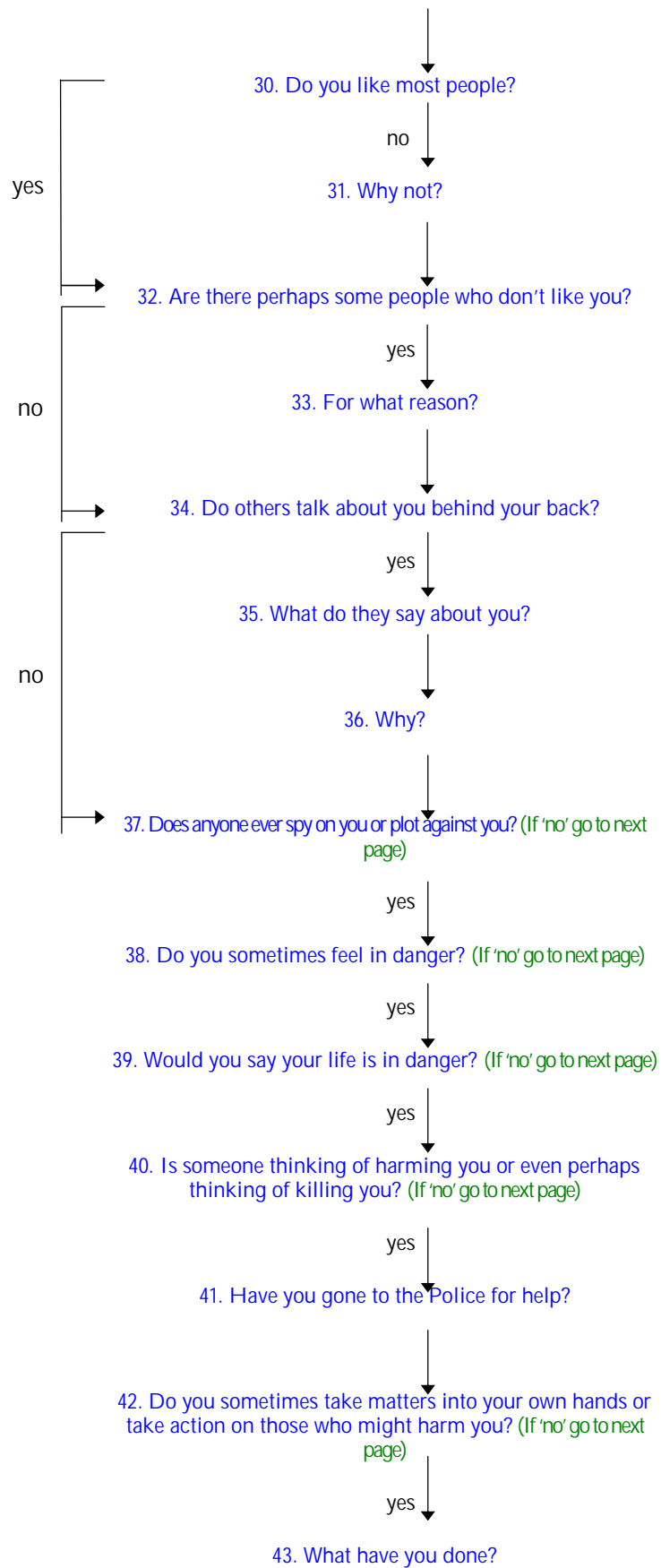


Data on **SUSPICIOUSNESS/PERSECUTION, PASSIVE/APATHETIC SOCIAL WITHDRAWAL, ACTIVE SOCIAL AVOIDANCE** and **POOR IMPULSE CONTROL.**



notes





notes

GENERAL RATING INSTRUCTIONS

Data gathered from this assessment procedure are applied to the PANSS ratings. Each of the 30 items is accompanied by a specific definition as well as detailed anchoring criteria for all seven rating points. These seven points represent increasing levels of psychopathology, as follows:

- 1- absent
- 2- minimal
- 3- mild
- 4- moderate
- 5- moderate severe
- 6- severe
- 7- extreme

In assigning ratings, one first considers whether an item is at all present, as judging by its definition. If the item is absent, it is scored 1, whereas if it is present one must determine its severity by reference to the particular criteria from the anchoring points. The highest applicable rating point is always assigned, even if the patient meets criteria for lower points as well. In judging the level of severity, the rater must utilise a holistic perspective in deciding which anchoring point best characterises the patient's functioning and rate accordingly, whether or not all elements of the description are observed.

The rating points of 2 to 7 correspond to incremental levels of symptom severity:

- A rating of 2 (minimal) denotes questionable or subtle or suspected pathology, or it also may allude to the extreme end of the normal range.
- A rating of 3 (mild) is indicative of a symptom whose presence is clearly established but not pronounced and interferes little in day-to-day functioning.
- A rating of 4 (moderate) characterises a symptom which, though representing a serious problem, either occurs only occasionally or intrudes on daily life only to a moderate extent.
- A rating of 5 (moderate severe) indicates marked manifestations that distinctly impact on one's functioning but are not all-consuming and usually can be contained at will.
- A rating of 6 (severe) represents gross pathology that is present very frequently, proves highly disruptive to one's life, and often calls for direct supervision.
- A rating of 7 (extreme) refers to the most serious level of psychopathology, whereby the manifestations drastically interfere in most or all major life functions, typically necessitating close supervision and assistance in many areas.

Each item is rated in consultation with the definitions and criteria provided in this manual. The ratings are rendered on the PANSS rating form overleaf by encircling the appropriate number following each dimension.

9. Wechsler Test of Adult Reading (WTAR)

WTAR Word List - UK pronunciation guide

Say 1 will show you some words that I will ask you to pronounce. Place the WTAR Word Card in front of the examinee. As you point to the card, say the following with the first word on the list, pronounce each word aloud. Start with this word (point to item 1), and go down this column, one by one, then across, without skipping any. When you finish this column, go to the next column (point to the second column). Pronounce each word again, one by one, in the other direction. Do you understand? When you are sure that the examinee understands the task, say, Ready? Begin.

Item	Pronunciation	Score (0, 1)	Item	Pronunciation	Score (0, 1)
1	again	26.	corrosionous	non-silver-EN-siss	
2	address	27.	heavily	HOM-in-lay or HOM-in-tee	
3	cough	28.	marry	KAL-uh-day or WAL-uh-dee	
4	preview	29.	subtle	SUH-tl	
5	all-though	30.	tearful	FE-und or FEE-und	
6	post	31.	palatable	PAL-uh-tuh-tul or PAL-uh-tuh-bul	
7	exaggerated	32.	perceptive	per-uh-NA-uh-cc	
8	know	33.	obfuscate	OB-fuh-skate	
9	plumb	34.	liaison	lee-AY-zoh or lee-AY-zh	
10	decorate	35.	exigency	eks-uh-jen gay or eks-uh-jen-see	
11	farce	36.	xenophobia	zen-uh-FO-bee-uh	
12	knack	37.	egre	OH-gur	
13	evile	38.	scurlous	SKUR-uh-lus or SKUR-uh-lus	
14	verigance	39.	elthral	uh-THEE-rue-ul or uh-THEER-see-ul	
15	prosligious	40.	paradigm	PAR-uh-dime	
16	weather	41.	verspaully	ver-spauh-KYUW-uh-liee	
17	gnat	42.	shelbra	PLET-uh-dah or PLH-uh-eh-rah	
18	smiththudic	43.	inguricus	oo-GOOB-ree-us or too-GOO-ree-us	
19	leu	44.	treasre	TREE-tz or TREET-z	
20	entreque	45.	diclantic	DILL-uh-tan-ley or DILL-uh-tahnt	
21	reeprent	46.	verliginicus	ver-TIDJ-in-ess	
22	calct	47.	uh-quitous	you-DIG-wur-liss or you-DIG-wur-tus	
23	elquestian	48.	hyperbole	hy-PER-bu-lay or hy-PUR-bul-lay	
24	forso sic	49.	insouciant	in-SOO-see-yunt	
25	assh-otic	50.	hegemony	neh-GEN-oh-nee or neh-JEM-oh-nee or neh-geh-non-see	

WTAR Raw Score

WTAR Standard Score

10. Beck Depression Inventory II (BDI-II)

BDI- II

Participant No:

Instruction: Please read each group of statements carefully, and then **pick out the one statement** in each group that best describes the way you have been feeling during the **past two weeks, including today**. If several statements in the group seem to apply equally well, check the highest number for that group.

<p>1. Sadness</p> <input type="checkbox"/> I do not feel sad <input type="checkbox"/> I feel sad much of the time <input type="checkbox"/> I am sad all the time <input type="checkbox"/> I am so sad or unhappy that I can't stand it	<p>8. Self- Criticalness</p> <input type="checkbox"/> I don't criticise or blame myself more than usual <input type="checkbox"/> I am more critical of myself than I used to be <input type="checkbox"/> I criticise myself for all of my faults <input type="checkbox"/> I blame myself for everything bad that happens	<p>15. Loss of Energy</p> <input type="checkbox"/> I have as much energy as ever <input type="checkbox"/> I have less energy than I used to have <input type="checkbox"/> I don't have enough energy to do very much <input type="checkbox"/> I don't have enough energy to do anything
<p>2. Pessimism</p> <input type="checkbox"/> I am not discouraged about my future <input type="checkbox"/> I feel more discouraged about my future than I used to be <input type="checkbox"/> I do not expect things to work out for me <input type="checkbox"/> I feel my future is hopeless and will only get worse	<p>9. Suicidal Thoughts or Wishes</p> <input type="checkbox"/> I don't have any thoughts of killing myself <input type="checkbox"/> I have thoughts of killing myself, but would not carry them out <input type="checkbox"/> I would like to kill myself <input type="checkbox"/> I would kill myself if I had the chance	<p>16. Changes in Sleep Pattern</p> <input type="checkbox"/> I have not experienced any change in my sleep pattern <input type="checkbox"/> I sleep somewhat more than usual <input type="checkbox"/> I sleep somewhat less than usual <input type="checkbox"/> I sleep a lot more than usual <input type="checkbox"/> I sleep a lot less than usual <input type="checkbox"/> I sleep most of the day <input type="checkbox"/> I wake up 1- 2 hours early and can't get back to sleep
<p>3. Past Failure</p> <input type="checkbox"/> I do not feel like a failure <input type="checkbox"/> I have failed more than I should have <input type="checkbox"/> As I look back, I see a lot of failures <input type="checkbox"/> I feel I am a total failure as a person	<p>10. Crying</p> <input type="checkbox"/> I don't cry anymore than I used to <input type="checkbox"/> I cry more than I used to <input type="checkbox"/> I cry over every little thing <input type="checkbox"/> I feel like crying, but can't	<p>17. Irritability</p> <input type="checkbox"/> I am no more irritable than usual <input type="checkbox"/> I am more irritable than usual <input type="checkbox"/> I am much more irritable than usual <input type="checkbox"/> I am irritable all the time
<p>4. Loss of Pleasure</p> <input type="checkbox"/> I get as much pleasure as I ever did from the things I enjoy <input type="checkbox"/> I don't enjoy things as much as I used to <input type="checkbox"/> I get very little pleasure from the things I used to enjoy <input type="checkbox"/> I can't get any pleasure from the things I used to enjoy	<p>11. Agitation</p> <input type="checkbox"/> I am no more restless or wound up than usual <input type="checkbox"/> I feel more restless or wound up than usual <input type="checkbox"/> I am so restless or agitated that It's hard to stay still <input type="checkbox"/> I am so restless or agitated that I have to keep moving or doing something	<p>18. Changes in Appetite</p> <input type="checkbox"/> I have not experienced any change in my appetite <input type="checkbox"/> My appetite is somewhat less than usual <input type="checkbox"/> My appetite is somewhat greater than usual <input type="checkbox"/> My appetite is much less than before <input type="checkbox"/> My appetite is much greater than usual <input type="checkbox"/> I have no appetite at all <input type="checkbox"/> I crave food all the time

<p>5. Guilty Feelings</p> <p><input type="checkbox"/> I don't feel particularly guilty</p> <p><input type="checkbox"/> I feel guilty over many things I have done or should have done</p> <p><input type="checkbox"/> I feel quite guilty most of the time</p> <p><input type="checkbox"/> I feel guilty all of the time</p>	<p>12. Loss of interest</p> <p><input type="checkbox"/> I have not lost interest in other people or activities</p> <p><input type="checkbox"/> I am less interested in other people or things than before</p> <p><input type="checkbox"/> I have lost most of my interest in other people or things</p> <p><input type="checkbox"/> It's hard to get interested in anything</p>	<p>19. Concentration Difficulty</p> <p><input type="checkbox"/> I can concentrate as well as ever</p> <p><input type="checkbox"/> I can't concentrate as well as usual</p> <p><input type="checkbox"/> It's hard to keep my mind on anything for very long</p> <p><input type="checkbox"/> I find I can't concentrate on anything</p>
<p>6. Punishment Feelings</p> <p><input type="checkbox"/> I don't feel I am being punished</p> <p><input type="checkbox"/> I feel I may be punished</p> <p><input type="checkbox"/> I expect to be punished</p> <p><input type="checkbox"/> I feel I am being punished</p>	<p>13. Indecisiveness</p> <p><input type="checkbox"/> I make decisions about as well as ever</p> <p><input type="checkbox"/> I find it more difficult to make decisions than usual</p> <p><input type="checkbox"/> I have much greater difficulty in making decisions than I used to</p> <p><input type="checkbox"/> I have trouble making any decisions</p>	<p>20. Tiredness or Fatigue</p> <p><input type="checkbox"/> I am no more tired or fatigued than usual</p> <p><input type="checkbox"/> I get more tired or fatigued more easily than usual</p> <p><input type="checkbox"/> I am too tired or fatigued to do a lot of the things I used to do.</p> <p><input type="checkbox"/> I am too tired or fatigued to do most of the things I used to do</p>
<p>7. Self Dislike</p> <p><input type="checkbox"/> I feel the same about myself as ever</p> <p><input type="checkbox"/> I have lost confidence in myself</p> <p><input type="checkbox"/> I am disappointed in myself</p> <p><input type="checkbox"/> I dislike myself</p>	<p>14. Worthlessness</p> <p><input type="checkbox"/> I do not feel I am worthless</p> <p><input type="checkbox"/> I don't consider myself as worthwhile and useful as I used to</p> <p><input type="checkbox"/> I feel more worthless as compared to other people</p> <p><input type="checkbox"/> I feel utterly worthless</p>	<p>21. Loss of Interest in Sex</p> <p><input type="checkbox"/> I have not noticed any recent change in my interest in sex</p> <p><input type="checkbox"/> I am less interested in sex than I used to be</p> <p><input type="checkbox"/> I am much less interested in sex now</p> <p><input type="checkbox"/> I have lost interest in sex completely</p>

11. Beck Anxiety Inventory (BAI)

BAI

Participant No:

Instructions: Below is a list of common symptoms of anxiety. Please carefully read each item in the list. Indicate how much you have been bothered by each symptom during the **past week, including today.**

	Not At All	Mildly (It did not bother me much)	Moderately (It was very unpleasant but I could stand it)	Severely (I could barely stand it)
1. Numbness or tingling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Feeling Hot	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Wobbliness in legs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Unable to relax	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Fear of the worst happening	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Dizzy or lightheaded	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Heart pounding or racing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Unsteady	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Terrified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Nervous	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Feelings of choking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Hands trembling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Shaky	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Fear of losing control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Difficulty breathing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Fear of dying	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Scared	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Indigestion or discomfort in abdomen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Faint	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Face flushed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Sweating (not due to heat)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

12. Worry About Others Questionnaire (Paranoia Scale)

Participant Code.....

For each question, please indicate the degree to which each statement is true or characteristic of you on this 5-point scale.

1- Not at all 2- Slightly 3- Moderately 4- Very 5-Extremely

Statement	Score
Someone has it in for me.	
I sometimes feel as if I'm being followed.	
I believe that I have often been punished without cause.	
Some people have tried to steal my ideas and take credit for them.	
My parents and family find more fault with me than they should.	
No one really cares much what happens to you.	
I am sure I get a raw deal from life.	
Most people will use somewhat unfair means to gain profit or an advantage, rather than lose it.	
I often wonder what hidden reason another person may have for doing something nice for you.	
It is safer to trust no one.	

Worry About Others Questionnaire continued...

Participant Code.....

Again for each question, please indicate the degree to which each statement is true or characteristic of you on this 5-point scale.

1- Not at all 2- Slightly 3- Moderately 4- Very 5-Extremely

Statement	Score
I have often felt that strangers were looking at me critically.	
Most people make friends because friends are likely to be useful to them.	
Someone has been trying to influence my mind.	
I am sure I have been talked about behind my back.	
Most people inwardly dislike putting themselves out to help other people.	
I tend to be on my guard with people who are somewhat more friendly than I expected.	
People have said insulting and unkind things about me.	
People often disappoint me.	
I am bothered by people outside, in cars, in stores, etc. watching me.	
I have often found people jealous of my good ideas just because they had not thought of them first.	

13. Rosenberg Self- Esteem Scale (Rosenberg SE)

Rosenberg Self- Esteem Scale

Participant No:

Instructions: How have each of these statements applied to you over the past month?
Please read each one carefully and put a tick in the appropriate box.

	Strongly Agree	Agree	Disagree	Strongly Disagree
On the whole I am satisfied with myself				
At times I think I am no good at all				
I feel that I have a number of good qualities				
I am able to do things as well as most people				
I feel I do not have much to be proud of				
I feel useless at times				
I feel that I am a person of worth, at least on an equal plane with others				
A wish I could have more respect for myself				
All in all I am inclined to feel that I am a failure				
I take a positive attitude towards myself				

14. The Need to Belong Scale (nBelong)

Participant Code.....

For each question, please indicate the degree to which each statement is true or characteristic of you on this 5-point scale.

1- Not at all 2- Slightly 3- Moderately 4- Very 5-Extremely

Statement	Score
If other people do not seem to accept me, I do not let it bother me.	
I try hard not to do things that will make other people avoid or reject me.	
I seldom worry about whether other people care about me.	
I need to feel that there are people I can turn to in times of need.	
I want other people to accept me.	
I do not like being alone.	
Being apart from my friends for long periods of time does not bother me.	
I have a strong “need to belong.”	
It bothers me a great deal when I am not included in other people’s plans.	
My feelings are easily hurt when I feel that others do not accept me.	

15. Primary Needs Questionnaires

Pre-task Primary Needs Questionnaire

Participant Code.....

For each question, please circle the number to the right that best represents the **feelings** you are currently experiencing before the game.

	Not at all				Extremely
Belonging	-	-	-	-	-
'I feel disconnected'	1	2	3	4	5
'I feel rejected'	1	2	3	4	5
'I felt like an outsider'	1	2	3	4	5
Self- esteem	-	-	-	-	-
'I feel good about myself'	1	2	3	4	5
'my self- esteem is high'	1	2	3	4	5
'I feel liked'	1	2	3	4	5
Control	-	-	-	-	-
'I feel powerful'	1	2	3	4	5
'I feel I have control over the course of the interaction'	1	2	3	4	5
'I feel superior'	1	2	3	4	5
Meaningful Existence	-	-	-	-	-
'I feel invisible'	1	2	3	4	5
'I feel meaningless'	1	2	3	4	5
'I feel non- existent'	1	2	3	4	5

Post-task Primary Needs Questionnaire

Participant Code.....

*For each question, please circle the number to the right that best represents the **feelings** you were experiencing **during** the game.*

	Not at all				Very much
Game Experience	-	-	-	-	-
I was ignored and I was excluded	1	2	3	4	5
Assuming that 33% of the time you would receive the ball if everyone received it equally, what percent of throws did you receive?					___ %
	Not at all				Extrem ely
Belonging	-	-	-	-	-
'I felt disconnected'	1	2	3	4	5
'I felt rejected'	1	2	3	4	5
'I felt like an outsider'	1	2	3	4	5
Self- esteem	-	-	-	-	-
'I felt good about myself'	1	2	3	4	5
'my self- esteem was high'	1	2	3	4	5
'I felt liked'	1	2	3	4	5
Control	-	-	-	-	-
'I felt powerful'	1	2	3	4	5
'I felt I had control over the course of the interaction'	1	2	3	4	5
'I felt superior'	1	2	3	4	5
Meaningful Existence	-	-	-	-	-
'I felt invisible'	1	2	3	4	5
'I felt meaningless'	1	2	3	4	5
'I felt non- existent'	1	2	3	4	5

16. Personality Attribution Questionnaire (PAQ)

Personality of Other Questionnaire

Participant Code.....

For each question, please indicate your beliefs about the other person using the 5-point scale.

The other person is:

Bad 1	2	3	4	Good 5
Mean 1	2	3	4	Pleasant 5
Disagreeable 1	2	3	4	Agreeable 5
Uncaring 1	2	3	4	Caring 5
Kind 1	2	3	4	Cruel 5
Harmful 1	2	3	4	Unharmful 5
Untrustworthy 1	2	3	4	Trustworthy 5
Unfriendly 1	2	3	4	Friendly 5
Unfearful 1	2	3	4	Fearful 5
Dangerous 1	2	3	4	Not Dangerous 5

17. SPSS analysis of PANSS data

ANOVA

Descriptive Statistics

Dependent Variable: Abbrev PANNS Score

Experimental Group	Mean	Std. Deviation	N
Psychosis Group	24.00	4.493	22
Anxious Group	8.33	1.572	18
Healthy Control Group	7.37	1.257	19
Total	13.86	8.415	59

Tests of Between-Subjects Effects

Dependent Variable: Abbrev PANNS Score

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	3612.494 ^a	2	1806.247	204.582	.000	.880
Intercept	10259.126	1	10259.126	1161.987	.000	.954
ExG	3612.494	2	1806.247	204.582	.000	.880
Error	494.421	56	8.829			
Total	15448.000	59				
Corrected Total	4106.915	58				

T-Test Psychotic vs Anxious

a. R Squared = .880 (Adjusted R Squared = .875)

Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means							
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
								Lower	Upper	
Abbrev PANNS Score	Equal variances assumed	20.507	.000	1.408E1	38	.000	15.667	1.113	13.414	17.920
	Equal variances not assumed			1.525E1	27.005	.000	15.667	1.027	13.559	17.774

T-Test Psychotic vs Healthy

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Abbrev PANNS Score	Equal variances assumed	27.431	.000	15.592	39	.000	16.632	1.067	14.474	18.789
	Equal variances not assumed			16.625	24.739	.000	16.632	1.000	14.570	18.693

T-Test Anxious vs Healthy

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Abbrev PANNS Score	Equal variances assumed	1.429	.240	2.068	35	.046	.965	.467	.018	1.912
	Equal variances not assumed			2.056	32.549	.048	.965	.469	.009	1.920

18. SPSS analysis of demographic data

Relationship Status * Experimental Group Crosstabulation

			Experimental Group			
			Psychosis Group	Anxious Group	Healthy Control Group	Total
Relationship Status	Yes	Count	2	7	14	23
		% within Relationship Status	8.7%	30.4%	60.9%	100.0%
		% within Experimental Group	9.1%	38.9%	73.7%	39.0%
		% of Total	3.4%	11.9%	23.7%	39.0%
Relationship Status	No	Count	20	11	5	36
		% within Relationship Status	55.6%	30.6%	13.9%	100.0%
		% within Experimental Group	90.9%	61.1%	26.3%	61.0%
		% of Total	33.9%	18.6%	8.5%	61.0%
Relationship Status	Total	Count	22	18	19	59
		% within Relationship Status	37.3%	30.5%	32.2%	100.0%
		% within Experimental Group	100.0%	100.0%	100.0%	100.0%
		% of Total	37.3%	30.5%	32.2%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	17.883 ^a	2	.000	.000		
Likelihood Ratio	19.542	2	.000	.000		
Fisher's Exact Test	18.420			.000		
Linear-by-Linear Association	17.548 ^b	1	.000	.000	.000	.000
N of Valid Cases	59					

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 7.02.

b. The standardized statistic is -4.189.

Gender Raw * Experimental Group Crosstabulation

		Experimental Group			
		Psychosis Group	Anxious Group	Healthy Control Group	Total
Gender Raw Male	Count	19	12	10	41
	% within Gender Raw	46.3%	29.3%	24.4%	100.0%
	% within Experimental Group	86.4%	66.7%	52.6%	69.5%
	% of Total	32.2%	20.3%	16.9%	69.5%
Female	Count	3	6	9	18
	% within Gender Raw	16.7%	33.3%	50.0%	100.0%
	% within Experimental Group	13.6%	33.3%	47.4%	30.5%
	% of Total	5.1%	10.2%	15.3%	30.5%
Total	Count	22	18	19	59
	% within Gender Raw	37.3%	30.5%	32.2%	100.0%
	% within Experimental Group	100.0%	100.0%	100.0%	100.0%
	% of Total	37.3%	30.5%	32.2%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	5.569 ^a	2	.062	.063		
Likelihood Ratio	5.856	2	.053	.071		
Fisher's Exact Test	5.582			.063		
Linear-by-Linear Association	5.428 ^b	1	.020	.027	.015	.009
N of Valid Cases	59					

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.49.

b. The standardized statistic is 2.330.

Education * Experimental Group Crosstabulation

		Experimental Group			
		Psychosis Group	Anxious Group	Healthy Control Group	Total
Education GCSE	Count	15	13	12	40
	% within Education	37.5%	32.5%	30.0%	100.0%
	% within Experimental Group	68.2%	72.2%	63.2%	67.8%
	% of Total	25.4%	22.0%	20.3%	67.8%
A-Level	Count	5	3	5	13
	% within Education	38.5%	23.1%	38.5%	100.0%
	% within Experimental Group	22.7%	16.7%	26.3%	22.0%
	% of Total	8.5%	5.1%	8.5%	22.0%
Higher-Ed	Count	2	2	2	6
	% within Education	33.3%	33.3%	33.3%	100.0%
	% within Experimental Group	9.1%	11.1%	10.5%	10.2%
	% of Total	3.4%	3.4%	3.4%	10.2%
Total	Count	22	18	19	59
	% within Education	37.3%	30.5%	32.2%	100.0%
	% within Experimental Group	100.0%	100.0%	100.0%	100.0%
	% of Total	37.3%	30.5%	32.2%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	.554 ^a	4	.968	.981		
Likelihood Ratio	.567	4	.967	.981		
Fisher's Exact Test	.846			.981		
Linear-by-Linear Association	.087 ^b	1	.768	.819	.429	.087
N of Valid Cases	59					

a. 6 cells (66.7%) have expected count less than 5. The minimum expected count is 1.83.

b. The standardized statistic is .295.

Ethnicity * Experimental Group Crosstabulation

		Experimental Group			
		Psychosis Group	Anxious Group	Healthy Control Group	Total
Ethnicity White	Count	20	16	14	50
	% within Ethnicity	40.0%	32.0%	28.0%	100.0%
	% within Experimental Group	90.9%	88.9%	73.7%	84.7%
	% of Total	33.9%	27.1%	23.7%	84.7%
Non-White	Count	2	2	5	9
	% within Ethnicity	22.2%	22.2%	55.6%	100.0%
	% within Experimental Group	9.1%	11.1%	26.3%	15.3%
	% of Total	3.4%	3.4%	8.5%	15.3%
Total	Count	22	18	19	59
	% within Ethnicity	37.3%	30.5%	32.2%	100.0%
	% within Experimental Group	100.0%	100.0%	100.0%	100.0%
	% of Total	37.3%	30.5%	32.2%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	2.684 ^a	2	.261	.288		
Likelihood Ratio	2.534	2	.282	.354		
Fisher's Exact Test	2.408			.320		
Linear-by-Linear Association	2.226 ^b	1	.136	.196	.102	.058
N of Valid Cases	59					

a. 3 cells (50.0%) have expected count less than 5. The minimum expected count is 2.75.

b. The standardized statistic is 1.492.

Occupation * Experimental Group Crosstabulation

			Experimental Group			
			Psychosis Group	Anxious Group	Healthy Control Group	Total
Occupation	Employed	Count	2	5	16	23
		% within Occupation	8.7%	21.7%	69.6%	100.0%
		% within Experimental Group	9.1%	27.8%	84.2%	39.0%
		% of Total	3.4%	8.5%	27.1%	39.0%
Unemployed	Count	17	10	2	29	
		% within Occupation	58.6%	34.5%	6.9%	100.0%
		% within Experimental Group	77.3%	55.6%	10.5%	49.2%
		% of Total	28.8%	16.9%	3.4%	49.2%
Student	Count	3	3	1	7	
		% within Occupation	42.9%	42.9%	14.3%	100.0%
		% within Experimental Group	13.6%	16.7%	5.3%	11.9%
		% of Total	5.1%	5.1%	1.7%	11.9%
Total	Count	22	18	19	59	
		% within Occupation	37.3%	30.5%	32.2%	100.0%
		% within Experimental Group	100.0%	100.0%	100.0%	100.0%
		% of Total	37.3%	30.5%	32.2%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	26.155 ^a	4	.000	.000		
Likelihood Ratio	28.350	4	.000	.000		
Fisher's Exact Test	26.474			.000		
Linear-by-Linear Association	15.643 ^b	1	.000	.000	.000	.000
N of Valid Cases	59					

a. 3 cells (33.3%) have expected count less than 5. The minimum expected count is 2.14.

b. The standardized statistic is -3.955.

ANOVA

Tests of Between-Subjects Effects

Dependent Variable: Age

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	2167.412 ^a	2	1083.706	10.829	.000	.279
Intercept	62313.910	1	62313.910	622.667	.000	.917
ExG	2167.412	2	1083.706	10.829	.000	.279
Error	5604.249	56	100.076			
Total	69216.000	59				
Corrected Total	7771.661	58				

a. R Squared = .279 (Adjusted R Squared = .253)

Correlation with PNQ-D

Correlations

		PNQ Difference	Age
PNQ Difference	Pearson Correlation	1.000	-.110
	Sig. (2-tailed)		.412
	N	58.000	58
Age	Pearson Correlation	-.110	1.000
	Sig. (2-tailed)	.412	
	N	58	59.000

T-test Psychotic vs Anxious

6

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Age	9.087	.005	-2.707	38	.010	-6.364	2.351	-11.123	-1.605
Equal variances not assumed			-2.614	29.587	.014	-6.364	2.434	-11.338	-1.389

T-test Psychotic vs Healthy

Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Age Equal variances assumed	19.780	.000	-4.425	39	.000	-14.574	3.293	-21.235	-7.913
Equal variances not assumed			-4.205	23.883	.000	-14.574	3.466	-21.729	-7.419

T-test Anxious vs Healthy

Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Age Equal variances assumed	5.396	.026	-2.128	35	.040	-8.211	3.859	-16.044	-.377
Equal variances not assumed			-2.154	30.371	.039	-8.211	3.812	-15.991	-.430

19. SPSS analysis of mood manipulation data

MCR

Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Manipulation Check Rating	.726	.398	-6.666	57	.000	-1.997	.299	-2.596	-1.397
Equal variances not assumed			-6.643	53.987	.000	-1.997	.301	-2.599	-1.394

MCP

Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Winsorised Manip Check	3.051	.086	9.782	56	.000	23.207	2.372	18.454	27.959
Equal variances not assumed			9.782	51.251	.000	23.207	2.372	18.445	27.969

20. SPSS analysis of PNQ-D data

Descriptive Statistics

Dependent Variable:PNQ Difference

Experimental Group	Experimental Condition	Mean	Std. Deviation	N
Psychosis Group	Included	-3.36	10.122	11
	Excluded	-11.09	13.634	11
	Total	-7.23	12.367	22
Healthy Control Group	Included	4.44	8.974	9
	Excluded	-11.22	13.962	9
	Total	-3.39	13.950	18
Total	Included	-1.30	4.448	10
	Excluded	-19.25	8.172	8
	Total	-9.28	11.055	18
Total	Included	-3.33	8.636	30
	Excluded	-13.46	12.562	28
	Total	-6.67	12.510	58

Levene's Test of Equality of Error Variances^a

Dependent Variable:PNQ Difference

F	df1	df2	Sig.
2.334	5	52	.055

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + ExG + ExC + ExG * ExC

Tests of Between-Subjects Effects

Dependent Variable:PNQ Difference

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	3187.944 ^a	5	637.589	5.783	.000	.357
Intercept	2775.279	1	2775.279	25.173	.000	.326
ExG	426.482	2	213.241	1.934	.155	.069
ExC	2717.347	1	2717.347	24.648	.000	.322
ExG * ExC	292.078	2	146.039	1.325	.275	.048
Error	5732.832	52	110.247			
Total	11503.000	58				
Corrected Total	8920.776	57				

a. R Squared = .357 (Adjusted R Squared = .296)

21. SPSS analysis of separate 'primary needs' data

Descriptive Statistics

Dependent Variable:PNQBel Diff

Experimental Group	Experimental Condition	Mean	Std. Deviation	N
Psychosis Group	Included	-.73	4.125	11
	Excluded	-4.27	5.002	11
	Total	-2.50	4.828	22
Anxious Group	Included	.11	1.269	9
	Excluded	-5.00	4.555	9
	Total	-2.44	4.176	18
Healthy Control Group	Included	-.70	3.057	10
	Excluded	-6.38	3.204	8
	Total	-3.22	4.195	18
Total	Included	-.47	3.060	30
	Excluded	-5.11	4.341	28
	Total	-2.71	4.377	58

Tests of Between-Subjects Effects

Dependent Variable:PNQBel Diff

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	336.790 ^a	5	67.358	4.638	.001	.308
Intercept	457.480	1	457.480	31.499	.000	.377
ExG	13.925	2	6.962	.479	.622	.018
ExC	326.519	1	326.519	22.482	.000	.302
ExG * ExC	12.315	2	6.157	.424	.657	.016
Error	755.228	52	14.524			
Total	1517.000	58				
Corrected Total	1092.017	57				

a. R Squared = .308 (Adjusted R Squared = .242)

Descriptive Statistics

Dependent Variable:PNQCon Diff

Experimental Group	Experimental Condition	Mean	Std. Deviation	N
Psychosis Group	Included	-.64	2.461	11
	Excluded	-1.64	2.656	11
	Total	-1.14	2.550	22
Anxious Group	Included	.78	4.631	9
	Excluded	-2.00	3.354	9
	Total	-.61	4.175	18
Healthy Control Group	Included	-.70	2.359	10
	Excluded	-2.75	1.832	8
	Total	-1.61	2.330	18
Total	Included	-.23	3.191	30
	Excluded	-2.07	2.652	28
	Total	-1.12	3.061	58

Tests of Between-Subjects Effects

Dependent Variable:PNQCon Diff

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	67.909 ^a	5	13.582	1.515	.201	.127
Intercept	76.676	1	76.676	8.552	.005	.141
ExG	11.108	2	5.554	.619	.542	.023
ExC	53.992	1	53.992	6.022	.018	.104
ExG * ExC	8.015	2	4.007	.447	.642	.017
Error	466.246	52	8.966			
Total	607.000	58				
Corrected Total	534.155	57				

a. R Squared = .127 (Adjusted R Squared = .043)

Descriptive Statistics

Dependent Variable:PNQME Diff

Experimental Group	Experimental Condition	Mean	Std. Deviation	N
Psychosis Group	Included	-1.09	3.390	11
	Excluded	-3.73	5.641	11
	Total	-2.41	4.737	22
Anxious Group	Included	1.22	3.032	9
	Excluded	-2.56	4.978	9
	Total	-.67	4.446	18
Healthy Control Group	Included	-.20	1.476	10
	Excluded	-3.75	5.523	8
	Total	-1.78	4.124	18
Total	Included	-.10	2.845	30
	Excluded	-3.36	5.230	28
	Total	-1.67	4.446	58

Tests of Between-Subjects Effects

Dependent Variable:PNQME Diff

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	188.807 ^a	5	37.761	2.093	.081	.168
Intercept	162.216	1	162.216	8.993	.004	.147
ExG	31.565	2	15.782	.875	.423	.033
ExC	157.834	1	157.834	8.750	.005	.144
ExG * ExC	3.717	2	1.858	.103	.902	.004
Error	937.969	52	18.038			
Total	1289.000	58				
Corrected Total	1126.776	57				

a. R Squared = .168 (Adjusted R Squared = .088)

Descriptive Statistics

Dependent Variable:PNQSE Diff

Experimental Group	Experimental Condition	Mean	Std. Deviation	N
Psychosis Group	Included	-.73	3.467	11
	Excluded	-2.00	3.376	11
	Total	-1.36	3.402	22
Anxious Group	Included	1.89	3.257	9
	Excluded	-1.33	4.330	9
	Total	.28	4.070	18
Healthy Control Group	Included	.30	2.163	10
	Excluded	-3.62	3.623	8
	Total	-1.44	3.451	18
Total	Included	.40	3.114	30
	Excluded	-2.25	3.748	28
	Total	-.88	3.657	58

Tests of Between-Subjects Effects

Dependent Variable:PNQSE Diff

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	159.109 ^a	5	31.822	2.744	.028	.209
Intercept	48.032	1	48.032	4.142	.047	.074
ExG	39.921	2	19.961	1.721	.189	.062
ExC	112.704	1	112.704	9.718	.003	.157
ExG * ExC	19.101	2	9.550	.824	.445	.031
Error	603.046	52	11.597			
Total	807.000	58				
Corrected Total	762.155	57				

a. R Squared = .209 (Adjusted R Squared = .133)

22. SPSS analysis of psychological measures data

Tests of Between-Subjects Effects

Dependent Variable: Predicted IQ

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	606.195 ^a	5	121.239	.902	.486	.078
Intercept	641834.762	1	641834.762	4777.469	.000	.989
ExG	187.179	2	93.590	.697	.503	.026
ExC	343.550	1	343.550	2.557	.116	.046
ExG * ExC	77.597	2	38.798	.289	.750	.011
Error	7120.347	53	134.346			
Total	652753.000	59				
Corrected Total	7726.542	58				

a. R Squared = .078 (Adjusted R Squared = -.008)

Correlations

		PNQ Difference	Predicted IQ
PNQ Difference	Pearson Correlation	1.000	.199
	Sig. (2-tailed)		.134
	N	58.000	58
Predicted IQ	Pearson Correlation	.199	1.000
	Sig. (2-tailed)	.134	
	N	58	59.000

Tests of Between-Subjects Effects

Dependent Variable: Anxiety BAI

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	2772.307 ^a	5	554.461	4.624	.001	.304
Intercept	22446.359	1	22446.359	187.203	.000	.779
ExG	2621.003	2	1310.501	10.930	.000	.292
ExC	20.458	1	20.458	.171	.681	.003
ExG * ExC	100.030	2	50.015	.417	.661	.015
Error	6354.913	53	119.904			
Total	31934.000	59				
Corrected Total	9127.220	58				

a. R Squared = .304 (Adjusted R Squared = .238)

Correlations

		PNQ Difference	Anxiety BAI
PNQ Difference	Pearson Correlation	1.000	-.103
	Sig. (2-tailed)		.441
	N	58.000	58
Anxiety BAI	Pearson Correlation	-.103	1.000
	Sig. (2-tailed)	.441	
	N	58	59.000

Tests of Between-Subjects Effects

Dependent Variable: Depression BDI-II

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	2198.203 ^a	5	439.641	3.888	.004	.268
Intercept	15322.189	1	15322.189	135.519	.000	.719
ExG	1809.172	2	904.586	8.001	.001	.232
ExC	48.617	1	48.617	.430	.515	.008
ExG * ExC	306.147	2	153.074	1.354	.267	.049
Error	5992.339	53	113.063			
Total	24369.000	59				
Corrected Total	8190.542	58				

a. R Squared = .268 (Adjusted R Squared = .199)

Tests of Between-Subjects Effects

Dependent Variable: Rosenberg SE

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	482.761 ^a	5	96.552	4.055	.003	.277
Intercept	14364.558	1	14364.558	603.322	.000	.919
ExG	467.957	2	233.978	9.827	.000	.271
ExC	18.703	1	18.703	.786	.379	.015
ExG * ExC	2.139	2	1.069	.045	.956	.002
Error	1261.883	53	23.809			
Total	15997.000	59				
Corrected Total	1744.644	58				

a. R Squared = .277 (Adjusted R Squared = .208)

Correlations

		PNQ Difference	Depression BDI-II
PNQ Difference	Pearson Correlation	1.000	.013
	Sig. (2-tailed)		.921
	N	58.000	58
Depression BDI-II	Pearson Correlation	.013	1.000
	Sig. (2-tailed)	.921	
	N	58	59.000

Correlations

		PNQ Difference	Rosenberg SE
PNQ Difference	Pearson Correlation	1.000	-.181
	Sig. (2-tailed)		.174
	N	58.000	58
Rosenberg SE	Pearson Correlation	-.181	1.000
	Sig. (2-tailed)	.174	
	N	58	59.000

Tests of Between-Subjects Effects

Dependent Variable:Paranoia Corrected

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	5675.859 ^a	5	1135.172	6.000	.000	.361
Intercept	31366.996	1	31366.996	165.783	.000	.758
ExG	4870.598	2	2435.299	12.871	.000	.327
ExC	512.550	1	512.550	2.709	.106	.049
ExG * ExC	249.913	2	124.956	.660	.521	.024
Error	10027.870	53	189.205			
Total	49496.000	59				
Corrected Total	15703.729	58				

Tests of Between-Subjects Effects

Dependent Variable:nBelong Corrected

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	407.292 ^a	5	81.458	2.256	.062	.176
Intercept	30574.654	1	30574.654	846.950	.000	.941
ExG	18.179	2	9.089	.252	.778	.009
ExC	253.838	1	253.838	7.032	.011	.117
ExG * ExC	156.881	2	78.440	2.173	.124	.076
Error	1913.284	53	36.100			
Total	33302.000	59				
Corrected Total	2320.576	58				

Correlations

		PNQ Difference	Paranoia Corrected
PNQ Difference	Pearson Correlation	1.000	-.071
	Sig. (2-tailed)		.597
	N	58.000	58
Paranoia Corrected	Pearson Correlation	-.071	1.000
	Sig. (2-tailed)	.597	
	N	58	59.000

Correlations

		PNQ Difference	nBelong Corrected
PNQ Difference	Pearson Correlation	1.000	.116
	Sig. (2-tailed)		.387
	N	58.000	58
nBelong Corrected	Pearson Correlation	.116	1.000
	Sig. (2-tailed)	.387	
	N	58	59.000

23. SPSS analysis of antisocial reactive response data

Reactive Response * Combined Groups * Experimental Condition Crosstabulation

Experimental Condition		Combined Groups		
		Psychotic	Non-Psychotic	Total
Included Reactive Response Antisocial	Count	5	3	8
	% within Reactive Response	62.5%	37.5%	100.0%
	% within Combined Groups	45.5%	15.8%	26.7%
Neutral	Count	6	16	22
	% within Reactive Response	27.3%	72.7%	100.0%
	% within Combined Groups	54.5%	84.2%	73.3%
Total	Count	11	19	30
	% within Reactive Response	36.7%	63.3%	100.0%
	% within Combined Groups	100.0%	100.0%	100.0%

Reactive Response * Combined Groups * Experimental Condition Crosstabulation

Experimental Condition		Combined Groups		
		Psychotic	Non-Psychotic	Total
Excluded Reactive Response Antisocial	Count	5	9	14
	% within Reactive Response	35.7%	64.3%	100.0%
	% within Combined Groups	45.5%	52.9%	50.0%
Neutral	Count	6	8	14
	% within Reactive Response	42.9%	57.1%	100.0%
	% within Combined Groups	54.5%	47.1%	50.0%
Total	Count	11	17	28
	% within Reactive Response	39.3%	60.7%	100.0%
	% within Combined Groups	100.0%	100.0%	100.0%

Hierarchical Loglinear Analysis

Cell Counts and Residuals

			Observed		Expected		Residuals	Std. Residuals
			Count ^a	%	Count	%		
Combined Groups	Experimental Condition	Reactive Response						
Psychotic	Included	Antisocial	5.500	9.5%	5.500	9.5%	.000	.000
		Neutral	6.500	11.2%	6.500	11.2%	.000	.000
	Excluded	Antisocial	5.500	9.5%	5.500	9.5%	.000	.000
		Neutral	6.500	11.2%	6.500	11.2%	.000	.000
Non-Psychotic	Included	Antisocial	3.500	6.0%	3.500	6.0%	.000	.000
		Neutral	16.500	28.4%	16.500	28.4%	.000	.000
	Excluded	Antisocial	9.500	16.4%	9.500	16.4%	.000	.000
		Neutral	8.500	14.7%	8.500	14.7%	.000	.000

a. For saturated models, .500 has been added to all observed cells.

Goodness-of-Fit Tests

	Chi-Square	df	Sig.
Likelihood Ratio	.000	0	.
Pearson	.000	0	.

K-Way and Higher-Order Effects

	K	df	Likelihood Ratio		Pearson		Number of Iterations
			Chi-Square	Sig.	Chi-Square	Sig.	
K-way and Higher Order Effects ^a	1	7	13.530	.060	15.379	.031	0
	2	4	6.636	.156	6.200	.185	2
	3	1	2.408	.121	2.408	.121	3
K-way Effects ^b	1	3	6.895	.075	9.179	.027	0
	2	3	4.228	.238	3.792	.285	0
	3	1	2.408	.121	2.408	.121	0

a. Tests that k-way and higher order effects are zero.

b. Tests that k-way effects are zero.

Partial Associations

Effect	df	Partial Chi-Square	Sig.	Number of Iterations
CombGrp*ExC	1	.000	.986	2
CombGrp*ReactResp	1	.805	.370	2
ExC*ReactResp	1	3.339	.068	2
CombGrp	1	3.413	.065	2
ExC	1	.069	.793	2
ReactResp	1	3.413	.065	2

Parameter Estimates

Effect	Parameter	Estimate	Std. Error	Z	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
CombGrp*ExC*ReactResp	1	.208	.139	1.492	.136	-.065	.481
CombGrp*ExC	1	.042	.139	.301	.763	-.231	.315
CombGrp*ReactResp	1	.138	.139	.992	.321	-.135	.411
ExC*ReactResp	1	-.208	.139	-1.492	.136	-.481	.065
CombGrp	1	-.162	.139	-1.162	.245	-.435	.111
ExC	1	-.042	.139	-.301	.763	-.315	.231
ReactResp	1	-.222	.139	-1.592	.111	-.495	.051

Step Summary

Step ^a	Effects	Chi-Square ^c	df	Sig.	Number of Iterations
0 Generating Class ^b	CombGrp*ExC*ReactResp	.000	0	.	
Deleted Effect	1 CombGrp*ExC*ReactResp	2.408	1	.121	3
1 Generating Class ^b	CombGrp*ExC, CombGrp*ReactResp, ExC*ReactResp	2.408	1	.121	
Deleted Effect	1 CombGrp*ExC	.000	1	.986	2
	2 CombGrp*ReactResp	.805	1	.370	2
	3 ExC*ReactResp	3.339	1	.068	2
2 Generating Class ^b	CombGrp*ReactResp, ExC*ReactResp	2.408	2	.300	
Deleted Effect	1 CombGrp*ReactResp	.847	1	.357	2
	2 ExC*ReactResp	3.381	1	.066	2
3 Generating Class ^b	ExC*ReactResp, CombGrp	3.255	3	.354	
Deleted Effect	1 ExC*ReactResp	3.381	1	.066	2
	2 CombGrp	3.413	1	.065	2
4 Generating Class ^b	CombGrp, ExC, ReactResp	6.636	4	.156	
Deleted Effect	1 CombGrp	3.413	1	.065	2
	2 ExC	.069	1	.793	2
	3 ReactResp	3.413	1	.065	2
5 Generating Class ^b	CombGrp, ReactResp	6.705	5	.244	
Deleted Effect	1 CombGrp	3.413	1	.065	2
	2 ReactResp	3.413	1	.065	2
6 Generating Class ^b	CombGrp	10.118	6	.120	
Deleted Effect	1 CombGrp	3.413	1	.065	0
7 Generating Class ^b	Constant only	13.530	7	.060	
8 Generating Class ^b	Constant only	13.530	7	.060	

a. At each step, the effect with the largest significance level for the Likelihood Ratio Change is deleted, provided the significance level is larger than .050.

b. Statistics are displayed for the best model at each step after step 0.

c. For 'Deleted Effect', this is the change in the Chi-Square after the effect is deleted from the model.

Convergence Information^a

Generating Class	Constant only
Number of Iterations	.000
Max. Difference between Observed and Fitted Marginals	7.250
Convergence Criterion	.250

a. Statistics for the final model after Backward Elimination.

Cell Counts and Residuals

Combined Groups	Experimental Condition	Reactive Response	Observed		Expected		Residuals	Std. Residuals
			Count	%	Count	%		
			Psychotic	Included	Antisocial	5.000		
		Neutral	6.000	10.3%	7.250	12.5%	-1.250	-.464
	Excluded	Antisocial	5.000	8.6%	7.250	12.5%	-2.250	-.836
		Neutral	6.000	10.3%	7.250	12.5%	-1.250	-.464
Non-Psychotic	Included	Antisocial	3.000	5.2%	7.250	12.5%	-4.250	-1.578
		Neutral	16.000	27.6%	7.250	12.5%	8.750	3.250
	Excluded	Antisocial	9.000	15.5%	7.250	12.5%	1.750	.650
		Neutral	8.000	13.8%	7.250	12.5%	.750	.279

Goodness-of-Fit Tests

	Chi-Square	df	Sig.
Likelihood Ratio	13.530	7	.060
Pearson	15.379	7	.031

Psychotic

Experimental Condition * Reactive Response Crosstabulation^a

Count		Reactive Response		
		Antisocial	Neutral	Total
Experimental Condition	Included	5	6	11
	Excluded	5	6	11
	Total	10	12	22

a. Combined Groups = Psychotic

Non-psychotic

Experimental Condition * Reactive Response Crosstabulation^a

Count		Reactive Response		
		Antisocial	Neutral	Total
Experimental Condition	Included	3	16	19
	Excluded	9	8	17
	Total	12	24	36

a. Combined Groups = Non-Psychotic

Chi-Square Tests^c

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.000 ^a	1	1.000		
Continuity Correction ^b	.000	1	1.000		
Likelihood Ratio	.000	1	1.000		
Fisher's Exact Test				1.000	.665
Linear-by-Linear Association	.000	1	1.000		
N of Valid Cases	22				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.00.

Chi-Square Tests^c

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	5.573 ^a	1	.018		
Continuity Correction ^b	4.026	1	.045		
Likelihood Ratio	5.747	1	.017		
Fisher's Exact Test				.033	.022
Linear-by-Linear Association	5.418	1	.020		
N of Valid Cases	36				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.67.

24. SPSS analysis of confederate personality attributes data

Tests of Between-Subjects Effects

Dependent Variable: Winsorized Confederate Personality Attributes

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1812.248 ^a	5	362.450	2.468	.044	.192
Intercept	267809.700	1	267809.700	1823.473	.000	.972
ExG	783.480	2	391.740	2.667	.079	.093
ExC	835.076	1	835.076	5.686	.021	.099
ExG * ExC	209.388	2	104.694	.713	.495	.027
Error	7637.131	52	146.868			
Total	278458.000	58				
Corrected Total	9449.379	57				

a. R Squared = .192 (Adjusted R Squared = .114)