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EXPERIMENTAL INVESTIGATIONS OF PARANOIA: A LITERATURE REVIEW AND NOVEL RESEARCH

by

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Thesis for the degree of Doctorate in Clinical Psychology

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ABSTRACT

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EXPERIMENTAL INVESTIGATIONS OF PARANOIA: A LITERATURE REVIEW AND NOVEL RESEARCH

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Paranoid experience across the population has been of increasing interest to psychological researchers in recent years. Paranoia is no longer considered a purely psychiatric phenomenon, with numerous studies demonstrating delusional ideation in non-clinical populations. Theoretical models implicate emotions and beliefs as contributory factors in the most severe form of paranoia; persecutory delusions. Chapter one investigates the contribution of experimental studies investigating anxiety and paranoia to the understanding of the theoretical models of paranoid experience. Using a systematic search strategy and narrative synthesis, the review found extensive variance in design and methodology. Whilst there is some evidence of manipulations impacting paranoia and anxiety, the literature is limited by small samples, lack of replication and weak quality ratings. Further sufficiently powered replication studies and employment of mediational and covariate analyses are required to understand the causal relationships between theoretically relevant variables.

Chapter two presents an experimental investigation into the effect of mental imagery on variables relevant to models of paranoid experience. Large, significant effect sizes were found, although some analyses were underpowered. These results offer tentative support for the impact of mental imagery on factors theorised to be relevant to the experience of paranoid ideation. Theoretical, research and clinical implications are discussed.

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DECLARATION OF AUTHORSHIP

I, ... [please print name]

declare that this thesis and the work presented in it are my own and has been generated by me as the result of my own original research.

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I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University;
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4. Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
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Chapter 1: How Can Experimental Studies Investigating Paranoia and Anxiety Inform Our Understanding of Theoretical Models of Paranoia? A Systematic Review and Narrative Synthesis

Definition of Key Terms.

Paranoia. Paranoia is defined by Freeman (2016) as "… the complete range of paranoia in the general population (i.e. the paranoia spectrum), including mistrust, suspiciousness, ideas of reference and persecution, and delusions. It is not simply used to refer to the psychiatric diagnosis paranoia (now called delusional disorder)." (p. 686). Paranoid ideation refers to the experience of thoughts containing paranoid content (as defined above), and is distributed across the general population (Freeman et al., 2005).

Persecutory delusions. Persecutory delusions are defined as "The severe end of the paranoia spectrum, when the ideas are held with a strong conviction (at least 50% conviction) so that a belief is present. The beliefs vary along a number of dimensions, including the degree to which they are held, the amount of preoccupation, and the distress and impairment caused". (Freeman, 2016, p. 686). Persecutory delusions are the second most common symptom of people presenting with psychosis (Satiorius et al., 1986), and are hypothesised to be the most severe symptom in a hierarchy of paranoid experience (Freeman et al., 2005).

Anxiety. Anxiety has been defined as "… a vague, unpleasant emotional state with qualities of apprehension, dread, distress and uneasiness" (Reber, 1996, p. 45). Anxiety is also conceptualised as a range of disorders (American Psychiatric Association, 2013), however for the purposes of this review, "anxiety" refers to the former broad psychological state.

Self-beliefs. For the purposes of this review, the term "self-beliefs" refers to the broad range of concepts that conceptualise attitudes towards, beliefs about, or evaluations of the self. Kesting and Lincoln (2013) distinguish the concepts of schemas (cognitive representations based on historic experience) and evaluations (attitudes towards the self); therefore, when specific terms have been employed in the literature these terms will be reported.

1.1 Introduction

Cognitive models of persecutory delusions implicate negative emotions (Freeman, Garety, Kuipers, Fowler & Bebbington, 2002; Kesting & Lincoln, 2013) and negative beliefs about the self and/ or others (Bentall, Kinderman & Kaney, 1994; Freeman et al., 2002; Kesting & Lincoln, 2013) as crucial in their formation and maintenance. This aim of this review was to synthesise experimental literature investigating paranoid ideation and anxiety, which are two core components of current cognitive models (Freeman et al., 2002; Freeman, 2016; Kesting & Lincoln, 2013). This aim is partly driven by Freeman's (2007) recommendation that the existing evidence for associative relationships between variables is extended to ascertain potential causal relationships between theoretical variables. The review starts with a description of the relevant theoretical models, before existing reviews into paranoid ideation are summarised. This is followed by details of the systematic search method, article selection, data extraction and quality assessment, before a synthesis of the findings is proposed.

1.1.2. The Threat-Anticipation Model of Persecutory Delusions. Cognitive-Behavioural Therapy (CBT) is stipulated as an evidence-based treatment for psychosis (National Institute for Health & Care Excellence; NICE, 2014). The evaluation of the cognitive models on which these interventions are based is necessary to ensure effective and ethical clinical practice as well as theoretical understanding. The threat-anticipation model by Freeman et al. (2002) is the central theory informing the review for two reasons; firstly, it is the model that has received the most empirical support to date (Newman-Taylor & Stopa, 2013), and secondly, it explicitly postulates the role of anxiety and related processes as maintaining paranoid beliefs. An exclusive focus on experimental studies investigating these variables was justified by the inferences that can be made regarding potential causal relationships between these variables that is unique to experimental designs.

The model proposes that persecutory delusions are formed by the interaction of three core processes (emotion and beliefs about the self, others and the world; anomalous experiences/ arousal; and cognitive biases) in response to a precipitant, for example, a significant life event or increased stress. This interaction initiates a search for meaning, and the consequent selection of an explanation results in the formation of a threat belief (see Figure 1 for diagrammatic representation). The term "search for meaning" is deliberately

broad with the intention of capturing the range of individual attribution behaviours that may take place (Freeman et al., 2002), and the breadth of the factors involved is a strength of the theory. The model proposes that in the formation of a persecutory delusion, pre-existing levels of anxiety will influence the beliefs about the self, others and the world that are held in response to the precipitant. In a similar manner to persecutory delusions, anxiety is associated with the perception of threat from others and vulnerability of the self, and thus anxiety is considered the key emotion related to the onset of persecutory delusions (Freeman et al., 2002). The model predicts that paranoid ideation will occur in the presence of anxiety and that an increase in anxiety will increase paranoid ideation, and that any reduction in anxiety could result in a reduction of paranoid ideation. A further prediction of the model is that anxiety mediates the effect of any single manipulation (i.e. precipitant) on the presence of paranoid ideation.

The clinical utility of the model is limited by its complexity, and by difficulties in identification of the arousal and resulting anomalous experience that are central to belief formation once the belief has been formed (i.e. prior to contact with clinical services). The clarification of causal relationships between variables may facilitate practitioners in ascertaining which areas of the model are most useful to employ in formulation during clinical practice.

In the maintenance of persecutory delusions, anxiety and depression are uniquely identified as emotional states pivotal in maintaining the threat belief that forms the delusion. These, in conjunction with appraisal and cognitive processes, are hypothesised to maintain the threat belief and associated distress (see Figure 2 for diagrammatic representation). For example, a person experiencing a persecutory delusion that other people are trying to harm them may make the appraisal that their safety is at imminent risk in a coffee shop. As a result, their anxiety increases. Cognitive biases and behaviours associated with anxiety are triggered; they may discard the disconfirmatory evidence that, for example, nobody is moving toward them, and instead obtain confirmatory evidence, such as noting gestures or facial expressions that could be interpreted as threatening or suspicious. Safety behaviours, such as sitting at a table with their back against a wall and hypervigilant scanning of the environment are employed.

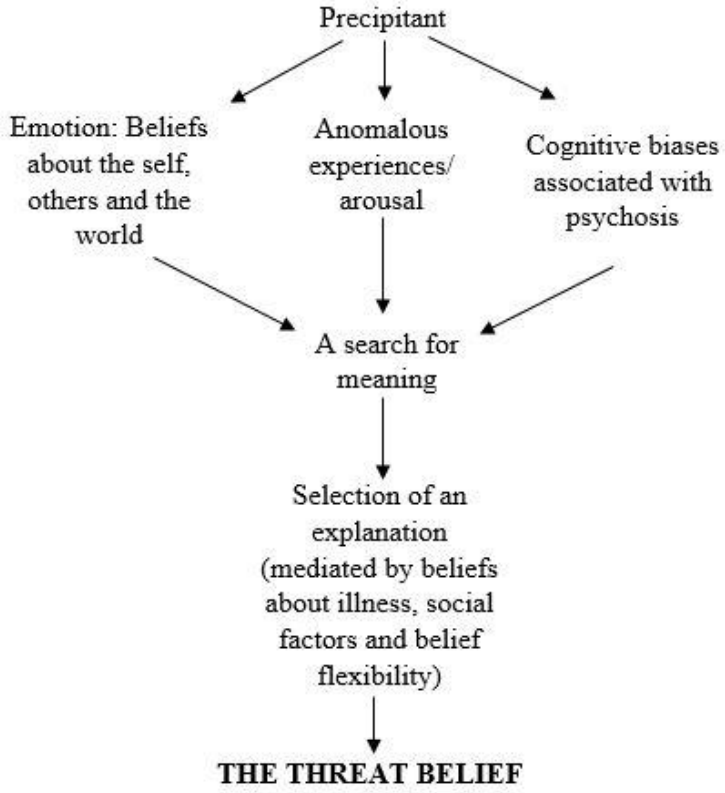

Figure 1. The cognitive model of the formation of a persecutory delusion (Freeman et al., 2002).

Ultimately, these biases and safety behaviours from the experience of anxiety reinforce the belief that others are trying to harm them; either by the confirmatory evidence obtained through cognitive biases, and/or by the assumption that the safety behaviours protected them from the attack. The maintenance model predicts anxiety will mediate effects on any dimension of paranoia, and that increasing paranoia will increase anxiety.

Whilst the maintenance model is intuitively more useful in practice due to the identification of potential intervention areas, the complexity means it is likely to require significant simplification for use clinically. The model does, however, offer a strong theoretical understanding of persecutory delusions; clear hypotheses can be made regarding the constituent variables, and these hypotheses can ethically be investigated in both practice-based and experimental research. However, to extend the clinical utility of these theories, causal relationships between variables need to be understood so that clinicians can adapt the models for effective use in clinical practice.

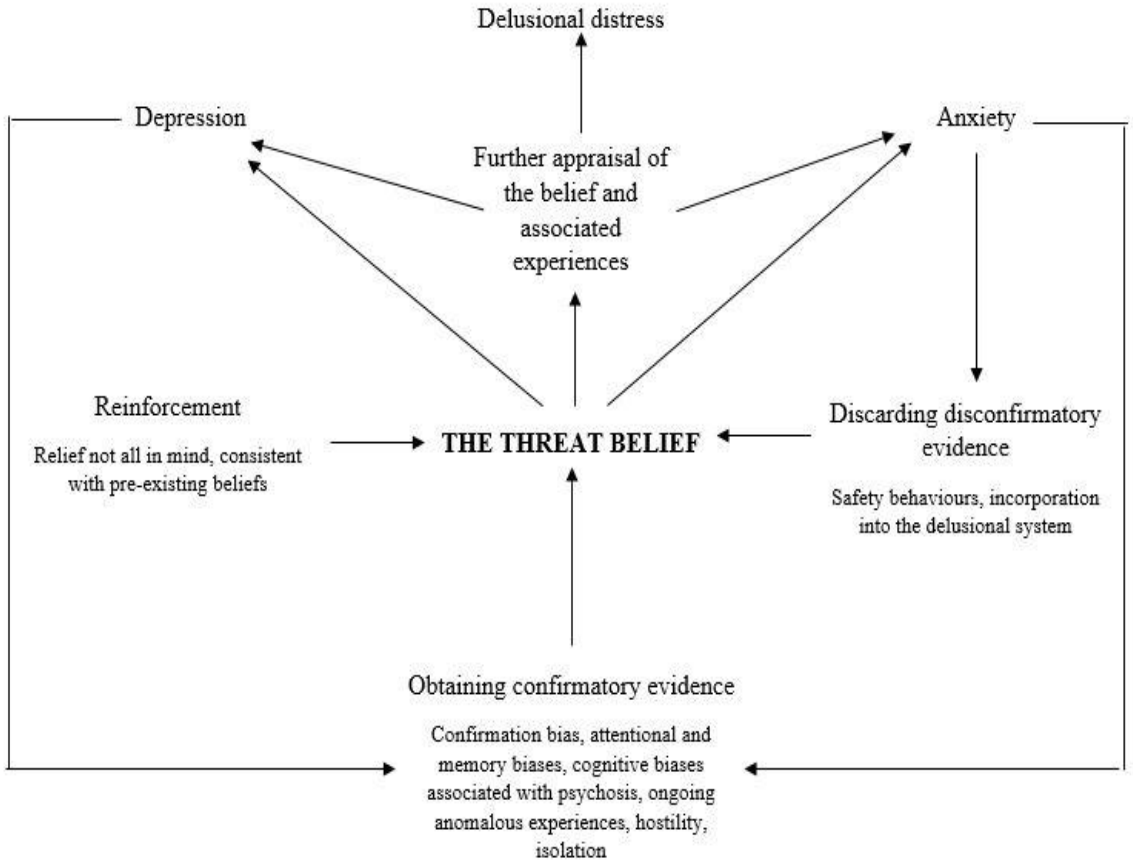

Figure 2. The cognitive model of the maintenance of a persecutory delusion (Freeman et al., 2002).

1.1.3. Systematic Reviews of Theoretically Relevant Concepts. Several reviews have sought to investigate the role of the theoretically relevant concepts (as hypothesised by Freeman et al., 2002) in paranoia, including self-beliefs and evaluations (Kesting & Lincoln, 2013; Tiernan, Tracey & Shannon, 2014) as well as anxiety and depression (Hartley, Barrowclaugh & Haddock, 2013). Tiernan et al. (2014) found associations between negative self-concepts (inclusive of schemas and evaluations) and paranoia, and Kesting and Lincoln (2013) found low and unstable self-esteem (defined as an attitude toward the self) and negative self-schemas (defined as cognitive representations of the self) in combination with persecutory ideation at both clinical and non-clinical levels. Kesting and Lincoln (2013) also found an association between low self-esteem and deservedness of persecution, though limited evidence for low implicit self-esteem and persecutory delusions. Finally, Hartley et al. (2013) investigated anxiety and depression in psychosis. They concluded that both anxiety and depression were associated with hallucinations and delusions.

Whilst reviews investigating theoretically relevant factors exist, many articles reviewed employed clinical samples only, limiting the conclusions that can be drawn regarding the constructs' contribution to symptoms across the paranoia spectrum and the formation of, or transition into, severe threat beliefs. The studies by Tiernan et al. (2014) and Kesting and Lincoln (2013) employed robust search methodologies, though the study by Hartley et al. (2013) was not theoretically driven, made no assessment of the quality of the studies, and the method did not conform to systematic guidelines (PRISMA; Moher, Liberati, Tetzlaff & Altman, 2009). Subtypes of each symptom were not explored, preventing conclusions regarding anxiety and depression in paranoia or persecutory delusions specifically. Most studies were cross-sectional or correlational in design, making the inference of causal relationships between such factors, as suggested in the cognitive model, impossible. Taken together, these reviews support the associative relationships between paranoia and the variables proposed by Freeman et al. (2002), however the nature of these relationships is not yet understood and requires further investigation to inform the theoretical understanding of paranoid experience.

1.1.4. A Spectrum of Paranoid Experience. Non-clinical samples have been used in studies investigating paranoid ideation based on the continuity hypothesis of psychotic symptoms (van Os & Verdoux, 2002). This hypothesis posits that paranoid experiences occur across the population, and so the study of mechanisms underpinning paranoid experiences in non-clinical populations can inform our understanding of the processes underpinning clinical levels of symptomology (Freeman, 2007). The model predicts that paranoid symptoms will be reported across both clinical and non-clinical samples.

Freeman et al. (2005) sought to explore this hypothesis by investigating the experience of paranoid ideation in non-clinical samples. For this purpose, a multidimensional measure of paranoid thoughts was generated (The Paranoia Checklist; Freeman et al., 2005) and administered to university students. They found not only that items pertaining to paranoid ideation were endorsed, but also that scores were distributed in a hierarchical manner, supporting the continuity hypothesis of paranoid experience (Freeman et al., 2005), and offering further justification for the exploration of paranoid ideation in non-clinical samples in addition to those with a clinical diagnosis.

Based on these findings, Freeman et al. (2005) present a hierarchy model of paranoia (see Figure 3), which suggests threat beliefs build upon common interpersonal concerns. Based on this model, investigations employing samples with lower level, though nonetheless evident, paranoid ideation can inform the theoretical understanding of clinically-significant levels of paranoid ideation. Additionally, it suggests that the study of non-clinical samples has the potential to identify mechanisms that transition these more common, non-clinical, threat beliefs into clinically significant paranoid ideation. For example, differences in high and low scoring groups could be compared and factors distinguishing them identified; potentially informing how one may transition up the hierarchy from more common interpersonal concerns to severe threat beliefs. However, the generalisation of these results is limited by a cross-sectional design and lack of clinical sample with which to compare the findings, which could inform this hypothesis further. Consistent with the threat-anticipation model, the paranoia hierarchy also predicts paranoia will occur in the presence of anxiety, given that the foundation of paranoid ideation is hypothesised to be in anxious processes (i.e. fear and a perception of threat).

As a result of empirical research supporting the presence of delusional ideation in the general population (see Freeman, 2006, for a review) and the development of scales to measure psychotic-like experiences (Chapman & Chapman, 1980; Peters, Joseph & Garety, 1999), the continuity hypothesis of psychotic symptoms is considered theoretically valid and it is widely accepted that studying paranoid symptoms can inform our understanding of persecutory delusions (Freeman, 2007; Kesting, Bredenpohl, Klenke, Westermann & Lincoln, 2013; van Os & Verdoux, 2002). The theory is also intuitively appealing in the current context of conceptualising mental disorders as spectrum-like in nature (Lobo & Agius, 2012). Assessment of the commonalities and/or differences between paranoid experiences in clinical and non-clinical samples can inform our understanding of the crucial processes that transition these experiences from non-clinical levels to the experience of severe mental disorder and associated distress.

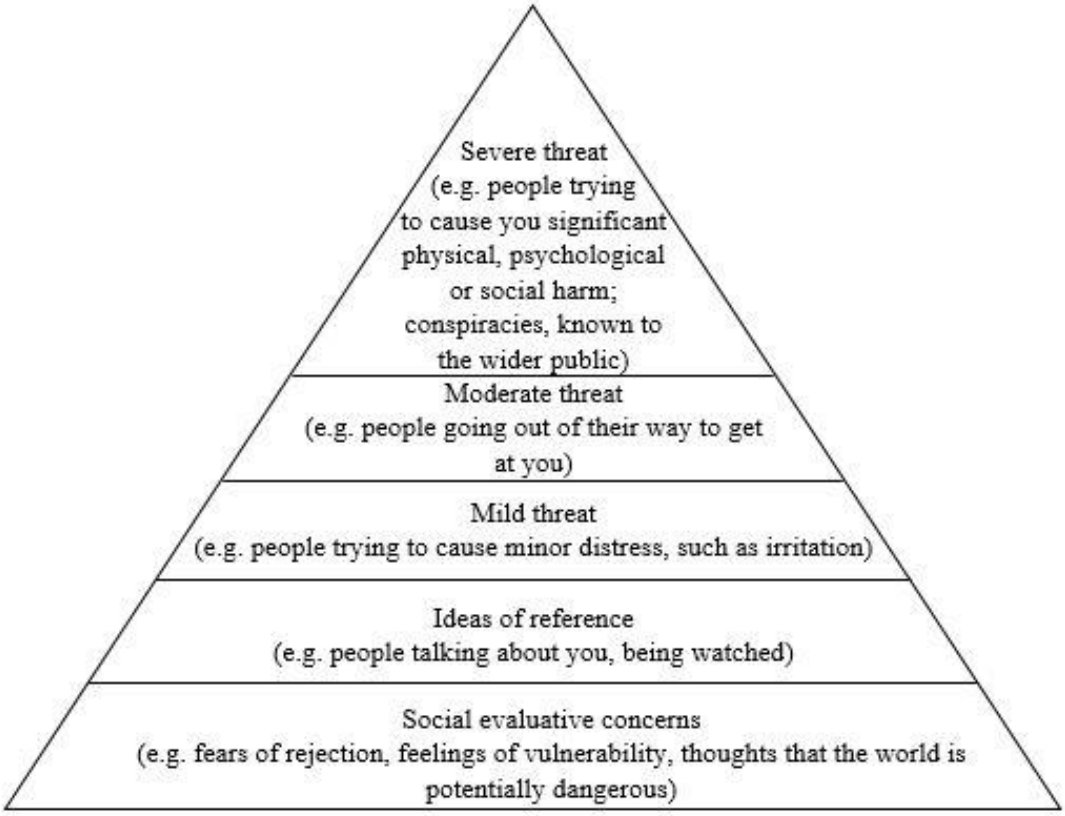

Figure 3. The paranoia hierarchy (Freeman et al., 2005).

There are two notes of caution to consider regarding a continuity approach to psychotic symptoms. Firstly, the measurements used to assess symptoms in people without a clinical diagnosis is likely to influence the empirical support (or lack thereof) for the continuity hypothesis (van Os & Verdoux, 2002). Van Os and Verdoux (2002) suggest scales that measure the same symptoms as experienced by diagnostic populations as opposed to "schizotypal" measures may be more useful in research into wider populations, as the stability of variables being assessed permits comparisons. Second is the conceptualisation of the term continuity, which can be considered from a fully dimensional or personality-based stance, in which deviations of clinical symptoms exist across the entire population, or from a quasi-dimensional or disease-based stance, in which only symptoms of a clinically significant range are considered on a continuum and therefore one either is or is not on the spectrum (Claridge, 1994; van Os & Verdoux, 2002); i.e. either one experiences symptoms constituting clinical diagnosis or not, and these diagnoses are on a spectrum of severity. Therefore, any review of the literature into the spectrum of

paranoid experience should attend to the measures employed and the assumptions that are made about the experience of paranoid symptoms.

1.1.5. Aims of the Current Review. The current paper uses a systematic search method (PRISMA; Moher et al., 2009) and a narrative synthesis (meta-analytic review was beyond the scope of the project) to review experimental research investigating anxiety and paranoia against the predictions made by the cognitive model of persecutory delusions (Freeman et al., 2002, Freeman et al., 2005) and the continuity hypothesis of psychosis (van Os & Verdoux, 2002). The exclusive focus on experimental studies is justified by the recommendation of Freeman (2007) that manipulation experimental designs are used to investigate the causal relationships between core theoretical variables, and the stipulation of Kesting et al. (2013) that this method permits causal conclusions. The exclusive focus on anxiety and paranoia is justified by the centrality of anxiety in the threat-anticipation model of persecutory delusions (Freeman et al., 2002) and the paranoia hierarchy (Freeman et al., 2005), and by literature demonstrating an associative (though not causal) relationship between the two (Freeman, 2007). The research question is: how can experimental studies investigating paranoia and anxiety inform our understanding of theoretical models of paranoia?

This review is focused specifically on factors influencing anxiety and paranoia, although the impact of manipulations on other factors of theoretical relevance to the threat-anticipation model that were assessed will briefly be discussed. This review will include clinical and non-clinical samples and assess whether patterns of relationships between variables seen in clinical cases are also evident in non-clinical cases of reported paranoid symptoms.

1.2. Method

1.2.1. Search Term Selection. Search terms were entered as three grouped concepts (A, B and C). Search terms A ("Anxiety" OR "Fear" OR "Worry" OR "Stress") were intended to capture the construct of anxiety. “Anxiety” was entered into the thesaurus function in PsycINFO, and terms not relating to specific anxiety disorders were included in the search. Specific anxiety disorders were excluded as the primary theoretical basis for the search is persecutory delusions. Search terms B ("Paranoi*" OR "Delus*" OR "Delud*" OR "Persecut*" OR "Suspicious*" OR “Schizotypy”) were intended to capture the construct of paranoia. Terms from the systematic review of persecutory delusions by Kesting and Lincoln (2013) were employed to promote consistency between the current review and existing systematic searches, with the addition of “Schizotypy” to ensure broad inclusion of paranoid-related studies. Search term C was selected to capture all types of experimental design ("Experiment*").

1.2.2. Inclusion and Exclusion Criteria.

Inclusion criteria:

1. An experimental study, defined as a quantitative study in which at least one variable was manipulated with a minimum of two levels.

2. The psychological measurement of anxiety AND paranoia before and after the manipulation. Measures were deemed to meet criteria if the scale or subscale included any word from search terms A in addition to a scale measuring paranoia, paranoid ideation, suspiciousness or persecutory delusions, or if the scale was stipulated as use as a measure of anxiety or paranoia. Measures were only included if they were analysed as an independent construct. Use of symptom specific scales was justified by the review concerning paranoia as opposed to broad psychotic symptoms, and the argument of van Os and Verdoux (2002) that symptom specific measurement may be more useful in assessing symptoms across a continuum.

Exclusion criteria:

1. Only a single level of the manipulation was applied.

2. Measurement of anxiety and/or paranoia at pre-or post the manipulation only.

3. Anxiety and/or paranoia not analysed as an independent construct, e.g. anxiety analysed with other emotions as a measure of "negative affect".

4. Studies using neurological, neuro-imaging or physiological measures without a psychological measure of anxiety and paranoia.

Studies using drug manipulations were beyond the scope of this review and were also excluded.

1.2.3. Search Process. Search terms A, B and C were entered into the following databases using the Boolean phrase "AND" between each: PsycINFO, MEDLINE, CINAHL Plus with Full Text, PsycARTICLES (via EBSCOhost), Web of ScienceTM (All databases: Web of ScienceTMCore Collection, BIOSIS Citation IndexSM, BIOSIS Previews®, Current Contents Connect®, Data Citation IndexSM, Derwent Innovations IndexSM,, Inspec®, KCI-Korean Journal Database, MEDLINE®, Russian Science Citation Index, SciELO Citation Index, Zoological Record®). Preliminary limiters were applied and duplicates removed.

Studies were first screened for relevance, and excluded if a) the abstract did not include any of search terms B, b) if "delusion" was not specified as paranoid, was specified as other type (e.g. grandiose) or if "paranoi*" did not appear in the abstract along with the term delus*, c) "suspicion" was not referring to a psychological process or state (e.g. a suspicious tumour) or d) the term "paranoid" served as an anagram for an unrelated concept. The remaining articles were then subjected to the inclusion and exclusion criteria as described above. Figure 4. displays an overview of the search and selection process based on the PRISMA Flow Diagram (Moher et al., 2009). The search and selection process was conducted by a single researcher.

1.2.4. Extraction. The data extracted was selected with an emphasis on design, measurement and key findings as these were identified as core features contributing to the research question. Missing effect sizes were manually calculated where sufficient information was provided, using the calculations and associated spreadsheet from Thalhiemer and Cook (2002; t-tests and F-tests), from www.psychometrica.de/effect_size.html#dep (chi-square), or manually from Cohen (1992;

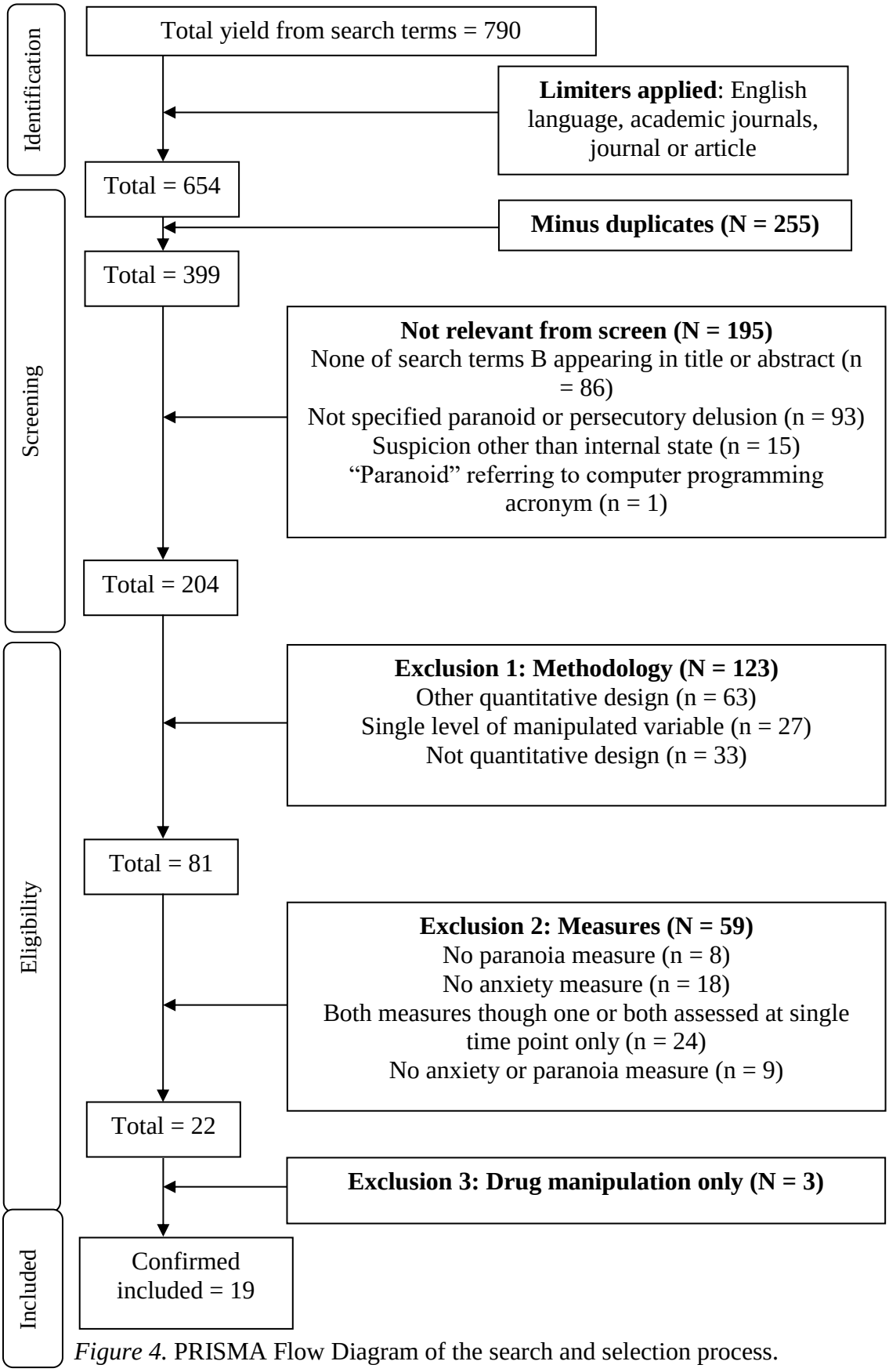

Figure 4. PRISMA Flow Diagram of the search and selection process.

multiple regression). Effect sizes were interpreted against Cohen (1992; *d*, *r*, η^2, f^2) and Kinnear and Gray (2008; η_p^2).

1.2.5. Quality Assessment. Quality assessment took place after the search process. Relevance of the content was prioritised over quality to ensure the included studies would have content that could satisfy the research question. It was intended that quality assessment would then form part of the discussion of the contribution of these studies to the theoretical understanding of paranoia. Quality assessment was carried out using the Effective Public Health Practice Project Quality Assessment Tool for Quantitative Studies (EPHPP QAT; Thomas, Ciliska, Dobbins & Micucchi, 2004) and the associated dictionary (accessed from www.ephpp.ca). As many studies used multiple measures, quality ratings for the measures regarding validity and reliability were only rated "Yes" if these were reported for >50% of the measures. Mean ages reported by group were added together and divided by the number of groups to obtain a whole-sample mean.

1.3. Results.

In total, 19 studies met the review criteria. Key features of the studies are displayed in Table 1, and key findings are displayed in Table 2.

1.3.1. Sample. For the purposes of the review, clinical samples refer to those recruited based on the presence of a psychiatric diagnosis or from a psychiatric health setting. Samples recruited based on a physical health diagnosis or from a physical health clinical setting are integrated with non-clinical samples as these diagnoses were unrelated to paranoid symptoms and therefore not of interest to the review. Six of the 19 studies (32.6%) used a clinical sample.

Recruitment and selection. All clinical samples were recruited from psychiatric clinical settings. Two studies recruited based on a diagnosis of persecutory delusions (Foster et al., 2010; Freeman et al., 2015) and one based on diagnosis of anxiety disorder (Giusti et al., 2017). Other inclusion criteria included clinically significant levels of worry (Foster et al. 2010), current delusions and schizophrenia spectrum diagnosis (Garety et al., 2015), and hospitalization for alcohol abuse (Passini et al., 1977). Only one study recruited not based on specific presentations, with a sample including psychotic, anxious, personality and mood disorders (Müller et al., 2014). The sample in Passini et al. (1977) had no participant presenting with a psychotic disorder.

Non-clinical samples were university students (Ascone et al., 2017; Bullock et al., 2016; Casanova et al., 1988; Hartmann et al., 2014; Isnanda et al., 2014; Lincoln et al., 2013; Lopes & Pinto-Gouveia, 2013) or recruited from physical health settings (Hou et al., 2014; Talakoub et al., 2012; Xu et al., 2016), schools (Franco et al., 2010) and charities (Pourmohamadreza-Tajrishi et al., 2015). One study was open to anyone aged 18 or over with sufficient language skills (Westermann et al., 2012). All clinical population studies were rated “weak” on the EPHPP QAT selection bias; all except two non-clinical studies were rated “weak” (Pourmohamadreza-Tajrishi et al., 2015; rated “moderate”; and Xu et al., 2016; rated “strong”).

Table 1. *Key Features of the Nineteen Studies Meeting Inclusion Criteria.*

Study	Sample (N; clinical status[1]; age[2]; country)	Design & Manipulation Single (S)/ Multiple (M)[3]	Control group (Y/N)[4]	Measures (Subscale) Pre-Manipulation		Measures Post Manipulation		Analytic Strategy	QAT rating
				Anxiety	Paranoia	Anxiety	Paranoia		
Ascone, Jaya and Lincoln (2017)	N = 172; Non-clinical; Not stated; Germany	2x2 Social profile comparison (S)	N	Validated emotion intensity rating (VEIR) - Anxiety; Insecure Striving (Fears of Rejection and Losing Opportunities)	Paranoia checklist (PC; state)	VEIR- Anxiety	PC (state)	Repeated Measures (RM) ANOVA; Regression	Weak
Bullock, Newman-Taylor and Stopa (2016)	N = 30, Non-clinical; M = 20.9; UK	2x2 Interpersonal imagery (S)	N	State and Trait Anxiety Inventory (STAI)	Paranoia Scale (PS); PC (state)	SAI	PC (state)	T-test and Chi Square; Mixed Model (MM) ANOVA + post-hoc t-test	Weak

Casanova, Katkovsky and Hershberger (1988)	N = 80, Non-clinical; M = Not stated; USA	2x2x2 Feedback/ hearing (S)	N	SAI	Paranoid Adjective Checklist (PAC)	SAI	PAC	MANOVA + post-hoc ANOVA	Weak
Foster, Startup, Potts and Freeman (2010)	N = 20; Clinical; M = 39.55*; UK	2x3 Worry-based CBT (M)	Y	Penn State Worry Questionnaire (PSWQ)	Green et al. Paranoid Thoughts Scale (GPTS)	PSWQ	GPTS	Multilevel linear regression and Kendall Tau correlations	Weak
Franco, Mañas, Cangas, Moreno and Gallego (2010)	N = 68; Non-clinical; M = 40.2; Spain	2x3 Mindfulness (M)	Y	Symptom Checklist (SCL-90-R; Anxiety and Phobic Anxiety)	SCL-90-R (Paranoid Ideation)	SCL-90-R (Anxiety and Phobic Anxiety)	SCL-90-R (Paranoid Ideation)	T-tests	Weak

Freeman et al. (2015)	N = 59; Clinical; M = 43.35*; UK	2x2 Street exposure (S)	Y	Visual analogue scale (VAS)- Anxiety	State Social Paranoia Scale (SSPS); VAS - Paranoia and Conviction; Schizotypal Symptoms Inventory - Paranoia (SSI-P)	VAS- Anxiety	SSPS; VAS - Paranoia and Conviction; SSI- P	ITT ANCOVAs and causal mediation analysis	Weak
Garety et al. (2015)	N = 101; Clinical; M = 41.6; UK	2x4 Computerized reasoning training (M)	Y	Beck Anxiety Inventory (BAI); VAS - Anxiety	GPTS (6 items + conviction)	VAS- Anxiety	GPTS (6 items + conviction)	ITT ANCOVA; Regression	Weak

Giusti et al. (2017)	N = 60; Clinical; M =; 25.45*; Italy	2x2x2 Anxiety management & metacognitive training (M)	Y	SCL-90-R (Anxiety and Phobic Anxiety); STAI; Self-Rating Anxiety Scale (SAS)	SCL-90-R (Paranoid Ideation)	SCL-90-R (Anxiety and Phobic Anxiety); STAI; SAS	SCL-90-R (Paranoid Ideation)	ANOVA + Chi square; RM ANCOVA	Weak
Hartmann, Sundag and Lincoln (2014)	N = 60; Non-clinical: M = 21.9; Germany	3x3 Self-discrepancies exposure (S)	Y	VEIR- Anxiety	Community Assessment of Psychotic Experiences (CAPE)	VEIR- Anxiety	PC (shortened)	Spearman correlations; RM ANOVA + post hoc t-tests; Multiple regression	Weak
Hou, Hu, Liang and Mo (2014)	N = 103; Non-clinical; M =; 53.45*; China	2x2 CBT (M)	Y	SCL-90-R (Anxiety and Phobic Anxiety)	SCL-90-R (Paranoid Ideation)	SCL-90-R (Anxiety and Phobic Anxiety)	SCL-90-R (Paranoid Ideation)	T-tests; Chi-square	Weak

Isnanda, Brinkman, Veling, van der Gaag and Neerincx (2014)	N = 24; Non-clinical; M = 28.42; The Netherlands	2x2x2 Stress probability and cycle time (S)	N	Social Interaction Anxiety Scale (SIAS)	GPTS	Subjective Unit of Distress (SUD) - Anxiety	Coding Scheme Paranoid Thoughts Commentaries (CSPTC)	RM MM ANOVA	Weak
Lincoln, Hohenhaus and Hartmann (2013)	N = 71; Non-clinical; M	2x4 Mental imagery (S)	Y	VEIR - Fear	CAPE; PC (state)	VEIR - Fear	PC (state)	T-test; RM ANOVA; Multiple regression	Weak

Lopes and Pinto-Gouveia (2013)	N = 153; Non-clinical; M = 19.84*; Portugal	4x3x2 Affective sounds (S)	N	Social Interaction and Performance Anxiety and Avoidance Scale (SIPAAS); Fear of Negative Evaluation (FNE); Depression and Anxiety Stress Scale (DASS-42; Anxiety); STAI; VAS - Anxiety	PS; PC	VAS - Anxiety; DASS-42 (Anxiety); STAI	VAS - Paranoia; PS	ANCOVA + post hoc t-test; MANOVA	Weak
Müller, Haffelder, Schlotman, Schaefers and Teuchert-Noodt (2014)	N = 50; Clinical; M = 48.25; Germany	2x4 Brain rhythm adapted music & exercise (M)	Y	Brief Symptoms Inventory (BSI; Anxiety and Phobic Anxiety)	BSI (Paranoid Ideation)	BSI (Anxiety and Phobic Anxiety)	BSI (Paranoid Ideation)	Chi-square	Weak

Passini, Watson, Dehnel, Herder and Watkins (1977)	N = 50; Clinical; M = 43.8*; USA	2x2 Alpha wave biofeedback training (M)	Y	STAI; Brief Psychiatric Rating Scale (BPRS; Anxiety); Multiple Affect Adjective Check List (MAACL; Anxiety)	Minnesota Multiphasic Personality Inventory (MMPI; Paranoia); BPRS (Suspiciousness)	STAI; BPRS (Anxiety); MAACL (Anxiety)	MMPI (Paranoia); BPRS (Suspiciousness)	ANOVA	Weak
Pourmohamadreza-Tajrishi, Azadfallah, Hemmati Garakani and Bakhshi (2015)	N - 55; Non-clinical; M = 35.22; Iran	2x2 Problem-focused coping (M)	Y	SCL-90-R (Anxiety and Phobic Anxiety)	SCL-90-R (Paranoid Ideation)	SCL-90-R (Anxiety and Phobic Anxiety)	SCL-90-R (Paranoid Ideation)	ANCOVA	Weak

Talakoub, Gorbani, Hasanpour, Zolaktaf and Amini (2012)	N = 64; Non-clinical; M = 17.47*; Iran	2x2 Aerobic exercise (M)	Y	SCL-90-R (Anxiety and Phobic Anxiety)	SCL-90-R (Paranoid Ideation)	SCL-90-R (Anxiety and Phobic Anxiety)	SCL-90-R (Paranoid Ideation)	T-test	Weak
Westermann, Kesting and Lincoln (2012)	N = 116; Non-clinical; M = 28.52; Germany	2x3 Social exclusion (S)	N	SIAS; VEIR - Anxiety	PC (full and state adapted and item selected)	VEIR - Anxiety	PC (state adapted and item selected)	Bivariate correlations; Mann Whitney-U; Multiple regression	Weak
Xu, Li and Yao (2016)	N = 115; Non-clinical; M = 67.35; China	2x2 Collective exercise (M)	Y	SCL-90-R (Anxiety)	SCL-90-R (Paranoid Ideation)	SCL-90-R (Anxiety)	SCL-90-R (Paranoid Ideation)	T-tests; Chi square and Willcoxon Signed Ranks	Weak

[1] *Clinical defined as either a) participants selected or included based on a psychiatric diagnosis and/or b) participants recruited from a mental health/ psychiatric clinical setting. Participants selected on physical health diagnoses or recruited from physical health settings are considered non-clinical samples.*

[2] *Asterixed means are pooled means calculated from group means provided in the article.*

[3] *Single episode manipulations refer to those studies in which the manipulation and assessments took place in a single time; multiple episode refers to instances in which assessment and manipulation took place over a minimum of two separate time points.*

[4] *Y = Yes; N = No*

Demographics. Most non-clinical samples were overrepresented by females (11 of 13) whereas most clinical samples were overrepresented by males (four of six). Non-clinical samples were younger (M = 33.2 years, range 17.47 – 67.35) compared to clinical samples (M = 40.33, range 25.45 – 48.25).

Mental health in non-clinical samples. Mental health diagnoses were an exclusion criterion of two non-clinical sample studies (Ascone et al., 2017; Hou et al., 2014), and diagnoses of paranoid disorder specifically were excluded in Isnanda et al. (2014). Seven studies did not exclude psychiatric diagnoses although they did not report the mental health status of participants (Bullock et al., 2016; Casanova et al., 1988; Franco et al., 2010; Lopes & Pinto-Gouveia, 2013; Pourmohamadreza-Tajrishi et al., 2015; Talakoub et al., 2012; Xu et al., 2016), and three reported either diagnoses (Hartmann et al., 2014; 15%; Lincoln et al., 2013; 8%) or receipt of psychological or pharmacological treatment (Westermann et al., 2012; 10%). Diagnoses reported were depression, anxiety and eating disorders (Hartmann et al., 2014; Lincoln et al., 2013). Only Lincoln et al., (2013) factored diagnoses into the results, finding an intervention effect on paranoia and emotions remained despite diagnoses, though an effect of emotions on paranoia was significant including these participants and trend-level only when participants with diagnoses were removed from the analysis.

Treatment in clinical samples. Half of the clinical population studies reported baseline medication use (Freeman et al., 2015; Giusti et al., 2017; Passini et al., 1988), of which two (Giusti et al., 2017; Passini et al., 1977) reported no between-groups differences at baseline. Two studies excluded participants in receipt of other psychological therapy (Foster et al., 2010; Garety et al., 2015). The sample of Müller et al. (2014) continued treatment as usual (TAU) alongside the manipulation, though the actual TAU received (e.g. medication, one to one support) was not specified further.

Table 2. *Key Findings of the Nineteen Studies Meeting Inclusion Criteria.*

Study	Key findings
Ascone et al. (2017)	1. Significant effect of time on paranoia ($p < .001$, $\eta^2 = 0.468$; large) 2. No significant interaction effect for anxiety ($p = .435$, $\eta^2 = 0.004$) or paranoia ($p = .381$, $\eta^2 = 0.005$) 3. Post-test paranoia predicted by pre-test paranoia and group*insecure striving ($p < .01$, $R^2 = .80$, $f^2 = 0.03$; small) 4. Post-test paranoia predicted by pre-test paranoia and group*active rejection ($p < .01$, $R^2 = .80$, $f^2 = 0.04$; small) and by group*passive rejection ($p < .01$, $R^2 = .80$, $f^2 = 0.03$; small)
Bullock et al. (2016)	1. Significant post-test between group differences on state paranoia ($p < .001$, $d = 4.1$; large) and state anxiety ($p \leq .001$, $d = 2.7$; large) 2. Significant within group differences on state paranoia (negative $p < .001$, $d = 2.34$; large; positive $p < .001$, $d = 1.66$; large) and state anxiety (negative $p < .001$, $d = 2.32$; large; positive $p < .001$, $d = 1.23$; large) 3. State paranoia: main effect of group ($p \leq .001$, $\eta_p^2 = 0.38$; large) not time ($p = .164$, $\eta_p^2 = 0.07$; medium), group*time ($p < .001$, $\eta_p^2 = 0.77$; large) 4. State anxiety: main effect of group ($p = .001$, $\eta_p^2 = 0.3$; large) not time ($p = .73$, $\eta_p^2 = 0.1$; medium), group*time interaction ($p < .001$, $\eta_p^2 = 0.75$; large)
Casanova et al. (1988)	1. Main effect of impaired hearing on paranoia (ps <.001 - <.05, ds^1 0.13 - 0.39; small), state anxiety ($p < .05$, $d^1 = 0.83$; large), mistrust and negative attribution ($p < .001$, $d^1 = 1.72$; large) 2. Main effect of unfavourable feedback on paranoia subscales except hostility (ps <.01 - < .05, ds^1 0.13 - 0.36; small), state anxiety ($p < .05$, $d^4 = 0.75$; large), and mistrust and negative attribution ($p <. 001$, $d^1 = 1.03$; large) 3. No hearing*feedback interaction ($p > .15$)

Foster et al. (2010)	1. Significant reduction of worry (coefficient -10.00, p = .025) in intervention group compared to TAU; maintained at 2 month follow up 2. No significant reduction in GPTS ideation (-10.50, p = .255) or distress (-4.58, p = .285) 3. Significant associations between changes in worry and GPTS ideation at both follow ups (k = .390, p = .018; k = .342, p = .038) and with GPTS distress at follow up 2 (k = .381, p = .021)
Franco et al. (2010)	1. Significant post-test between group differences on anxiety (p = .001, d^1 = 1.13; large), phobic anxiety (p <.05, d^1 = 0.75; medium), and paranoid ideation (p <.05, d^1 = 0.78; medium) 2. Significant within-group differences for experimental group on pre-post anxiety (p = .001, d = 1.20; large), phobic anxiety (p <.05, d = 1.03; large), and paranoid ideation (p <.05, d = 1.04; large) and pre-follow up anxiety (p < .01, d = 1.06; large), phobic anxiety (p <.05, d = 0.77; medium) and paranoid ideation (p <.05, d = 0.89; large) 3. No significant difference between post and follow up scores (all p > .102)
Freeman et al. (2015)	1. Significant between-groups differences in total paranoia (effect = 0.37, p = .037), state paranoia (effect = 5.98 p = .012), schizotypal questionnaire (effect = 2.14, p = .007) and anxiety (effect = 27.48, p = .001) - all increased in exposure group 2. Paranoia increase partially mediated by anxiety when adjusting for baseline (R^2 = .45.12, p = .09, f^2 = -1.01[3]; significant if unadjusted (R^2 = .60.3, p = .03, f^2 = -1.01[3]); partial mediation of anxiety, negative beliefs about others, depression (~40%) and negative beliefs about self (15%) 3. No mediation effect of hallucination frequency

Garety et al. (2015)	1. Significant between-groups differences on paranoia (effect size = -0.36, p = .028) - decreased in experimental group 2. No post-test group differences in anxiety (effect size = -1.00, p = .874) 3. Partial mediation of belief flexibility (−0.17 (0.08), p = .057) and alternative explanation (−0.08 (0.06), p = .182) not significant with adjusted effects for baseline measures 4. No mediation effect of JTC (−0.02 (0.04), p = .512)
Giusti et al. (2017)	1. Significant effect of time on SAI, TAI, SAS and paranoia (all p <.01, ds[1] 3.37, 3.93, 4.4 and 1.07 respectively; all large) 2. Significant group*time interaction on TAI (p < .01, η_p^2 = 0.181; large), SAS (p <.01, η_p^2= 0.558; large) and paranoia (p < .05, η_p^2= 0.077; medium) - experimental group reduced 3. Significant baseline paranoia*group effect on SAS (p <.01, η_p^2= 0.632; large), TAI (p <.01, η_p^2= 0.202; large) and paranoia (p <.01, η_p^2= 0.546; large) - high paranoia subgroup in experimental condition greatest reductions
Hartmann et al. (2014)	1. No significant correlation between self-discrepancies and baseline paranoia 2. Significant between-groups differences in anxiety (p < .01, d[1] = 1.09) and paranoia (p <.01, d[1] = 1.03) -anxiety differed between discrepancy conditions, paranoia did not 3. Impact of self-other*neutral on paranoia significantly mediated by anxiety (unstandardized β = 1.51, SE = 0.46, p < .05) 4. Self-other*self-ideal discrepancy did not impact paranoia
Hou et al. (2014)	Significant between-groups differences in anxiety (p <.001, d[1] = 1.93; large) and paranoid ideation (p = .09, d[1] = 0.35; small) post-test - treatment group lower than control

Isnanda et al. (2014)	1. Significant effect of probability on paranoid comments during (p = .001, d^1 = 1.64; large) and after (p < .001, d^1 = 1.69; large) exposure 2. Probability*cycle effect on comments during exposure (p = .03, d^1 = .99; large) - more comments in short-vs-long cycle in low probability condition (p = .033, d^1 = .92; large) and no difference in high probability conditions (p = .305) 3. No differences in type of paranoid thought (p = .28) 4. Between group differences in type of stressors (χ^2 (3) = 30.26; p <.001)- snatches of conversation result in more comments than expressions and walking around 5. Probability*cycle interaction effect on anxiety (p = .010, d^1 = .85) - low probability = more distress in short cycle
Lincoln et al. (2013)	1. Within-groups differences in fear ($p \leq .006$) - higher post-mood induction 2. Within groups differences in state paranoia trend level only (p = .08) - higher post-mood induction 3. Increased paranoia correlated with increased negative valence (r = .34, p = .004; medium) 4. No main effect of time (p = .337) or condition (p = .852) but group*time effect (p = .017, d = 0.59; medium) on state-paranoia 5. Impact of intervention on paranoia mediated by negative emotions (Z = -2.33, p = 0.19) 6. Self-esteem not predictive of paranoia (p = .612) 6. Significant decrease in state paranoia only in high-prone (β = -.45, t = -3.56, p = .003, d = 1.0; large) 7. Analyses excluding previous diagnoses significant except impact of emotions on paranoia only trend level (β = .21, p =.06)

Lopes and Pinto-Gouveia (2013)	1. Paranoia group higher paranoid thinking, frequency, conviction, anxiety and hallucinatory predisposition than social anxiety group (*p*s < .05, .005 or .001, *d*s[1] 0.55 – 2.9; medium-large) and control group (*p* <.001, *d*s[1] 1.46 – 5.16; large) 2. No difference between anxiety and paranoia on paranoia distress (*p* =.149) or stress (*p* = 0.98) 3. Anxiety group higher paranoid thinking, frequency, conviction, distress, anxiety and stress than controls (*p*s < .005 or. 001, *d*s[1] 0.91 – 2.93; large) 4. Paranoia and social anxiety groups higher state (*p* <.001, *d*[4] = 1.91; large; and *p* <.001, *d*[4] = 1.4; large, respectively) and trait (*p* <.001, *d*[4] = 2.2; large, and *p* <.001, *d*[4] = 1.91; large, respectively) anxiety than controls; no significant differences between social anxiety and paranoia group 5. Effect of hallucinatory predisposition on paranoid thinking (*p* = .044, *d*[1] = 0.23; small) 6. Multivariate effect for group (*p* <.001, η_{ϱ}^{2} =.001) and condition (*p* = <.001, η_{ϱ}^{2}=.001) on paranoid thinking 7. Group*predisposition*condition predicted post-test paranoid thinking (*p* =.005, *d*[1] = 0.19) -higher predisposition predicts higher post paranoid thinking (*r* = .65, *p* < .001; large) 8. Predisposition to hallucination predicted post-test paranoia (*p* <.001, *d*[1] = 1.21; large)
Müller et al. (2014)	Significant between- group differences in paranoid ideation (*p* <.05, *d*[4] = 0.69), anxiety (*p* <.01, *d*[4] = 0.79) and phobic anxiety (*p* <.05, *d*[4] = 0.64) at 18 month follow up - experimental group improved more than control
Passini et al. (1977)	1. Significant condition*time effect on SAI (*p* <. 05, *d*[1] = 0.48; small) and TAI (*p* <.05, *d*[1] = 0.71; medium) but not BPRS anxiety (*p* >.05) 2. Significant condition*time effect on MMPI paranoia (*p* <.05, *d*[1] = 0.48; small) and BPRS suspiciousness (*p* <.05, *d*[1] = 0.49; small) 3. Significant effect of time on SAI (*d*[1] = 1.01; large), TAI (*d*[1] = 0.9; large), MAACL anxiety (*d*[1] = 1.01; large), MMPI paranoia (*d*[1] = 0.68; medium), and BPRS anxiety (*d*[1] = 1.97; large)

Pourmohamadreza-Tajrishi et al. (2015)	1. Significant between-groups differences at post-test in phobia (p <.001, η^2 = .48; large), paranoid thought (p <.001, η^2 = .03; small) and anxiety (p <.001, η^2 = .50; large) - experimental group lower than control
Talakoub et al. (2012)	Significant within-group differences from pre-to post-test in anxiety (p =.001, d[1] = 1.04; large), phobic anxiety (p =.001, d[1] = 1.28; large) and paranoid ideation (p =.001, d[1] = 1.16; large) in experimental group; no significant changes in control group (all p <.05)
Westermann et al. (2012)	1. Significant inter correlations between: paranoia proneness and distress (r = .74, p <.01; large); paranoia proneness and social anxiety (r = .50, p <.01; large); paranoia distress and social anxiety (r = .43, p <.01; medium); habitual expressive suppression and paranoia proneness (r = .18, p < .10; small) and social anxiety (r = .22, p <.05; small); reappraisal and paranoia distress (r = -0.18, p <.10; small) and social anxiety (r = -0.24, p <.01; small) 2. Between-groups differences in anxiety (r = 0.183, p = .025; small) - higher in exclusion 3. Condition*reappraisal*trait paranoia predicted state paranoia (p < .001, R^2=0.24, f^2 = 0.32[3]; medium) 4. State paranoia in exclusion predicted by reappraisal and reappraisal*paranoia proneness (p < .001, R^2=0.43, f^2 = 0.75[3]; large)
Xu et al. (2016)	1.Between-groups differences in anxiety (p = .002, d[1] = 0.6; medium) and paranoia (p = .010, d[1] = 0.49; small) at post-test - experimental group lower than control 2. Within-groups differences from pre-to post-test in experimental group (all p <.05) - lower at post-test 3. No within-group differences from pre-to post-test in control group scores

[1] *Effect size calculated using Thalheimer & Cook (2002)*
[2] *Footnote "2" not employed as appears erroneously as a square-foot symbol in some instances*
[3] *Effect size calculated using Cohen (1992)*
[4] *Effect size calculated from www.psychometrica.de/effect_size*

1.3.2. Design. "Single episode" manipulations refer to studies in which the manipulation and assessments took place in a single time period; "multiple episode" refers to instances in which assessment and manipulation took place over a minimum of two separate time points. Nine studies employed a single episode manipulation of either mental imagery or memory exposure (n = 3; Bullock et al., 2016; Hartmann et al., 2014; Lincoln et al., 2013) or exposure to a social stressor (n = 6; Ascone et al., 2017; Casanova et al., 1988; Freeman et al., 2015; Isnanda et al., 2014; Lopes & Pinto-Gouveia, 2013; Westermann et al., 2012). Ten studies utilised multiple-episode manipulations involving psychological (n = 6; Foster et al., 2010; Franco et al., 2010; Garety et al., 2015; Giusti et al., 2017; Hou et al., 2014; Pourmohamadreza-Tajrishi et al., 2015) or physical (n = 4; Müller et al., 2014; Passini et al., 1977; Talakoub et al., 2012; Xu et al., 2016) intervention. Psychological interventions were defined as those employing an intervention targeting psychological processes and physical interventions were defined as those in which the primary intervention strategy involved physical activity or a biological factor. Imagery or memory interventions involved the induction of a mental image or memory; social stressors involved a range of environmental stimuli conceptualised as causing interpersonally-based stress (e.g. receiving negative feedback; Casanova et al., 1988). "Physical activity" involved prescribed episodes of cardiovascular exercise; biological factors included biofeedback training (Passini et al., 1977) and prescribed music that was adapted to individual brain rhythms (Müller et al., 2014).

Measures of paranoia. Twelve different measures of paranoia were used in the literature (see Table 1). Paranoia was measured as a unidimensional construct other than in studies that employed the full Paranoia Checklist (PC; n = 2; Lopes & Pinto-Gouveia, 2013; Westermann et al., 2012) or the full Green et al. Paranoid Thoughts Scale (GPTS; n= 1; Foster et al., 2010), permitting assessment of preoccupation (GPTS), frequency (PC), conviction and distress (GPTS and PC). The most commonly used measure was the Paranoid Ideation subscale of the Symptoms Checklist- Revised (SCL-90-R; n = 6), followed by the PC (inclusive of state and shortened versions n = 4) and the GPTS (n = 3 pre/ n = 2 post). All studies used at least one measure both pre and post manipulation other than Hartmann et al. (2014), who used the Community Assessment of Psychotic Experiences (CAPE) as a measure of paranoia-proneness at baseline and a shortened

version of the PC post manipulation; and Isnanda et al. (2014) who used the GPTS pre-manipulation and the Coding Scheme Paranoid Thoughts Commentaries (CSPTC) as a post manipulation measure. Cronbach's α for the sample was reported in five studies (Ascone et al., 2017; Bullock et al., 2016; Franco et al., 2010; Lopes & Pinto-Gouveia, 2013; Westermann et al., 2012).

Measures of anxiety. A total of 15 different measures of anxiety were used; the most common were the anxiety subscales of the SCL-90-R (n = 6), followed by the state scale of the State and Trait Anxiety Inventory (STAI; n = 4), validated emotion intensity rating scales (VEIR; n = 4), and visual analogue/ subjective units of distress (VAS; n = 3 pre/ n = 4 post). Most measures of anxiety assessed the construct by the frequency or intensity of symptoms as a broad concept (SAS; SCL-90-R subscales; STAI; VEIR/ VAS), although some assessed anxieties relating specifically to social interactions (Social Interaction Anxiety Scale [SIAS]; Social Interaction and Performance Anxiety and Avoidance Scale [SIPAAS]), or to specific constructs, including fears of rejection (SIAS) and of negative evaluation (Fear of Negative Evaluations [FNE]). All the studies used repeated measures other than Isnanda et al. (2014) who employed the SIAS before and subjective units of distress after the experimental manipulations. Cronbach's α was provided in the five studies that reported it for the paranoia measures.

Quality assessment. All studies in the review were rated "strong" in design due to the use of experimental designs. 17 studies also received a "strong" rating for the controlling of confounders, other than Casanova et al. (1988) and Pourmohamadreza-Tajrishi et al. (2015) that were rated "weak". A "moderate" rating for blinding was given to 13 articles; the remaining six (Bullock et al., 2016; Foster et al., 2010; Freeman et al., 2015; Garety et al. 2015; Talakoub et al., 2012; Xu et al., 2016) were rated "weak". Data collection methods were rated as "weak" due to not reporting on the validity of the measures employed, except for Lincoln et al. (2013; rated "moderate") and Talakoub et al., (2012; rated "strong"). The literature was rated "strong" with regards to withdrawals and drop-outs other than Isnanda et al. (2014), Passini and Watson (1977), Talakoub et al. (2012) and Westermann et al. (2012; all rated "weak") and Müller et al. (2014; rated "moderate"). Every study yielded a rating of "weak" overall, which is attained by two or more "weak" subscale ratings.

1.3.3. The Impact of Experimental Manipulations on Anxiety and Paranoia.

Single episode manipulations. Imagery that involved distressing interpersonal memories or inducing self-discrepancies or a negative sense of self (conceptualised as "negative" mental imagery) resulted in an increase of large effect size, or was predictive of post- manipulation scores, in both anxiety and paranoia. The single exception was the Lincoln et al. (2013) study which predicted an increase in paranoia at trend level only. The use of imagery that induced a positive sense of self or compassionate mental imagery consistently resulted in a reduction of paranoia with medium to large effect sizes, although these effect sizes were smaller than those seen for negative mental imagery manipulations. Bullock et al. (2016) also reported a reduction in anxiety following positive imagery.

There was an increase in paranoia as a direct result of the manipulation in four of the five studies investigating social stress that used an analysis strategy permitting this inference (ANOVA, ANCOVA and MANOVA; Casanova et al., 1988; Freeman et al., 2015; Isnanda et al., 2014; Lopes & Pinto-Gouveia, 2013), and Lopes and Pinto-Gouveia (2013) report an interaction effect of baseline symptomology on manipulation effects on paranoia. Small and large effect sizes were reported for the increase in paranoia in social stress studies.

Anxiety increased as a direct result of social stress in three of these studies (Casanova et al., 1988; Freeman et al., 2015; Westermann et al., 2012), and by an interaction of manipulations in one other (Isnanda et al., 2014). Effect sizes for anxiety ranged from small to large. The only stressor that did not result in increased paranoia and anxiety was the social profile comparison by Ascone et al. (2017); however, Lopes and Pinto-Gouveia (2013) do not report on between-groups differences in anxiety following the manipulation.

Multiple episode manipulations. Multiple-episode psychological manipulations varied in terms of the length of the programme (minimum three sessions/ two weeks, maximum 48 sessions/ three months), the target psychological process, and the interventions strategies used. The majority of psychological manipulations found some intervention effects on reducing levels of anxiety and paranoia, despite only one intervention stating paranoia as a primary target outcome (Garety et al., 2015). The effect

sizes for post intervention anxiety scores were notably larger than those for paranoia (Franco et al., 2010; Giusti et al., 2017; Hou et al., 2014; Pourmohamadreza-Trajrishi et al., 2015). The training intervention by Garety et al. (2015) was the only study that found a significant reduction in paranoia but not anxiety.

Physical interventions (for example prescribed exercise regimes) also varied in treatment duration (12 days to 18 months), intervention target, and intervention strategy. All these studies found an effect for the intervention in reducing anxiety and paranoia, though the effect sizes were smaller than psychological interventions with only one study reporting large effect sizes (Talakoub et al., 2012). The effect sizes for reductions in anxiety were not consistently larger than those for paranoia following physiological interventions.

Differential effects. Differential effects of the manipulation on anxiety and paranoia were reported in four studies. Hartmann et al. (2014) found anxiety was affected more by self-other discrepancies than by self-ideal discrepancies, whereas there were no differences between two self-discrepant manipulations on paranoia. Garety et al. (2015) found a reduction in paranoia following computerised reasoning training but no change anxiety, whereas Foster et al. (2010) found the opposite, an impact of worry-based CBT in reducing anxiety but not paranoia (see below re: differential effects by measure). Lincoln et al. (2013) found an increase in paranoia at trend level only following negative emotion induction, though this was significant for anxiety.

Differential effects for the same construct as measured by different scales were shown by two studies. Foster et al. (2010) did not find any change in distress from, or frequency of, paranoid ideation as measured by the paranoia-specific measure (GPTS), though there was a significant reduction in distress as measured by a broad delusions measure (PSYRATS- Delusions subscale). Given that the sample was diagnosed with persecutory delusions, it is reasonable to assume that this effect reflects changes in distress relating to persecutory delusions, which contradicts the result of no change on the GPTS. Passini et al. (1977) also found a differential effect on anxiety by measure, with a group*time effect on the STAI scales but not the Brief Psychiatric Rating Scale or the Multiple Affect Adjective Checklist (MAACL).

Summary. A large proportion of single episode and multiple episode interventions to date appear to result in changes in levels of both anxiety and paranoia, supporting the

theoretical models of paranoia and suggesting psychological processes that underpin both anxious and paranoid experiences are affected by these manipulations. The differential effects reported in some studies may reflect the different measures employed, or alternatively that these manipulations affect a psychological process unique to either paranoia or anxiety.

1.3.4. Predictive Power and Mediation Effects.

Single episode manipulations. There were numerous mediation effects reported in studies that used a single episode of manipulation. Lincoln et al. (2013) found that negative emotions mediated the impact of imagery on paranoia, although there was no predictive effect of self-esteem on post- intervention paranoia. Hartmann et al. (2014) found anxiety to mediate the impact of self-other discrepancies on paranoia, and Freeman et al. (2015) found a trend-level effect of depression on paranoia (p = .09) though no significant mediation effect. Lopes and Pinto-Gouveia (2013) found anxiety was non-significant as a covariate in the relationship between manipulation and paranoia.

Westermann et al. (2012) demonstrate a social stress*cognitive strategy*trait symptom interaction as predictive of subsequent paranoia; use of reappraisal as a cognitive strategy following social exclusion was associated with higher state paranoia (Westermann et al., 2012). However, they did not find an association between use of suppression and state paranoia. Ascone et al. (2017) found a small predictive effect of the interaction between favourability comparisons and social evaluative concerns on paranoia.

Multiple episode manipulations. Foster et al. (2010) found that post-intervention changes in paranoid ideation and distress (GPTS) were associated with post-intervention changes in worry. Giusti et al. (2017) found significant interaction effects of baseline symptomology and manipulation on both anxiety and paranoia, and Garety et al. (2015) found a partial mediation of belief flexibility on the intervention effect on paranoia, though this did not reach significance when controlling for baseline data. The study also failed to find a mediation effect of JTC on paranoia. Passini et al. (1977) report a negative correlation between change in suspiciousness and change in alpha wave production (conceptualised as an “antidote to tension”; Passini et al., 1977, p. 292) in their eyes-closed condition.

Differential effects. Westermann et al. (2012) report associations between emotion regulation strategies and symptoms. They found that both dimensions of paranoia (frequency and distress) were correlated with one another and with social interaction anxiety; however, frequency was correlated with suppression whereas distress was associated with reappraisal. Social interaction anxiety, however, was associated with both reappraisal and suppression strategies. Lopes and Pinto-Gouveia (2013) divided participants into three non-clinical groups based on symptom measures; paranoid, socially anxious and controls, and found that there were no significant differences between the paranoid and anxious groups on distress from paranoid thoughts or state and trait anxiety scores, whereas they did significantly differ on frequency and conviction of paranoid thoughts, anxiety (as measured by Depression and Anxiety Stress Scale [DASS-42]) and hallucinatory predisposition.

Summary. There is some preliminary evidence that emotions mediate the impact of single episode manipulations on paranoia, and some indication that differing cognitive processes may be associated with anxious and paranoid presentations. However, there was little evidence for a mediation effect of cognitive biases on the relationship between manipulations and subsequent levels of paranoia.

1.3.5. Other Theoretically Relevant Variables. Other variables stipulated in the cognitive model (Freeman et al., 2002) that were assessed included mood and emotion, self/ other beliefs and cognitive processes. An overview of the findings (if analysed independently), are shown in Table 3.

Depression. All three single episode manipulations (Freeman et al., 2015; Lincoln et al., 2013; Lopes & Pinto-Gouveia, 2013) and five of the eight multiple-episode interventions (Franco et al., 2010; Hou et al., 2014; Pourmohamadreza-Tajrishi et al., 2010; Talakoub et al., 2012; Xu et al., 2016) that measured depression found a reduction in depression alongside reductions in anxiety and paranoia. Garety et al (2015) found a reduction in paranoia but not in depression, which is in keeping with the differential effect of the intervention on anxiety and paranoia. The two studies that used physical interventions did not find an effect on depression although there was a decrease in anxiety and paranoia (Müller et al., 2014; Passini et al., 1977).

Beliefs. All the studies investigating self and/ or other beliefs found that negative beliefs were affected by manipulations in the same way as anxiety and paranoia, i.e. if

paranoia and anxiety increased, self/other negative beliefs also increased (Bullock et al., 2016; Freeman et al., 2015; Lincoln et al., 2013). The manipulations had an inverse effect on positive beliefs; when paranoia and anxiety increased, positive beliefs decreased (Bullock et al., 2016; Freeman et al., 2015).

Emotions. Studies investigating happiness and positive affect consistently found inverse effects of the manipulation to those seen on anxiety and paranoia (Bullock et al., 2016; Lincoln et al., 2013; Westermann et al., 2012). Two studies found intervention effects on "negative" affect (Bullock et al., 2016) or "emotions" (Lincoln et al., 2013) consistent with the trends in anxiety and paranoia. The effect of manipulations on other emotions was inconsistent. Westermann et al. (2012) found effects on sadness were similar to the effects on anxiety and paranoia, whereas Ascone et al. (2017) did not. Guilt feelings were not affected in the study by Passini et al., (1977).

Cognitive biases. Two of three studies found an intervention effect on the jumping to conclusions bias (JTC) in conjunction with an effect on anxious and paranoid symptoms. Garety et al.'s (2015) computerised reasoning training intervention and Giusti et al.'s (2017) worry-based CBT both reduced JTC. Freeman et al. (2015) did not find an effect of street exposure impacting JTC compared with controls. Effects on belief flexibility were also variable, with no change evident in the presence of changes in anxiety and paranoia in Freeman et al., (2015). Garety et al. (2015) found decreases in paranoia were accompanied by increased belief flexibility, whilst there was no change in anxiety. Of the single studies investigating them, no intervention effects were seen on self-focus, threat anticipation or interpretation of ambiguity (Freeman et al., 2015) or insight (Giusti et al., 2017). Lincoln et al., (2013) found that anxiety, paranoia and confusion increased following a negative mood induction, whilst motivation decreased.

Table 3. *Effect of Manipulation on Other Theoretically Relevant Variables.*

Variable	Study	Result	Effect Trend Same as Anxiety/ Paranoia? Y/N[1]
Depression (N = 11)	Franco et al. (2010)	Intervention effect: within groups (WG[2]; pre-post d = .84; pre-follow up d = .77) and between groups (BG[3]; p = .001)	Y
	Freeman et al. (2015)	Intervention effect (BG; p = .027, effect 12.98)	Y
	Garety et al. (2015)	No intervention effect	Y – anxiety; N - paranoia
	Hou et al. (2014)	Intervention effect (BG; p < .001)	Y
	Lincoln et al. (2013)	Intervention effect group*time (β = .25, p = .013)	Y
	Lopes & Pinto-Gouveia (2013)	Paranoid group higher baseline depression than socially anxious (p < .005) and controls (p < .001); socially anxious group higher at baseline than controls (p < .001); depression not significant covariate of main effect on paranoia	Y
	Müller et al. (2014)	No intervention effect (BG; p >.05)	N
	Passini et al (1977)	Effect of time (MACCL-depression and MMPI-depression p <.05); no intervention effect	N

	Pourmohamadreza-Tajrishi et al. (2010)	Intervention effect (BG; $p < .001$, $\eta^2 = 0.36$)	Y
	Talakoub et al. (2012)	Intervention effect (WG; $p = .001$)	Y
	Xu et al. (2016)	Intervention effect (BG; $p = .009$)	Y
Beliefs (N =3)	Freeman et al. (2015) – self/other beliefs	Intervention effect: increased negative self (effect 1.68, $p = .032$) and other (effect 2.82, $p = .006$) beliefs and decreased positive self-beliefs (effect -2.09, $p = .036$) in experimental group	Y- Negative; N - Positive
	Bullock et al. (2016) – self-esteem	Intervention effect (BG; $p \leq .001$, $d = 2.18$ WG; decrease negative $p \leq .001$, $d = 2.32$/ increase positive $p \leq .001$, $d = 0.95$; group*time $p \leq .001$, $\eta_{\varrho}^2 = 0.69$)	Y – Negative; N - positive
	Lincoln et al. (2013)	Intervention effect ($\beta = .12$, $t = 2.28$, $p = .026$)	Y
Emotions (N =6)	Lincoln et al. (2013) – emotion	Intervention effect on negative emotions ($\beta = -.43$, $t = -4.25$, $p \leq .001$)	Y
	Ascone et al. (2017) - sadness	Small intervention effect condition*time (favourable decrease; $\eta_{\varrho}^2 = 0.033$)	N
	Westermann et al. (2012) - sadness	Intervention effect (BG; $p = .027$, $r = 0.18$)	Y - Anxiety

Lincoln et al. (2013) - happiness	Emotion induction effect ($p \leq .001$)	N
Westermann et al. (2012) - happiness	No intervention effect *(*$p = 0.36$)	N - Anxiety
Passini et al. (1977) - guilt	No intervention effect ($p > .05$)	Y - BPRS and MACCL anxiety N - STAI and paranoia
Bullock et al. (2016) – positive affect	Intervention effect (BG; $p < .001$, $d = 1.82$; WG; decreased in negative group $p <. 001$, $d = 1.28$, increased in positive group $p < .005$, $d = 1.04$; group*time $p <.001$, $\eta_{\varrho}^2 = 0.57$)	N
Bullock et al. (2016) – negative affect	Intervention effect (BG; $p < .001$, $d = 2.01$; WG; increased in negative group $p < .001$, $d = 1.88$ but stable in positive group $p = .056$; group*time $p < .001$, $\eta_{\varrho}^2 = 0.62$)	Y – Negative; N - positive
Lincoln et al. (2013) – negative affect	Emotion induction effect on anxiety, shame, fear and anger (all $p \leq .006$)	Y

Cognitive biases (N = 4)	Freeman et al. (2015) - JTC	No intervention effect (85/15 OR = 1.67, p = 4.83; 60/40 OR = 1.09, p = .918)	N
	Garety et al. (2015) - JTC	Significant intervention effect (85/15 effect size 0.31 post 1, effect size 0.40 post 2)	Y – Paranoia; N - Anxiety
	Giusti et al. (2017) 0- JTC	JTC distinguished high/low paranoia at baseline (p = .005); Intervention effect (BG; p = .05; group*time p < .001); high paranoia reduced JTC more than low paranoia	Y
	Freeman et al. (2015) – belief flexibility	No intervention effects all p > .05	N
	Garety et al. (2015) – belief flexibility	Significant intervention effect on probability of being mistaken at post 2 (effect size 0.35)	Y – Paranoia; N - Anxiety
	Freeman et al. (2015) - self-focus; threat anticipation and interpretation of ambiguity	No intervention effect (p > .05)	N
	Giusti et al. (2017) - insight	No intervention effect (p > .05)	N
	Lincoln et al. (2013) – cognitive and motivational state	Emotion induction effect on confusion and motivation ($p \leq .001$)	Y – Confusion; N - motivation

Emotion regulation (N = 1)	Westermann et al. (2012) – reappraisal and suppression	Suppression correlated with reappraisal ($p < .10$)	Not applicable

[1] *Y = Yes; N = No*

[2] *WG indicates within-groups analyses*

[3] *BG indicates between-groups analyses*

1.4. Discussion

1.4.1. Key Findings.

Single episode manipulations. Single episode imagery-based and stress manipulations have consistently been shown to impact anxiety and paranoia, and there is promising evidence for both to be considered as causal factors in increasing paranoid ideation and anxiety.

These studies suggest distressing mental imagery and memories can all serve as a trigger of arousal, resulting in increased anxiety and threat beliefs as predicted by the threat-anticipation model. Conversely, positively orientated mental imagery served to reduce both anxiety and paranoia, suggesting that mental imagery and memories are potential intervention targets in clinical practice. Limited analyses demonstrating mediating effects of negative emotions (Lincoln et al., 2013) and anxiety (Hartmann et al., 2014) on the relationship between mental imagery and memory manipulations and paranoia support the role of negative emotions in paranoia as the threat-anticipation model predicts.

Self-other discrepancies are both self and socially-orientated concepts, and the hierarchy model postulates that paranoid beliefs are built upon social evaluative concerns (Freeman et al., 2005). Therefore, the finding that anxiety mediates the impact of self-other discrepancies on paranoia would support this model providing the nature of the anxiety is socially-orientated, however a measure specific to social anxieties was not utilised. This result informs the threat-anticipation model by demonstrating that self-other discrepancy induction (a precipitant) directly affects the threat belief via activation of emotions. This finding shows promising results for extending the literature to inform our understanding of the clinical model, though self-discrepancies require further experimental investigation.

Stress manipulation studies used a variety of stressors and analytic procedures, which makes the results difficult to synthesise. The results suggest that social stress can act as a precipitant to threat beliefs as predicted by the threat-anticipation model, and that social stresses that result in an increase in anxiety also result in an increase in paranoia, which is consistent with the threat-anticipation and hierarchy models. This supports previous

literature demonstrating the impact of social stress on anxiety and paranoia (Lincoln, Peter, Schäfer & Moritz, 2009), and was evident across clinical and non-clinical samples.

There was no support for the threat-anticipation model's prediction that anxiety would mediate the increase in paranoia following social stress manipulations. Freeman et al. (2015) note that the study was underpowered to detect anything other than large effects, and the covariate data was not reported by Lopes and Pinto-Gouveia (2013). The role of cognitive processes and trait factors in predicting paranoia as hypothesised by the threat-anticipation model and continuity hypothesis was supported following manipulations of social exclusion (Westermann et al., 2012) and affective sounds (Lopes & Pinto-Gouveia, 2013).

Investigation of additional theoretically relevant factors yielded mixed results in studies using single-episode manipulations, and are difficult to synthesise due to the limited number of studies that included them. Differential correlations between dimensions of paranoia, anxiety and emotion regulation strategies (Westermann et al., 2012) warrant further investigation into similarities and differences in cognitive mechanisms that may differentiate anxious and paranoid presentations. The finding of a small predictive effect of an interaction between favourability comparisons and social evaluative concerns on paranoia from Ascone et al. (2017) would support the hierarchy model of paranoia, however more research is needed before conclusions regarding the effects of other factors relevant to the threat-anticipation model of paranoia on levels of paranoia and anxiety following single-episode manipulations can be made.

Summary. The results of single-episode manipulations are consistent with recent research demonstrating the effectiveness of imagery-based interventions on paranoia (Morrison, 2004; Serruya & Grant, 2009) and with research demonstrating that intrusive imagery is associated with negative core beliefs in persecutory delusions (Schulze, Freeman, Green & Kuipers, 2013). The comparable influence of these manipulations on both anxiety and paranoia supports the threat-anticipation and hierarchy models of paranoia, however mediational predictions are not supported by the experimental literature reviewed here.

Multiple episode manipulations. Synthesis of the studies using multiple-episode manipulations is made difficult by the extensive variance in study designs. Most interventions resulted in a decrease in anxious and paranoid symptoms, although this effect

was larger for anxious symptoms in psychological interventions, and effect sizes were generally larger for psychological interventions in comparison to physiological interventions.

The findings of Garety et al. (2015) supports the role of reasoning biases in the cognitive model of persecutory delusions and was designed to address paranoid beliefs, although the lack of impact on anxious symptoms raises further question about which cognitive processes are shared between and which are distinct in paranoid and anxious symptomology (Freeman & Garety, 2003). The differential effects found by Foster et al. (2010) may be indicative of the impact of using different measures in assessment of symptoms, and greater consistency between studies would allow a more reliable synthesis of the findings.

Multi-episode manipulations did not routinely use analytic strategies that allow inferences regarding predictions, covariance or causal relationships between variable to be made. Pourmohamadreza-Trajrishi et al (2015) did not state the variables added as covariates, preventing inferences from being made. The association between post-manipulation changes in anxiety and paranoia (Foster et al., 2010) suggests some processes may be similar in underlying anxiety and paranoia as suggested by Freeman and Garety (2003). Giusti et al. (2017) suggest baseline symptomology influences the effect of anxiety and metacognitive training on paranoia, which has the potential to offer value information regarding the effect of anxiety-based interventions on symptomology as suggested by some researchers (Freeman, Gittins, Pugh, Antley, Slater & Dunn, 2008) as well as to informing theoretical models. However, this is an isolated study with a limited sample and requires further exploration.

Summary. Overall, the interventions were supportive of the cognitive and hierarchy models in so far as changes in anxiety were generally accompanied by changes in paranoia, however inferences into mediational predictions of the model cannot be made due lack of mediational or covariate analyses. The literature suggests interventions inclusive of CBT, mindfulness, regular physical exercise and cognitive bias training may all be effective in the treatment of persecutory delusions, though specific mechanistic techniques cannot be identified from the current experimental literature.

Clinical and non-clinical samples. Intervention effects on anxiety and paranoia were seen across a spectrum of paranoid symptoms, and both non-clinical and clinical populations endorsed items on measures of paranoid ideation. It can be tentatively concluded that experimental studies investigating anxiety and paranoia support the continuity hypothesis; paranoid symptoms were endorsed by a variety of samples and a range of manipulations have been found to have similar effects on anxious and paranoid symptoms regardless of the sample used.

Other theoretically-relevant variables. The infrequent measurement of self-beliefs and cognitive biases that are central to the threat-anticipation model limits the conclusions about the direct influences of anxiety and experimental manipulations on paranoid ideation, as these additional processes have not been consistently incorporated into analyses. Preliminary trends suggest that anxiety, self and other beliefs and cognitive processes may influence the relationship between manipulations and resulting paranoia, as predicted by the cognitive model.

1.4.2. Critique. The literature using experimental investigation into anxiety and paranoia shows promising results regarding the casual influence of mental imagery and memories, social stress, and psychological and physiological interventions on these variables. Large effect sizes have been found, and theoretically relevant variables are being assessed in the experimental literature, which employs both clinical and non-clinical samples. Samples using non-clinical participants were not biased to using university students (53.85% used university sample), although they were biased towards females whereas clinical population studies were biased towards males.

Experimental manipulations lacked consistency in duration and content, limiting the conclusions that be drawn about which specific techniques or elements of the manipulations had a causal effect on symptoms, and therefore the likely efficacy of linked treatments. However, the few commonalities in the studies suggest techniques targeting metacognitive skills (Franco et al., 2010; Garety et al., 2015; Giusti et al., 2017; Pourmohamadreza-Tajrishi et al., 2010), relaxation strategies (Hou et al., 2012; Passini et al., 1977) and exercise (Talakoub et al., 2012; Xu et al., 2016) could be helpful in reducing symptoms and should be investigated in future research.

Effect sizes were not consistently reported in this literature, Cronbach's alphas for the measures in the sample, and some data from analyses were not reported (e.g.

covariance in Lopes & Pinto-Gouveia, 2013). The literature was ranked "weak" based on quality assessment, indicating more robust methodology (specifically with regards to sample selection and blinding) and reporting of results (including commentary on validity of assessment tools) is required.

Most studies utilised a single dimension measure of paranoia, however the results of Foster et al., (2010), Lopes and Pinto-Gouveia (2013) and Westermann et al., (2012) suggest differing dimensions of paranoia may be differentially sensitive to manipulations, as well as in their relationships with other symptoms. Similarly, most anxiety measures were unidimensional, whereas the hierarchy model suggests socially-related anxieties may be more relevant to paranoid symptoms. The impact of using multi-dimensional measures of these constructs may provide further insight as to the specificity of the impact of manipulations on various dimensions of paranoia and anxiety, and this in turn would allow improved extrapolation of the results to inform theoretical models.

Due to a lack of consistency and replication in the components of experimental design (including sample, measures, manipulation and analysis) and weak quality status of the literature, it is not possible to draw firm conclusions, to generalise the reported findings, or to draw causal inferences between theoretically relevant variables at this stage.

1.4.3. Strengths and Limitations of Review. The use of a systematic search process, criteria based in psychological theory and research, and of a quality assessment tool facilitates an objective critique of the literature which can be interpreted against the theoretical models and permits replication of the review in future. The stipulation regarding minimum design provided potential for the studies included in the review to draw conclusions regarding the causal effect of manipulations on anxiety and paranoia. To the knowledge of the author, no other review into anxiety and paranoia has stipulated this inclusion criteria, and this is therefore the only review that can draw such conclusions to date. The inclusion of both clinical and non-clinical samples affords the opportunity for inferences about the continuity hypothesis, as well as the hierarchy and cognitive models, to be drawn.

There were several limitations to the review. Firstly, whilst a quality assessment tool was employed, this was only rated by a single researcher which increases the probability of

subjective biases in the ratings. Secondly, the literature was only interpreted against the models of paranoia proposed by Freeman et al. (2002) and Freeman et al. (2005), despite various other theoretical models having been proposed (Bentall et al., 1994; Kesting & Lincoln, 2013; Freeman, 2016). An updated version of the threat-anticipation model has recently been presented (Freeman, 2016), in which other variables such as sleep dysfunction and safety behaviours, which were not included in the current review, are hypothesised in the maintenance of paranoid symptoms.

Whilst this review recommends investigation of other factors central to the threat-anticipation model, it is noteworthy that many of these are common to both the self-attribution (Bentall et al., 1994) and the self-esteem model (Kesting & Lincoln, 2013) of persecutory delusions. Investigations of self-beliefs and cognitive processes may therefore offer further insights into the impact of experimental manipulations on paranoia and anxiety. Additionally, this could inform our understanding of the interaction of variables that, whilst common to the differing models, are hypothesised to have differing causal and interactional effects dependent on the model ascribed. This would permit a comparative evaluation of the various cognitive models that are available.

Finally, the definitions employed in the results and synthesis of this review, including "clinical" vs "non-clinical", "single" vs "multiple" episode, and "psychological" vs "physiological" were generated subjectively by the researcher. Conceptualising the results using different groups, or conceding of group membership by a second author, may have reduced bias in the interpretations or offered insight into patterns in the results which were not evident from this review.

1.4.4. Implications.

Experimental studies. The primary implication for future experimental studies is the need for replication of the existing findings and consistency in the manipulations and measures used to investigate these variables. Assessment of other theoretically relevant concepts such as attributional and cognitive biases and self and other beliefs, which show promising trends in informing cognitive models but are lacking in consistent measurement in the literature, should also be assessed. Mediational or covariate analyses, and therefore larger samples, should be employed to investigate causal relationships between theoretically relevant variables in addition to investigating the impact of manipulations on paranoia and anxiety.

Future research investigating direct comparisons between clinical and non-clinical samples could augment the theoretical understanding of the continuity of paranoid symptoms and the transition into persecutory delusions. Additionally, non-clinical studies could collect data on the mental health status of participants so that this can be utilised as a covariate, or the analyses run with and without those with a history of or current mental health difficulties as in Lincoln et al. (2013).

Clinical implications. Due to the limitations of the literature, no definitive clinical implications can be made regarding paranoid symptoms. The research suggests that interventions affecting beliefs and emotions also affect levels of paranoia and anxiety, therefore treatments addressing these variables may be beneficial in clinical interventions. However, further mediational analysis of these effects is required before specificity regarding treatment targets can be recommended.

This review contributes to mixed results regarding the modification of anxiety treatments in the treatment of paranoia as suggested in Freeman et al. (2008) and Lincoln et al. (2009). The differential correlations in Westermann et al. (2012) suggests reappraisal, a common feature of anxiety treatment, would be contraindicated in paranoia triggered by social situations. However, Lincoln, Lange, Burau, Exner and Moritz (2010) suggest effective anxiety regulation (inclusive of reappraisal) may be helpful in reducing paranoid symptoms. Further investigation of the impact of anxiety treatment strategies is warranted, and experimental studies could provide a unique contribution to our understanding of which strategies may be helpful, and in what circumstances.

1.4.5. Summary. The literature investigating anxiety and paranoia using experimental methods offers support for the continuity hypothesis of paranoid symptoms, and tentative support for the cognitive and hierarchy models of paranoia (Freeman et al., 2002; Freeman et al., 2005). Mental imagery and memories and social stressors have been shown to be causal to paranoid and anxious symptoms, though variance in experimental design and small samples limit the generalisability of these relationships. Numerous psychological and physiologically based interventions have shown promise in reducing both anxious and paranoid symptoms as predicted by the hierarchy and cognitive models (Freeman et al., 2002; Freeman et al., 2005), though the lack of consistency between interventions and of mediational analyses prevent further conclusions from being drawn

and extrapolated as supportive or undermining of the threat-anticipation model of paranoia (Freeman et al., 2002).

Chapter 2: The Impact of Mental Imagery in Non-Clinical Paranoia

2.1. Introduction

Mental imagery has been defined as "a mental representation that occurs without the need for sensory input" (Stopa, 2009, p. 2) that can be visual, auditory, olfactory or tactile in nature, and the sensory properties that accompany imagery are believed to distinguish the experience from verbal cognitive processing (Holmes, Geddes, Collom & Goodwin, 2008; Pearson, Naselaris, Holmes & Kosslyn, 2015). The role of mental imagery in mental health disorders and the use of imagery-based interventions have been the focus of increasing research in recent years. This study will summarise the research to date, and investigate the impact of mental imagery on paranoid ideation, mood and beliefs in people with high non-clinical paranoia.

2.1.1 Mental Imagery in Mental Health. Intrusive mental imagery has emerged as a central maintenance factor in various mental health conditions (Holmes & Mathews, 2010; Pearson et al., 2015), and is often experienced as intrusive, detailed and vivid (Brewin, Gregory, Lipton & Burgess, 2010). There is consensus that the content of imagery is similar in content to the verbal equivalents maintaining disorders (Brewin et al, 2010; Pearson et al., 2015), and thus it frequently relates to distressing past or dreaded future events (Brewin et al., 2010). Experimental evidence has demonstrated a superior emotional valence in comparison to verbal equivalents, as well as an importance of the emotional valence of the imagery on emotion, with positive imagery resulting in increased positive emotion and reduced anxiety, and negative imagery increasing anxiety (Holmes & Mathews, 2010). Accordingly, intrusive images in mental health disorders are accompanied by intense emotions (Brewin et al., 2010; Mathews, Ridgeway & Holmes, 2013) and one hypothesis is that mental imagery serves to amplify the mood states maintaining a disorder (bipolar; Holmes et al., 2008; depression; Weßlau & Steil, 2014).

In light of evidence indicating a role of mental imagery in the maintenance of mental health disorders, the use of imagery-based techniques has emerged in clinical interventions. Two methods have been described regarding the use of imagery as an intervention technique; simple exposure, involving the holding of a mental image in mind (as in the experience of intrusive images), and imagery rescripting, in which the image is evoked and the content manipulated (Pearson et al., 2015). Evidence suggests the use of imagery techniques (exposure and/or rescripting) can be effective in the treatment of anxiety disorders (Brewin et al., 2010; Hackmann, Bennett-Levy & Holmes, 2011; Holmes, Arntz & Smucker, 2007; Pearson et al., 2015), post-traumatic stress disorder

(Hackmann, 2011), major depression (Weßlau & Steil, 2014; Wheatley & Hackmann, 2011), eating disorders (Cooper, 2011), and personality disorders (Arntz, 2011). It is hypothesised that imagery exposure allows the patient to habituate to the emotion evoked by or associated with the image (Pearson et al., 2015; Weßlau & Steil, 2014), whereas in imagery rescripting, both the restructuring of the initial autobiographical memory content (Brewin et al., 2010; Holmes et al., 2007) and the alteration of the encapsulated appraisal of the image that relates to beliefs about the self (Arntz, 2011; Cooper, 2011; Holmes et al, 2007; Wheatley & Hackmann, 2011) have been proposed as mechanisms of change.

2.1.2. Mental Imagery and Paranoia.

***Symptom maintenance*.** Persecutory delusions, the most severe form of paranoid experience, are a feature of psychotic experience (Freeman & Garety, 2014), and intrusive images in people with psychoses are common (Morrison, Beck, Glentworth, Dunn, Reid, Larkin & Williams, 2002; Schulze, Freeman, Green & Kuipers, 2013). Morrison et al. (2002) interviewed patients with psychosis about their experience of mental imagery, finding 74.3% reported experiencing mental imagery relating to their psychotic symptoms. Furthermore, 96.2% of those experiencing mental imagery could link the image to a specific emotion and belief (Morrison et al., 2002). This finding was supported by Schulze et al. (2013), who reported 72.5% of a sample experiencing persecutory delusions reported intrusive, negative imagery. These patients reported significantly more distress compared to those not experiencing imagery, described feelings of anxiety, helplessness, anger, sadness, shame and guilt in response to the images, and identified a strong level of conviction in the encapsulated belief associated with the image. These findings support an association between mental imagery, emotions, beliefs and paranoid symptoms, and taken together, these studies offer preliminary support for not only the presence of mental imagery in persecutory delusions, but also their association with emotion and beliefs; both of which are key features in the threat-anticipation model of persecutory delusions (Freeman, Garety, Kuipers, Fowler & Bebbington, 2002, see Figures 1 and 2, chapter one). It may be hypothesised that the experience of emotionally salient intrusive images serves as an activating factor in persecutory beliefs, either by being experienced as anomalous events or by triggering maintenance factors such as self and other beliefs and/ or emotions, although this has not been empirically tested to date.

Self-compassion is defined as "... compassion turned inward and refers to how we relate to ourselves in instances of perceived failure, inadequacy or personal suffering."

(Neff, 2016, p.265). Although it does not feature explicitly in cognitive models of persecutory delusions, there is an assumed influence of self-compassion on reducing negative evaluations (Zessin, Dickhäuser & Garbade, 2015) which are conceptualised as central to the onset and maintenance of persecutory delusions (Freeman et al., 2002). There is evidence for an association between self-compassion and psychopathology (Macbeth & Gumley, 2012), and given the relationship to negative evaluations that are central to paranoid experience, self-compassion has been investigated in experimental studies into mental imagery and paranoia. Lincoln, Hohenhaus and Hartmann (2013) found compassionate mental imagery decreased subsequent paranoia, and, following a systematic review into self-concepts and paranoia, Kesting and Lincoln (2013) argue that self-compassionate interventions may be helpful in treating paranoid experiences due to an impact on positive emotions, self-acceptance and self-esteem.

Experimental evidence. In order to further understand how imagery functions in paranoia, recent studies have explored the impact of imagery manipulations using experimental designs. Bullock, Newman-Taylor and Stopa (2016) investigated the impact of positively or negatively valanced mental imagery on levels of paranoid ideation, anxiety, affect, self-esteem and self-compassion in a non-clinical high paranoia sample. They found large effects of imagery on all measures, offering empirical support for the role of mental imagery in paranoid ideation. This was an isolated study that has not yet been replicated, and was limited by a small sample, absence of both a control group and any investigation of long-term effects. However, when taken with the results of Lincoln et al. (2013), these findings suggest mental imagery may impact paranoid ideation and associated maintenance factors. In a clinical sample, however, Ascone, Sundag, Schlier and Lincoln (2017) found these beneficial effects were not replicated, reporting no effect of compassionate imagery on paranoia, negative self-relating or negative affect, although self-reassurance and happiness increased. In summary, although there is preliminary evidence to suggest imagery may influence paranoia and hypothesised maintenance factors, this is not yet sufficiently evidenced in experimental research.

The treatment of paranoia. Current guidance stipulates individual Cognitive-behavioural therapy (CBT) or family intervention (NICE, 2014) be offered as interventions for psychosis. CBT establishes links between a person's thoughts, feelings and behaviours, and should include "the re-evaluation of people's perceptions, beliefs or reasoning relates to the target symptoms" (NICE, 2014; 1.3.7.1). The assessment and treatment of mental imagery in this conceptualisation is not specifically referenced in NICE guidance, and

traditional CBT for paranoia has relied on the reappraisal of verbal cognition ("thoughts"; Freeman & Garety, 2006) as opposed to the experience and appraisal of mental imagery. More recently, interventions that include imagery techniques have emerged.

Morrison (2004) and Serruya and Grant (2009) present single cases demonstrating cognitive therapy inclusive of imagery (manipulation and exposure, respectively) for the treatment of paranoid psychosis. Morrison (2004) found reduced distress from, conviction in, and vividness of mental imagery and Serruya and Grant (2009) found decreased delusions at 12-month follow-up. It is not possible to isolate the effect of the imagery-based and other treatment techniques; however, these authors emphasise the potential for use of imagery in the treatment of paranoia.

Whilst the use of imagery may be a helpful component of treatment, the papers described present single case studies and so it is not possible to draw any definitive conclusions. The role of imagery in persecutory delusions is not well-established, and thus the mechanism by which imagery techniques may function in isolation of or alongside other cognitive techniques cannot be determined. Furthermore, both papers describe different techniques and so the results cannot be synthesised to inform how imagery features in paranoid experience. Different measures of outcome were used, and whilst Morrison (2004) described a reduction in the distress from delusions, Serruya and Grant (2009) reported broad affective symptoms remained unchanged, raising further questions about how imagery and distressing affective symptoms interact with paranoid symptoms.

Summary. Research investigating the impact of imagery in paranoid experience is sparse, and limited by inconsistency in experimental design, manipulation and the variables assessed, which prevents any coherent synthesis of the findings at present. Whilst the two experimental studies using non-clinical populations (Bullock et al., 2016; Lincoln et al., 2013) suggest imagery may impact paranoia and other theoretically-relevant variables, these studies have not been replicated and therefore conclusions about the impact of imagery and factors associated with paranoia cannot be drawn. Due to small sample sizes and an absence of replication of these experimental effects, the impact of imagery in paranoia and the mechanisms of change in imagery interventions is not yet understood.

2.1.3. Aims. Research into imagery in psychosis, and specifically paranoia, is in its infancy. Controlled studies investigating the effect of simple imagery on paranoia and theoretically related factors is required to determine the potential therapeutic benefit and

associated mechanism of change. The current study aimed to replicate the findings of Bullock et al. (2016) using a more robust methodology employing a control group and one week follow up. A secondary aim was to explore the impact of imagery on the additional variables of self and other beliefs that are central in the threat-anticipation model of persecutory delusions (Freeman et al., 2002). Finally, the study aimed to assess the impact of imagery on trait measures of paranoia, anxiety, self-esteem and self-compassion.

There were three research questions:

1. Does holding a positive, negative or neutral image affect levels of paranoia, anxiety, self-esteem, self-compassion, affect and self and other beliefs in a high non-clinical paranoia student sample? Based on the findings of Bullock et al. (2016), it was hypothesised that positive imagery would increase self-esteem, self-compassion and positive affect and decrease paranoia, anxiety and negative affect, whereas negative imagery would have opposite effects on these variables.
2. Are these effects maintained one week later following repeated induction of the image?
3. Does mental imagery affect trait levels of paranoia, anxiety, self-esteem and self-compassion?

2.2. Method

Ethical approval for the study was granted by the University of Southampton Ethics Committee. See Appendix A for confirmation of the most recent revisions. An adverse incident report was submitted due to a participant completing the first experimental stage when they in fact no longer met criteria at stage two due to a miscalculation of their score; their data were not used in the analyses.

2.2.1. Participants. Participants were students at a British university aged 18 years or over, and were given course credits or cash payment for participation. Cash payment was increased for the final two months of recruitment following poor uptake; the final two participants received the increased rate.

2.2.2. Design. The study utilised a 3 x 3 mixed model design, with imagery condition as the between-subjects factor (positive, negative or control) and time as the within-subjects factor (pre-imagery, post-imagery and follow up). The primary dependent variable (DV) was state paranoia, and secondary DVs were state anxiety, self-esteem, self-compassion, positive and negative self and other beliefs and affect. Trait measures of paranoia, anxiety, self-esteem and self-compassion were also analysed to investigate any effect of the experimental condition on these factors at a dispositional level.

A G*Power calculation (G*Power 3.1; Faul, Erdfelder, Lang, & Buchner, 2007) was carried out based on a mixed model ANOVA analysis with an effect size of .4 and power of .8. This estimate was based on the Bullock et al. (2016) study which reported an effect size of .4 for the impact of group on the primary outcome measure of state paranoia. The power calculation advised a sample size of 45 was necessary for this analysis.

2.2.3. Measures and Materials.

State measures.

The Paranoia Checklist (PC; Freeman et al., 2005). The PC measures paranoid ideation in non-clinical samples, and the 18 items have demonstrated acceptable convergent validity (Freeman et al., 2005). Respondents rate the level of frequency, conviction and distress experienced in relation to each item. The adapted state version (Lincoln, Lange, Burau, Exner & Moritz, 2010) measures the presence of each paranoid thought “at the moment”, and produces a single scale result that was used as a measure of

state paranoia. Each item is rated from 1 (not at all) to 5 (very strongly), with total scores ranging 18 to 90. The adapted scale has been shown to have good internal consistency (α = *.84*; Lincoln et al., 2010).

The State and Trait Anxiety Inventory (STAI; Spielberger, 1983) – State Scale (S-Anxiety). The S-Anxiety measures state anxiety, and consists of 20 items on which participants rate the intensity of their experience on a 4-point Likert scale from 1 (not at all) to 4 (very much so). The S-Anxiety produces a single scale score ranging 20 to 80. Items reflecting the absence of anxiety are reverse scored, with higher scores indicating higher anxiety. The scale has shown construct, concurrent, convergent and divergent validity, and excellent reliability in a college student sample (α = *.91* males*,* α = *.93* females; Spielberger, 1983).

State Self-Esteem Scale (SSES; Heatherton & Polivy, 1991). The SSES measures state self-esteem. It can be scored as three separate subscales (performance, social and appearance) or as a single measure of state self-esteem. It has 20 items, which respondents rate how true each statement feels for them at that moment from 1 (not at all) to 5 (extremely) with total scores ranging 20 to 100. Higher scores indicate higher state self-esteem. The scale has demonstrated construct and discriminant validity, excellent internal consistency (α = .92) and test-retest reliability (r = .70-.72; Heatherton & Polivy, 1991). The single measure was utilised as an assessment of state self-esteem in the current study.

The Self-Compassion Scale- Short Form (SCS-SF; Raes, Pommier, Neff, & Van Gucht, 2011). This short version of the Self-Compassion Scale (SCS; Neff, 2003) consists of 12 items measuring self-compassion which are rated from 1 (almost not at all) to 5 (almost completely). The scale produces the same subscales as the original SCS, with raw total scores ranging from 12 to 60 from which a mean score is calculated. The English version of the original SCS-SF has shown acceptable convergent validity and high internal consistency (α = .86; Raes et al., 2011). Instructions were adapted to instruct participants to answer how much they believed the item "right now" to measure state self-compassion. The decision to adapt the SCS-SF instructions as opposed to using an existing state measure of self-compassion (Brienes & Chen, 2013) was justified by the items of the SCS-SF having shown a factor structure that has been cross-validated with the original SCS.

The Positive and Negative Affect Schedule (PANAS; Watson, Clark & Tellegen, 1988). The PANAS measures positive and negative affect. Consisting of a list of 20

feelings, respondents rate themselves from 1 (very slightly or not at all) to 5 (extremely). The scale produces two subscales of positive (PANAS-PA) and negative (PANAS-NA) affect, with scores ranging from 10 to 50. The scale has been shown to have acceptable validity and good internal consistency for both subscales (PANAS-PA α = .89, PANAS-NA α = .85; Crawford & Henry, 2004). The instructions "at the moment" were employed to provide a measure of state positive and negative affect.

Trait measures.

The Paranoia Scale (PS; Fenigstein & Vanable, 1992). The PS measures paranoid ideation and was used as a measure of trait paranoia. It consists of 20 items rated from 1 (not at all applicable) to 5 (extremely applicable), the measure produces a single scale score ranging 20 to 100. Higher scores indicate higher levels of ideation. The scale has shown good convergent and discriminant validity, internal reliability (α = .84), and test-retest reliability (r = .70; Fenigstein & Vanable, 1992).

The State and Trait Anxiety Inventory (STAI; Spielberger, 1983) – Trait Scale (T-Anxiety). The T-Anxiety assesses trait anxiety, and consists of 20 items on which participants rate the frequency of their experience on a 4-point Likert scale from 1 (not at all) to 4 (very much so). Items reflecting the absence of anxiety are reverse scored. The scale produces a single scale score ranging 20 to 80, with higher scores indicating higher anxiety. The scale has shown construct, concurrent, convergent and divergent validity, and excellent reliability in a college student sample ($\alpha = .90$ males, $\alpha = .91$ females; Spielberger, 1983).

Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965). The RSES measures trait self-esteem. It consists of 10 items on which respondents rate their agreement with on a 4-point scale from 3 (strongly agree) to 0 (strongly disagree). Scores are reversed for the negatively worded items and together with positively worded items provide a single scale score of self-esteem ranging from 0 to 30. Low scores are associated with low self-esteem and high scores indicate high self-esteem (Rosenberg, 1965). The scale has shown reproducibility of .92 and scalability of .72 in the original sample (Rosenberg, 1965), and Schmitt and Allik (2005) found convergent and discriminant validity and excellent reliability in a UK sample; α = .90.

The Self-Compassion Scale (SCS; Neff, 2003). The SCS is a 26-item scale measuring self-compassion. Respondents rate the frequency of them behaving in line with the item from 1 (almost never) to 5 (almost always). The scale can produce six subscale scores or a single overall self-compassion score (Neff, 2003). The raw subscale scores range between 4 and 25, and a grand mean is calculated by summing the subscale means. The scale has shown excellent internal consistency (α = .92), test-retest reliability (r = .93; Neff, 2003), predictive, convergent and discriminant validity (Neff, 2016). The overall score was utilised as a trait measure of self-compassion.

The Brief Core Schema Scales (BCSS; Fowler et al, 2006). The BCSS measure positive and negative evaluations of the self and of others. It has 24 items, with respondents first rating whether they believe an item (yes/no). For items answered "Yes", participants rate the extent to which they believe the statement from 1 (believe it slightly) to 4 (believe it totally). Four subscale scores are produced ranging 6 to 24: negative-self, negative-other, positive-self and positive-other, with higher scores reflecting higher endorsement of belief statements contributing to the subscale construct. The scale was conceptualised as a trait measure for the purposes of the study as the scale was designed with the aim of capturing self and other evaluations at a schema level (Fowler et al., 2006). Each subscale has demonstrated construct validity and good internal consistency and test-retest reliability in a non-clinical sample: positive-self α = .78, r =0.82; negative-self α = .86, r = 0.84; positive-other α = .88, r =0.72; negative-other α = .88. r =0.70 (Fowler et al., 2006).

Demographic data. Participants were asked to provide information on age (free-text), gender (multiple-choice) and ethnicity (multiple-choice) at screening stage one.

Permissions. Use of the BCSS, PANAS, PC, and PS was permitted via direct contact with the scale authors (See Appendix B). The RSES is listed as freely available providing the author's family are informed if the work is published (www. psytoolkit.gla.ac.uk). The SCS, SCS-SF and SSES are free to use from the authors' websites (www.selfcompassion.org; www.dartmouth.edu). A licence for the manual and 135 copies of the STAI was purchased (see Appendix C).

Imagery conditions.

Experimental scripts. Imagery scripts for the positive and negative conditions were those used by Bullock et al. (2016), which were based on semi-structured interviews of

Hackmann, Clark and Mcmanus (2000) and designed to elicit either a positive or negative interpersonal self-image. The positive group were instructed to think of a time when they were around others and felt "relaxed", "secure" and although they could "trust" those that they were with, whereas the negative group were instructed to think of a time when they were around others and felt "wary or suspicious" (Bullock et al., 2016). Participants in the positive condition were asked to rate their feeling of being "safe and secure" and level of trust in the people they were with, and confirmed having a positive sense of self in that situation (Bullock et al., 2016). The negative group rating feelings of being "wary or suspicious" and confirmed a negative sense of self in that situation (Bullock et al., 2016). Both groups were then asked a series of questions designed to guide them through details of the image (e.g. "What can you see and hear?"; Bullock et al., 2016). All rating scales were amended so that all ratings within the scripts ranged 0 to 100 as opposed to varying between 0 to10 and 0 to 100. The control imagery script was based on the existing scripts, including the ratings of vividness, feelings of trust, suspiciousness, safety/ security and sense of self. The content of the guided imagery, however, was designed to guide the participant through the various features of a face rather than the image of a personal memory. Scripts are available on request. Every fifth script in each condition was recorded.

Daily practice scripts. Daily practice scripts were designed to elicit the mental image daily between laboratory sessions by guiding participants through the features of the image. Scripts were standardised across the positive and negative self-imagery conditions, (e.g. "What are other people doing in the image?). The control script was standardised for time (within 10 seconds of the self-imagery script) though the content regarded the image of the face (e.g. "What expression does the person in the image have?"). The scripts were audio-recorded and sent to two people known to the experimenter, who provided feedback on the flow, timing and quality of the recordings. Ratings are shown in Table 4 and were deemed comparable between the self-imagery and control face scripts. The appropriate audio was sent to participants after the first laboratory session. Scripts are presented in Appendix D.

Daily practice sheet. Each participant was given a sheet on which to record daily practice. The sheet included an image prompt, a tick box to confirm the practice had taken place, the time practice took place, and the date and time of the follow up appointment (see Appendix E).

Table 4. *Daily Practice Scripts Piloting Feedback (N = 2).*

Respondent	Control practice script[1]	Positive/ negative practice script[1]
A	F +10	F +10
	T +10	T +10
	Q +10	Q +8
B	F +8	F +9
	T +7	T +8
	Q +9	Q +9
Mean	F +9	F +9.5
	T +8.5	T +9
	Q +9.5	Q +8.5

[1] *Scripts rated from -10 (very poor) to +10 (very good). F = Flow, T = Timing, Q = Quality of recording.*

Control condition. Three options for the control group were considered for use; no image, a neutral image or low paranoia. A neutral interpersonal image was chosen to control for emotional valence of the interpersonal imagery. The control condition was therefore designed with the aim of holding a mental image that was interpersonal in nature, though neutral with regards to the emotional valence and sense of self that holding the image created. The control image had three desirable qualities:

1. It did not provoke a positive or negative sense of self
2. It was easy to hold in mind vividly
3. It did not create a substantial change in emotion

Full details of the selection process and piloting for the control image stimuli can be found in Appendix F. In summary, two images from the NimStim© database were selected for use; one white female (01F_NE_C) used as image A, and one black male (40M_NE_C) utilised as image B for instances in which participants reported a positive or negative sense of self in response to image A. It was noted that there was a slight decrease in positive affect in response to image A, however, considering consistent reporting of a neutral sense of self in response to the image and ease of holding the image in mind, this was deemed the most appropriate image for use.

Piloting. The experimental procedure was then piloted on an opportunity sample (N = 3; one per condition). These were recorded, and the recordings discussed with a supervisor of the project prior to the experimental procedure being finalised.

2.2.4. Procedure.

Recruitment. Adverts were displayed around campus and on the university online platform for research studies. The author also attended lectures to raise awareness of the study. Adverts directed participants to participate in the initial screening via the online platform. After being presented with an information sheet (see Appendix G), participants clicked a dial box to indicate they consented to take part. Participants were asked to provide an email address and demographic information, before completing the PS. Due to poor uptake, additional approval was sought and approved to attend social spaces around campus where people could complete pen and paper consent, screening and demographic questions. Eligible participants were sent an email invitation to participate in the experimental stage of the study. Up to two reminder emails were sent if there was no response, after which it was assumed the participant did not wish to take part and they were excluded from the active contacts list, as were participants who initially responded but then did not confirm an appointment and did not reply to further communication. Participants were eligible to take part if they scored within the predetermined range for high trait non-clinical paranoia; a score in the 84th percentile or above (+1*SD* of non-clinical population mean, score ≥ 53; Bullock et al., 2016). No other inclusion criteria were used. Participants in the control group could be excluded during the experiment (see below). Figure 5 displays a consort diagram. Recruitment for the experiment took place over a period of 10 months.

Experimental procedure. Participants were given the relevant information sheets and provided consent when progressing through each stage of the study (see Appendices H and I), and were fully debriefed following completion of the follow-up questionnaires or point of exclusion (see Appendix J for debriefing sheets). Figure 6 displays a diagram of the experimental procedure.

Questionnaires were given in a standardised order as follows: PS, SCS-SF, PC, PANAS, SSES, S-Anxiety, T-Anxiety, BCSS, RSES, SCS. Though this increases the risk of order effects, the decision to follow a standardised order was twofold:

1. The S-Anxiety is recognised to be potentially influenced by the emotion created by completing the T-Anxiety first (Spielberger, 1983); all state measures were completed prior to trait measures to protect them from this bias (other than the PS, which was completed first to screen).

2. Due to identical items in the state and trait self-compassion measures, it was desired that the SCS-SF and SCS were completed as far apart as possible, meaning the order within state and trait subgroups could not be randomised.

Participants were randomised using a block randomisation procedure. A block of 27 was entered into www.randomizer.org. Participants were assigned to the group that appeared next on the randomised list as it existed on the date and time of their laboratory session. The final two participants were not randomized and allocated to the positive imagery condition to ensure equal groups following poor uptake. Participants were blind to randomisation and to the measurement of paranoia in the study, whereas the experimenter knew which condition each participant was assigned to.

Data analytic strategy. All analyses were performed using IBM SPSS Statistics version 24. The dataset was screened for anomalous data in adherence with guidance from Wilkinson and the Taskforce on Statistical Inference (1999). Due to the small sample size, missing data were prorated by calculating the mean of the completed data from the relevant scale or subscale (as appropriate) and entering this as the value for the missing item, rather than being deleted. Appendix K displays an overview of prorated data. Data for all measures were subject to scrutiny for normal distribution and outliers across group and time point by use of the Shapiro-Wilk test (due to small sample size; Mayers, 2013), calculation of Z-scores of skew and kurtosis (Field, 2009), and inspection of histograms and scatter plots to permit broad pattern inspection alongside statistical inferences of normality (Wilkinson & the Taskforce on Statistical Inference, 1999). The Shapiro-Wilk test was employed due to the small sample size (Mayers, 2013).

Internal consistency of measures. The Kaiser–Meyer–Olkin measure of sampling adequacy (KMO; Kaiser, 1970) was applied to assess sample size adequacy for internal consistency analysis at each time point. Cronbach's alpha (α) is reported for PANAS-NA post-imagery only, as this was the only data to reach the cut off score for "good" data ($\geq$ .80; Kaiser, 1970). Cronbach's α for the PANAS-NA post-imagery was α = .91, exceeding the minimum cut off α = .70 (Kline, 2000).

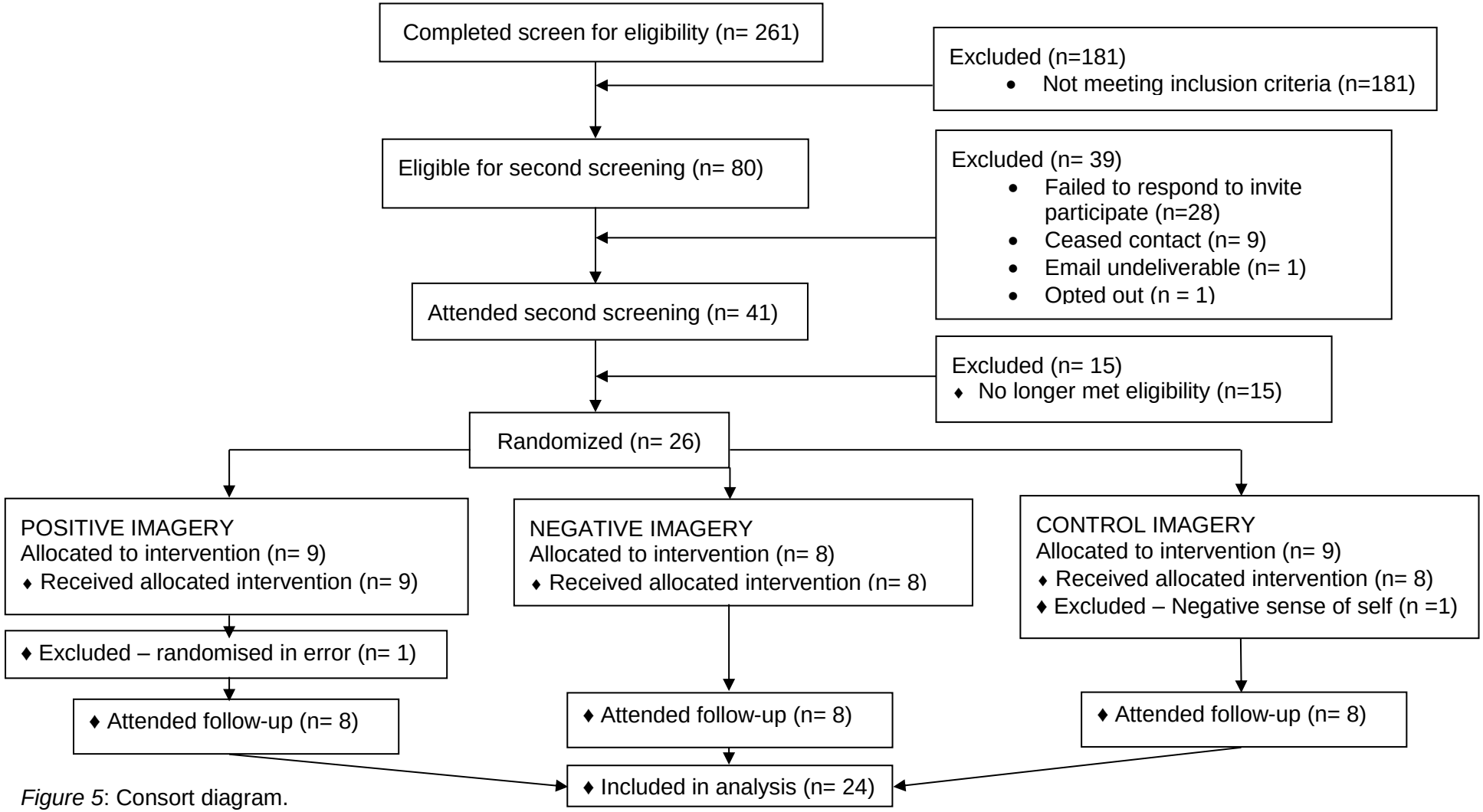

Figure 5: Consort diagram.

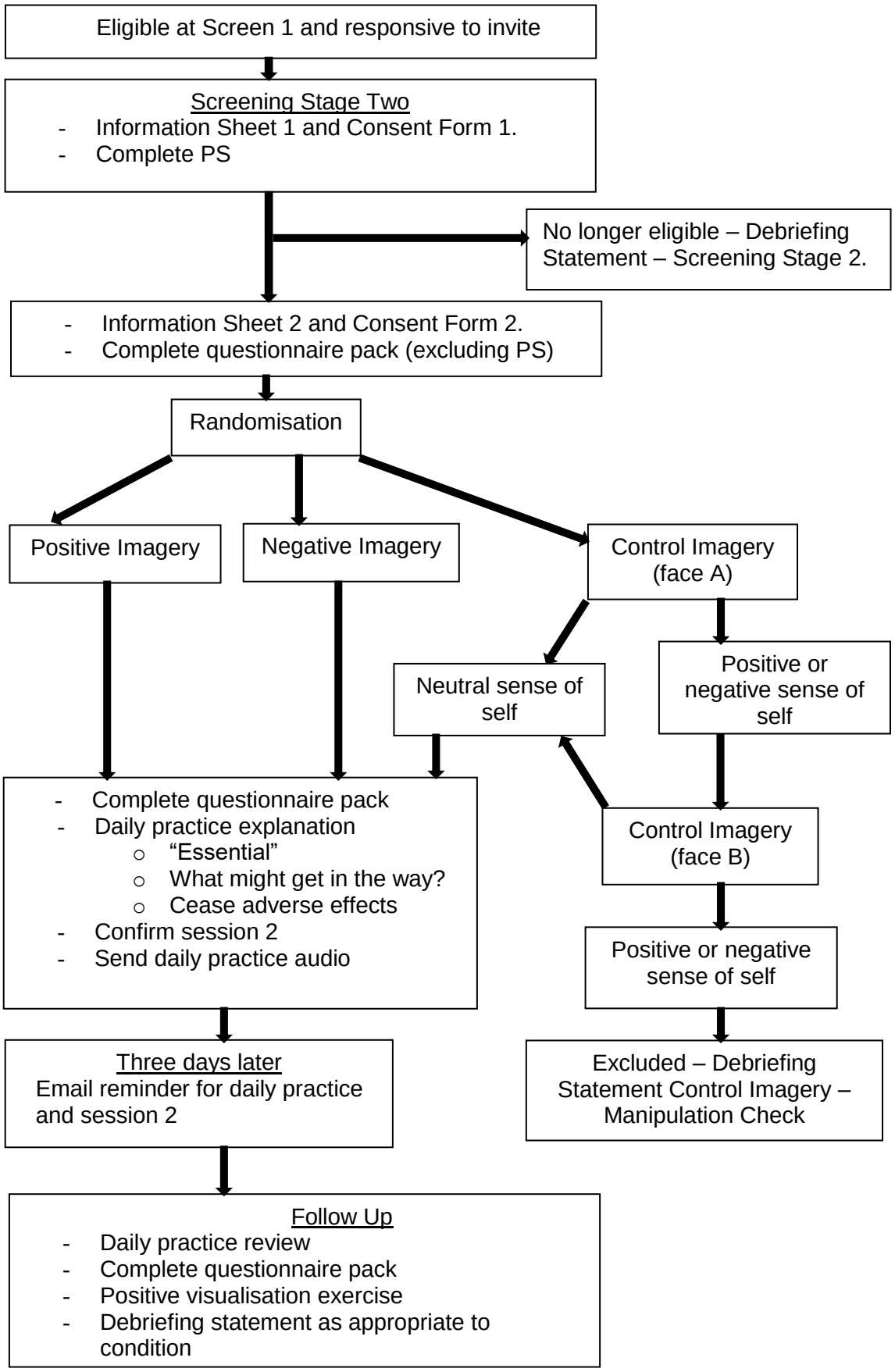

Figure 6. Experimental procedure.

Preliminary analyses. Baseline differences between groups were assessed for age, pre-manipulation measures and image vividness using a series of One-Way Analyses of Variance (ANOVAs). The bootstrapping function was employed to in cases of non-normal distribution, set to 1000 samples and 95% bias-accelerated confidence intervals (BCa 95% CIs). BCa 95% CIs are reported in the case of significant results. Welch's *F* is reported when equal variances were not assumed. Baseline differences between groups in gender and ethnicity were assessed using Pearson's Chi-Square test, and correlations between age and all dependent variables were assessed using bivariate correlations.

Main analyses. Differences across all dependent variables were analysed using a series of 3x3 Mixed Model ANOVAs, with one between-subject variable (experimental group) and one within subject variable (time). Post-hoc analyses employed Bonferroni's correction set at $p < .017$. The Greenhouse-Geisser statistic is reported when sphericity was not assumed unless there was a large difference between this and the Huynh-Feldt statistic, in which case a mean of the two statistics was reported (Field, 2009). Follow up One-Way and Repeated Measures ANOVAs were employed to locate the source of any interaction effects, with Bonferroni corrected *p* values reported for post hoc analyses. Welch's *F* and Games-Howell are reported in cases of unequal variances. The bootstrap function, employed as described above, was applied for one-way ANOVAs with non-normal distribution, with BCa 95% CIs reported in the case on significant results. Analyses of Covariance (ANCOVA) were run for dependent variables that correlated with age, with covariate independence assumed from assessment of baseline group differences. Partial eta squared (η_p^2) was calculated as an index of effect size for significant and trend-level results and interpreted against Kinnear and Gray (2008). Eta squared (η^2) was calculated for one-way follow-up analyses.

2.3. Results

2.3.1. Data Distribution. Numerous violations of the assumption of normality as assessed by either a Z score exceeding 1.96 for skew or kurtosis (Field, 2009), a significant Shapiro-Wilk test, or presence of outliers are summarised in Appendix L. Age (positive and negative conditions), post-state paranoia in the control condition, post-negative affect scores in the positive condition, and trait self-compassion and self-negative beliefs across groups at follow up violated all three methods of normality assessment. As ANOVA is considered robust enough to detect differences even when assumptions have been violated and there are equal groups (Field, 2009; Mayers, 2013), mixed model ANOVAs were carried out, with a bootstrap function set to 1000 samples and 95% bias-accelerated confidence intervals (BCa 95% CIs) employed during baseline and follow up one-way ANOVAs. BCa 95% CIs are reported in the case of significant results.

2.3.2. Descriptive Statistics. Table 5 shows descriptive statistics for demographic data, with trait data displayed in Table 6 and state data in Table 7. Mean baseline scores on state paranoia, anxiety and affect, trait anxiety, and age fell within one standard deviation of the Bullock et al. (2016) sample, suggesting similar baseline characteristics between the samples. Trait self-esteem fell outside one standard deviation of the Bullock et al. (2016) sample, suggesting the current sample had lower levels of trait self-esteem. All participants reported practising the image for six days. Twenty-one participants attended on day seven, three participants attended later than this, on days nine, 14 and 27, due to unforeseen circumstances.

2.3.3. Baseline Comparisons. Trait self-compassion and self-esteem and self-positive beliefs violated the assumption of homogeneity of variance, therefore Welch's *F* statistic reported for these analyses. Homogeneity of variance was met for all other variables. There were no significant differences between the groups at baseline with regards to age F (2, 21) = 0.244, p = .79, gender χ^2 (2) = .505, p = .78, ethnicity χ^2 (2) = 7.118, p = .52, trait paranoia F (2, 21) = 0.692, p = .51, trait anxiety F (2, 21) = 0.128, p = .88, trait self-esteem Welch's F (2, 21) = 0.289, p = .75, trait self-compassion Welch's F (2, 21) = 0.002, p < .10, state paranoia F (2, 21) = 0.816, p = .46, state anxiety F (2, 21) = 0.175, p = .84, state self-esteem F (2, 21) = 0.15, p = .86, state self-compassion F (2, 21) = 0.221, p = .80, state positive affect F (2, 21) = 0.219, p = .81, state negative affect F (2, 21) = 0.116, p = .87, self-positive beliefs Welch's F (2, 21) = 1.104, p = .36, self-negative

beliefs F (2, 21) = 0.226, p = .80, other-positive beliefs F (2, 21) = 2.11, p = .15, other-negative beliefs F (2, 21) = 0.115, p = .89, or image vividness F (2, 21) = .172, p = .84. Age was significantly correlated with other-negative beliefs at follow up r = - 4.63, p = .02, BCa 95% CIs [-.62, -.31].

Table 5. *Descriptive Statistics for Demographic Variables.*[1]

Measure/ Demographic	Group	N	Mean (Standard Deviation)/ Percentage
Age	Positive	8	21.00 (2.67)
	Negative	8	21.00 (7.29)
	Control	8	19.63 (1.30)
	Sample	24	20.54 (4.39)
Gender - Female[2]	Positive	6	75%
	Negative	6	75%
	Control	7	87.5%
	Sample	19	79%
Gender - Male[2]	Positive	2	25%
	Negative	2	25%
	Control	1	12.5%
	Sample	5	21%
Gender – Other or Prefer not to say[2]	Sample	0	0%
Ethnicity – White [2]	Positive	5	62.5%
	Negative	6	75%
	Control	6	75%
	Sample	17	70.8%
Ethnicity – Asian [2]	Positive	1	12.5%
	Negative	0	0%
	Control	2	25%

	Sample	3	16.6%
Ethnicity – Black [2]	Positive	1	12.5%
	Negative	0	0%
	Control	0	0%
	Sample	1	4%
Ethnicity – Mixed [2]	Positive	0	0%
	Negative	1	12.5%
	Control	0	0%
	Sample	1	4%
Ethnicity – Chinese [2]	Positive	1	12.5%
	Negative	0	0%
	Control	0	0%
	Sample	1	4%

[1]Means displayed with Standard Deviation (SD) in brackets, both rounded to two decimal places.

[2]Percentage of group total rounded to two decimal places.

Table 6. *Descriptive Statistics for Trait Measures.*[1]

Measure/ Demographic	Group	N	Pre	Post	Follow up
Paranoia Scale (PS)	Positive	8	64.63 (8.40)	54.25 (11.61)	51.00 (10.37)
	Negative	8	61.75 (6.61)	70.76 (13.00)	61.50 (8.70)
	Control	8	66.00 (6.99)	68.00 (8.72)	66.88 (0.09)
	Sample	24	64.13 (7.27)	64.34 (13.04)	59.79 (11.24)
Trait Anxiety Inventory (TAI)	Positive	8	55.88 (6.75)	51.88 (7.68)	50.63 (10.50)
	Negative	8	54.25 (6.23)	56.88 (7.43)	51.63 (8.75)
	Control	8	54.88 (6.45)	55.75 (5.83)	58.13 (8.39)
	Sample	24	55 (6.23)	54.83 (7.06)	53.46 (9.48)
Rosenberg Self-Esteem Scale (RSES)	Positive	8	12.63 (2.07)	15.13 (2.17)	16.00 (2.00)
	Negative	8	13.38 (4.41)	13.38 (4.41)	14.88 (5.11)
	Control	8	13.63 (3.29)	13.13 (4.58)	15.25 (4.03)
	Sample	24	13.21 (3.27)	13.75 (3.93)	15.38 (3.79)
Self-Compassion Scale (SCS)	Positive	8	2.41 (0.16)	2.60 (0.57)	2.66 (0.57)
	Negative	8	2.42 (0.57)	2.24 (0.63)	2.40 (0.66)
	Control	8	2.40 (0.50)	2.40 (0.18)	2.32 (0.22)
	Sample	24	2.41 (0.42)	2.42 (0.51)	2.46 (0.52)
Brief Core Schema Scale- Self-Positive (BCSS-sp)	Positive	8	6.88 (2.42)	11.25 (4.50)	11.00 (4.41)
	Negative	8	9.13 (5.33)	7.50 (4.57)	10.13 (5.30)
	Control	8	8.75 (3.28)	8.13 (5.22)	9.13 (4.49)
	Sample	24	8.25 (3.24)	8.96 (4.86)	10.08 (4.61)

Brief Core Schema Scale- Self-Negative (BCSS-sn)	Positive	8	5.63 (4.00)	1.50 (1.50)	2.50 (2.83)
	Negative	8	5.38 (3.85)	5.38 (3.20)	2.00 (2.33)
	Control	8	6.75 (5.12)	4.63 (4.81)	4.25 (4.30)
	Sample	24	5.92 (4.21)	3.83 (3.71)	2.92 (3.26)
Brief Core Schema Scale-Other-Positive (BCSS-op)	Positive	8	6.88 (3.31)	9.50 (5.86)	8.38 (5.93)
	Negative	8	10.50 (5.16)	7.15 (4.48)	9.13 (3.09)
	Control	8	10.25 (3.01)	7.50 (4.38)	8.00 (3.02)
	Sample	24	9.21 (4.13)	8.05 (4.85)	8.50 (4.08)
Brief Core Schema Scale-Other-Negative (BCSS-on)	Positive	8	9.00 (4.47)	6.50 (5.48)	6.00 (4.72)
	Negative	8	8.75 (6.30)	11.00 (7.84)	8.13 (5.08)
	Control	8	7.75 (5.60)	8.00 (5.68)	6.13 (3.48)
	Sample	24	8.50 (5.29)	8.50 (6.43)	6.75 (4.40)

[1]Means displayed with Standard Deviation (SD) in brackets, both rounded to two decimal places.

Table 7. *Descriptive Statistics for State Measures.* [1]

Measure/ Demographic	Group	N	Pre	Post	Follow up
Paranoia Checklist (PC; State Version)	Positive	8	47.38 (9.67)	40.88 (15.45)	34.00 (11.61)
	Negative	8	43.63 (9.50)	52.00 (15.05)	37.63 (6.61)
	Control	8	50.38 (12.36)	51.75 (14.43)	54.50 (20.45)
	Sample	24	47.13 (10.51)	48.21 (15.27)	42.04 (16.27)
State Anxiety Inventory (SAI)	Positive	8	44.63 (13.99)	40.50 (12.59)	38.50 (9.57)
	Negative	8	47.13 (9.51)	58.38 (9.90)	45.38 (9.84)
	Control	8	43.75 (11.56)	47.63 (9.43)	41.75 (13.07)
	Sample	24	45.17 (11.40)	48.83 (12.71)	41.88 (10.85)
State Self-Esteem Scale (SSES)	Positive	8	53.25 (10.94)	59.63 (10.46)	62.00 (11.69)
	Negative	8	52.13 (13.34)	48.13 (12.35)	55.31 (14.60)
	Control	8	55.25 (10.22)	49.75 (7.83)	54.63 (13.56)
	Sample	24	53.54 (11.14)	52.50 (11.19)	57.31 (13.20)
State Self-Compassion Scale (SSCS)	Positive	8	2.59 (0.45)	3.00 (0.55)	2.81 (0.44)
	Negative	8	2.48 (0.48)	2.30 (0.69)	2.48 (0.63)
	Control	8	2.48 (0.21)	2.51 (0.21)	2.32 (0.17)
	Sample	24	2.52 (0.39)	2.60 (0.58)	2.54 (0.52)
Positive and Negative Affect Scale – Positive (PANAS-PA)	Positive	8	29.63 (7.73)	31.88 (10.08)	28.38 (5.93)
	Negative	8	27.88 (5.06)	23.13 (5.11)	26.50 (6.05)
	Control	8	28.00 (4.41)	24.75 (3.69)	27.88 (6.47)
	Sample	24	28.50 (5.70)	26.58 (7.62)	27.58 (5.93)

Positive and Negative Affect Scale – Negative (PANAS-NA)	Positive	8	16.75 (5.44)	16.75 (8.86)	14.13 (3.56)
	Negative	8	18.31 (5.88)	25.75 (6.11)	16.38 (3.78)
	Control	8	16.88 (6.62)	18.00 (7.41)	18.50 (7.64)
	Sample	24	17.31 (5.78)	20.17 (8.28)	16.33 (5.41)
Vividness of image (manipulation check)	Positive	8	70.63 (15.22)		
	Negative	8	73.13 (13.87)		
	Control	8	67.00 (13.61)		
	Sample	24	72.54 (10.40)		

[1]Means displayed with Standard Deviation (SD) in brackets, both rounded to two decimal places.

2.3.4. Main Analyses.

Assumptions of sphericity of within-groups variance, homogeneity of variance and homogeneity of variance-covariance were met unless otherwise indicated. Main effects of time, group and group*time interactions on state measures are displayed in Table 9, with effects for trait measures displayed in Table 10. The results of post-hoc analyses and follow-up one-way and repeated measures ANOVAs are outlined below.

Table 9. *Main Effects on State Measures.*

Measure	Effect	Test statistic[1]	Significance	Effect size (interpretation)[2]
State paranoia	Group	F (2, 21) = 1.960[3]	p = .17	η_p^2 = .157 (large)
	Time	F (2, 42) = 4.477	p = .02	η_p^2 = .176 (large)
	Group*time interaction	F (4, 42) = 4.732[3]	p = .003	η_p^2 = .311 (large)
State anxiety	Group	F (2, 21) = 1.765	p < .10	η_p^2 = .144 (large)
	Time	F (2, 42) = 6.785	p = .003	η_p^2 = .244 (large)

	Group*time interaction	F (4, 42) = 2.996	p = .03	η_p^2 = .222 (large)
State self-compassion	Group	F (2, 21) = 1.1962[3,4]	p = .16	η_p^2 = .160 (large)
	Time	F (2, 42) = 0.991	p = .38	η_p^2 = .045 (small)
	Group*time interaction	F (4, 42) = 4.482[3,4]	p = .004	η_p^2 = .299 (large)
State self-esteem	Group	F (2, 21) = 0.765	p = .48	η_p^2 = .068 (medium)
	Time	F (2, 42) = 5.290[5]	p = .02[6]	η_p^2 = .201 (large)
	Group*time interaction	F (4, 42) = 3.203[5]	p = .03[6]	η_p^2 = .234 (large)
Positive Affect	Group	F (2, 21) = 1.323	p = .29	η_p^2 = .112 (medium)
	Time	F (2, 42) = 1.213	p = .31	η_p^2 = .055 (small)
	Group*time interaction	F (4, 42) = 2.145	p = .09	η_p^2 = .170 (large)
Negative Affect	Group	F (2, 21) = 1.188[3]	p = .32	η_p^2 = .102 (medium)
	Time	F (2, 42) = 6.564[5]	p = .01[6]	η_p^2 = .238 (large)
	Group*time interaction	F (4, 42) = 4.299 [3,5]	p = .01[6]	η_p^2 = .290 (large)

[1] *Degrees of freedom in brackets.*
[2] *Interpreted against Kinnear and Gray (2009)*
[3] *Homogeneity of variance violated at follow-up*
[4] *Homogeneity of variance violated at post-imagery*
[5] *Sphericity of within group variances was violated*
[6] *P value reported is mean of Greenhouse-Geisser and Huynh-Feldt values*

Table 10. *Main Effects on Trait Measures.*

Measure	Effect	Test statistic[1]	Significance	Effect size (interpretation)[2]
Trait paranoia	Group	F (2, 21) = 3.562	p = .05	η_p^2 = .253 (large)
	Time	F (2, 42) = 4.444	p = .02	η_p^2 = .175 (large)
	Group*time interaction	F (4, 42) = 6.724	p < .001	η_p^2 = .390 (large)
Trait anxiety	Group	F (2, 21) = 0.467	p = .63	η_p^2 = .043 (small)
	Time	F (2, 42) = 1.541	p = .23	η_p^2 = .068 (medium)
	Group*time interaction	F (4, 42) = 5.416	p = .001	η_p^2 = .340 (large)
Trait self-compassion[3]	Group	F (2, 21) = 0.457[4]	p = .69	η_p^2 = .042 (small)
	Time	F (2, 42) = 359[5]	p = .48[6]	η_p^2 = .017 (small)
	Group*time interaction	F (4, 42) = 2.290[3,4,5]	p = .09[6]	η_p^2 = .179 (large)
Trait self-esteem	Group	F (2, 21) = .124[7]	p = .88	η_p^2 = .012 (small)
	Time	F (2, 42) = 8.282[5]	p = .003[8]	η_p^2 = .283 (large)
	Group*time interaction	F (4, 42) = 1.598[5,7]	p = .21[6]	η_p^2 = .132 (medium)
Self- negative beliefs	Group	F (2, 21) = .818[9]	p = .46	η_p^2 = .072 (medium)
	Time	F (2, 42) = 9.303[5]	p = .001[6]	η_p^2 = .307 (large)
	Group*time interaction	F (4, 42) = 2.069[5.9]	p = .12[6]	η_p^2 = .165 (large)
Self-positive beliefs	Group	F (2, 21) = .144[7]	p = .87	η_p^2 = .014 (small)
	Time	F (2, 42) = 3.673	p = .03	η_p^2 = .149 (large)

	Group*time interaction	F (4, 42) = 3.962[7]	p = .01	η_p^2 = .272 (large)
Other-negative beliefs	Group	F (2, 21) = 0.430	p = .66	η_p^2 = .039 (small)
	Time	F (2, 42) = 3.996	p = .03	η_p^2 = .160 (large)
	Group*time interaction	F (4, 42) = 1.855	p = .14	η_p^2 = .150 (large)
Other-positive beliefs	Group	F (2, 21) = 0.062[10]	p = .94	η_p^2 = .006
	Time	F (2, 42) = 1.1 60	p = .32	η_p^2 = .052 (small)
	Group*time interaction	F (4, 42) = 3.228[10]	p = .02	η_p^2 = .235 (large)

[1] *Degrees of freedom in brackets.*
[2] *Interpreted against Kinnear and Gray (2009)*
[3] *Box's M statistic was significant at p = .001*
[4] *Homogeneity of variance violated at post-imagery and follow-up*
[5] *Sphericity of within group variances was violated*
[6] *p value reported is mean of Greenhouse-Geisser and Huynh-Feldt values*
[7] *Homogeneity of variance violated pre-imagery*
[8] *p value reported is Greenhouse-Geisser*
[9] *Homogeneity of variance violated post-imagery*
[10] *Homogeneity of variance violated at follow-up*

State measures.

State paranoia. There was no effect of group, although there was a main effect of time and a significant interaction effect which is displayed in Figure 7. This interaction resulted in significant differences in state paranoia across time points for the positive imagery (F (2, 14) = 16.08, $p < .001$, $\eta_p^2 = .70$) and negative imagery (F (2, 14) = 9.40, $p = .003$, $\eta_p^2 = .57$) groups, but not in the control imagery group (F (2, 14) = 3.28, $p = .60$[1], $\eta_p^2 = .05$). Scores in the positive imagery group did not differ from pre to post imagery ($p = .16$) or post imagery to follow-up ($p = .09$) however scores at follow-up were significantly lower than pre-imagery ($p < .001$). In the negative imagery group, post-hoc tests did not reach significance (ps > .017).

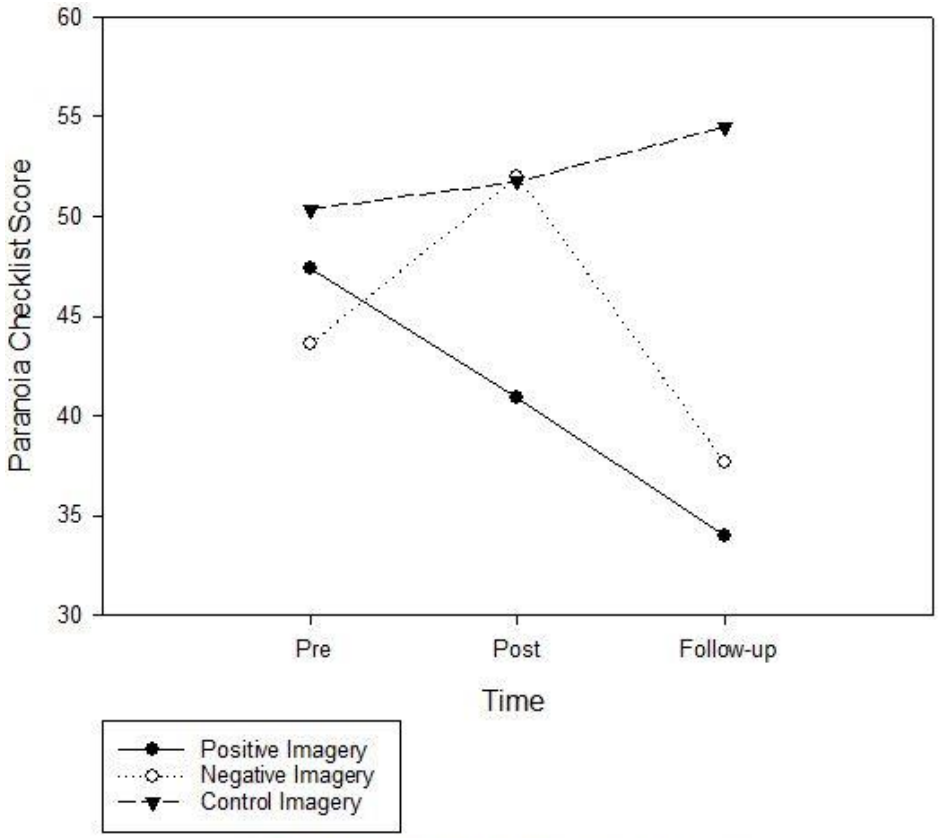

Figure 7. Interaction effect on state paranoia.

[1] *P* value reported is mean of Greenhouse-Geisser and Huynh-Feldt values due to violation of sphericity of within-group variances.

State anxiety. There was no effect of group, although there was a main effect of time and a significant interaction effect, which is displayed in Figure 8. This interaction resulted in a significant difference across time points for the negative imagery group (F (2, 14) = 9.85, p = .002, η_p^2 = .59) but not the positive imagery (F (2, 14) = 1.28, p =.31, η_p^2 = .15) or control imagery (F (2, 14) = 2.65, p = .11, η_p^2 = .28) groups. Scores in the negative imagery group significantly increased from pre to post imagery (p =.005).

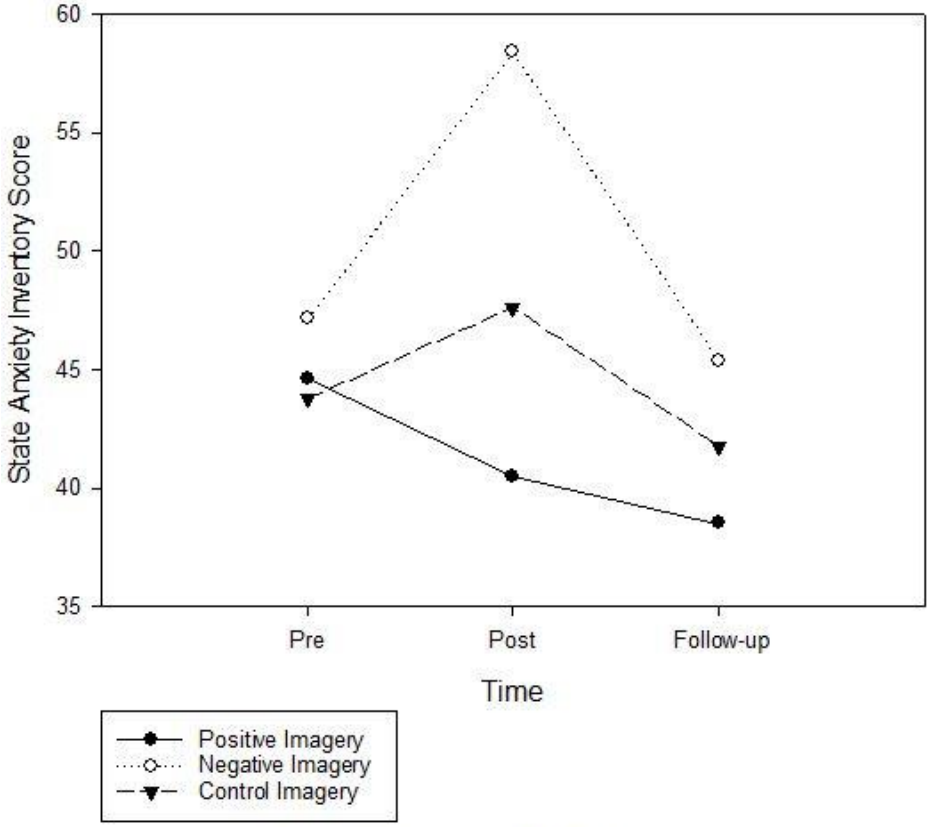

Figure 8. Interaction effect on state anxiety.

State self-compassion. There was no effect of time or group, although there was a significant interaction effect, which is displayed in Figure 9. This interaction effect resulted in a significant difference in state self-compassion across time points for the positive imagery (F (2, 14) = 4.90, p = .03, η_p^2 = .41) and control imagery (F (2, 14) = 5.53, p = .02, η_p^2 = .44) groups, but not the negative imagery group (F (2, 14) = 1.25, p = .32, η_p^2 = .15). Post-hoc tests did not reach significance for the positive or control imagery groups (ps > .017).

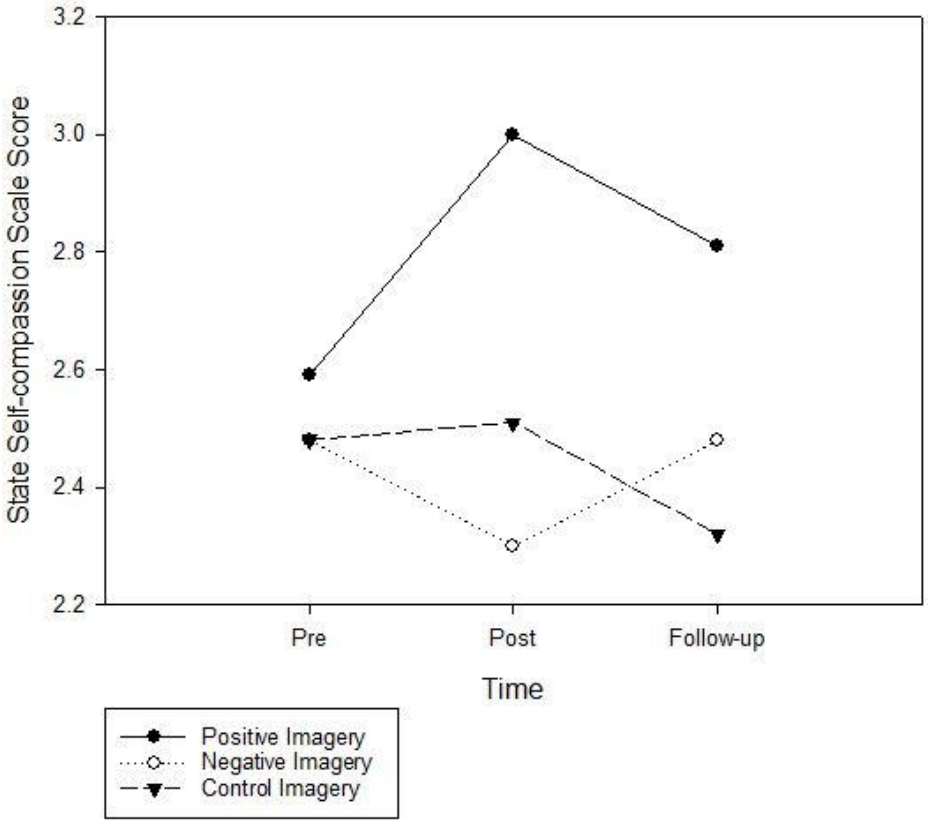

Figure 9. Interaction effect on state self-compassion.

State self-esteem. There was no effect of group, although there was a main effect of time and a significant interaction effect, which is displayed in Figure 10. This interaction effect resulted in a significant difference in state self-esteem across time points for the positive imagery (F (2, 14) = 6.10, p = .01, η_p^2 = .47) and negative imagery (F (2, 14) = 4.69, p = .03, η_p^2 = .40) groups but not in the control imagery group (F (2, 14) = 1.90, p = .19, η_p^2 = .21). Post-hoc tests did not reach significance (ps > .017).

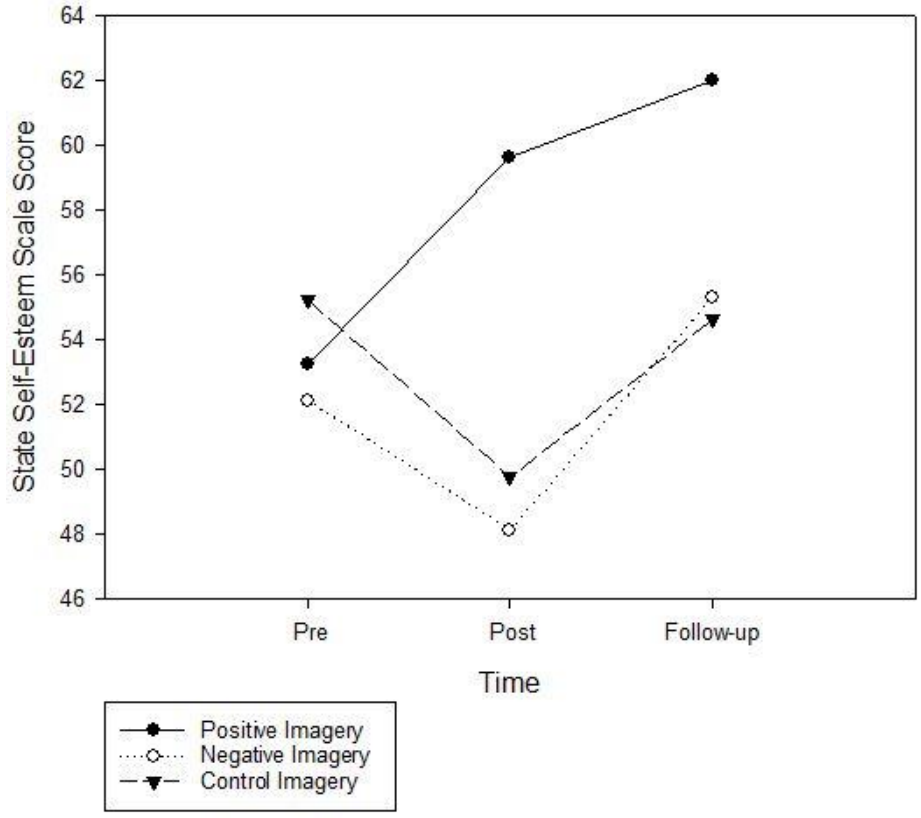

Figure 10. Interaction effect on state self-esteem.

Negative affect. There was no effect of group, although there was a main effect of time and a significant interaction effect, which is displayed in Figure 11. There was no significant difference in negative affect across time points for the positive imagery (F (2, 14) = .70, p = .51, η_p^2 = .09) or control imagery (F (2, 14) = .74, p = .49, η_p^2 = .10) groups, although there was a significant difference in negative affect across time points for the negative imagery group (F (2, 14) = 19.63, p <.001, η_p^2 = .74). Scores significantly increased from pre to post imagery (p = .002), and significantly decreased from post-imagery to follow-up (p = .003).

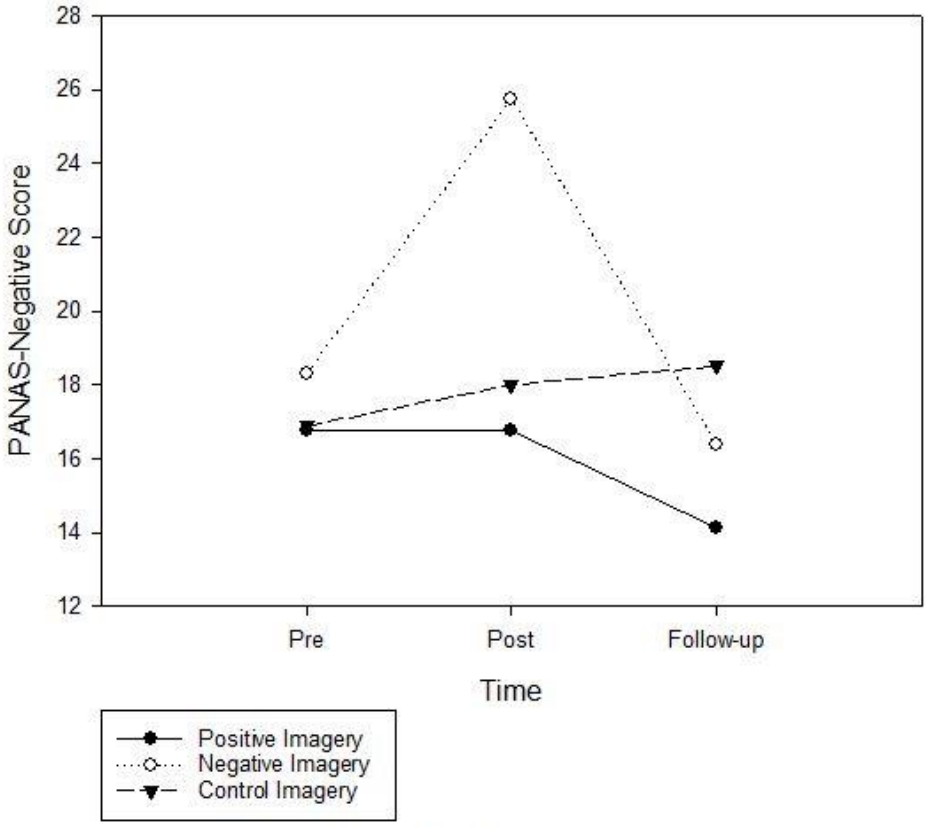

Figure 11. Interaction effect on negative affect.

Trait measures.

Trait paranoia. There was a main effect of time and of group, and a significant interaction effect which is displayed in Figure 12. There was a significant difference in trait paranoia across time points for the positive imagery group (F (2, 14) = 13.60, p < .001, η_p^2 = .67) but not the negative imagery (F (2, 14) = 3.43, p = .06, η_p^2 = .33) or control imagery (F (2, 14) = .64, p = .54, η_p^2 = .08) groups. Scores in the positive imagery group did not differ significantly from pre to post imagery (p =.06), although scores at follow-up were significantly lower than pre-imagery (p =.003).

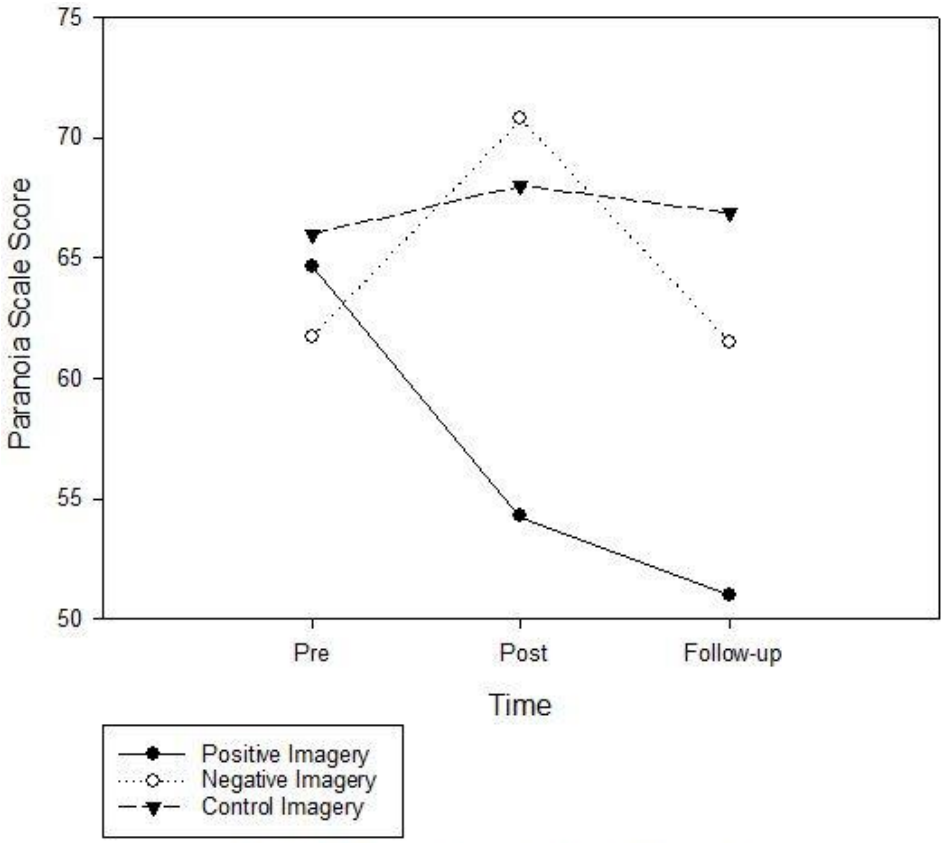

Figure 12. Interaction effect on trait paranoia.

Trait anxiety. There was no effect of group or time, although there was a significant interaction effect which is displayed in Figure 13. There was a significant difference in trait anxiety across time points for the positive imagery (F (2, 14) = 3.84, $p < .05$, η_p^2 = .35) and negative imagery (F (2, 14) = 5.34, p = .02, η_p^2 = .43) groups, but not in the control imagery group (F (2, 14) = 3.04, p = .08, η_p^2 = .30). Post-hoc tests were not significant.

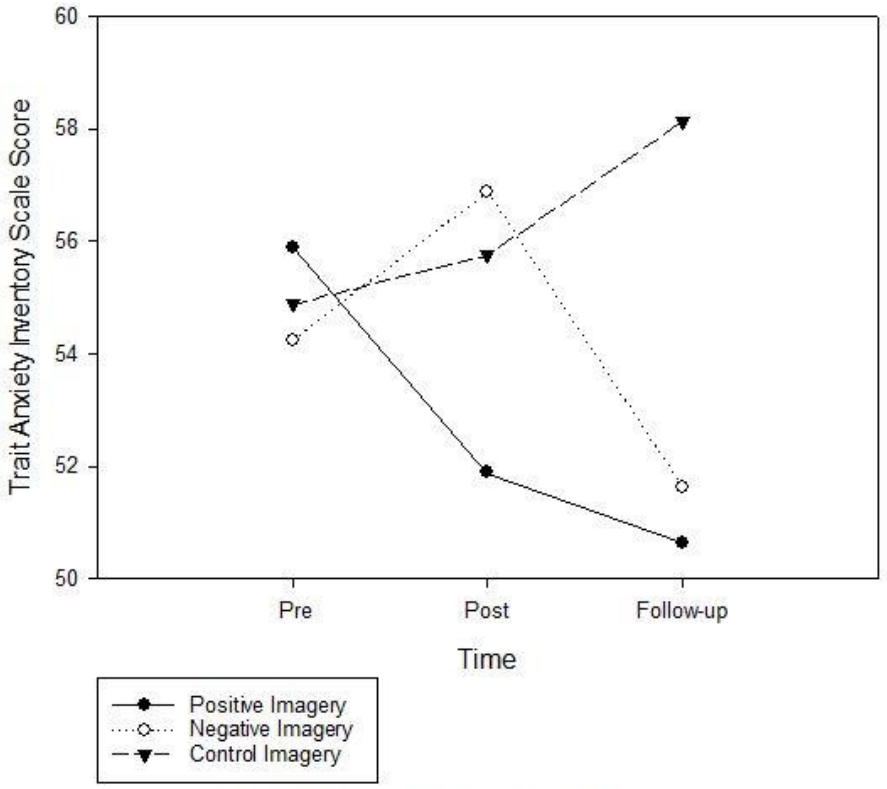

Figure 13. Interaction effect on trait anxiety.

Self-positive beliefs. There was no effect of group, although there was a main effect of time and a significant interaction effect which is displayed in Figure 14. There was a significant difference in self-positive beliefs across time points for the positive imagery group (F (2, 14) = 11.78, p =.01[2], η_p^2 = .63) but not the negative (F (2, 14) = 1.74, p = .21, η_p^2 = .20) or the control (F (2, 14) = .45, p = .65, η_p^2 = .06) groups. Post hoc tests were non-significant (ps > .017).

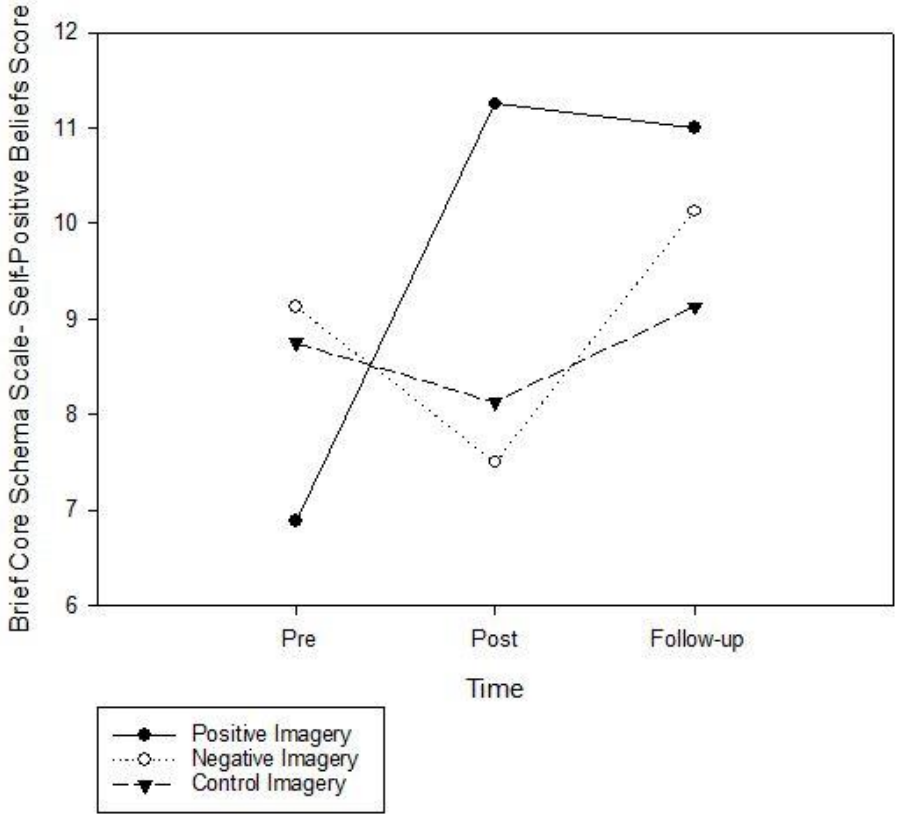

Figure 14. Interaction effect on self-positive beliefs.

[2] Greenhouse-Geisser p reported due to violation of sphericity of within-group variances

Other-positive beliefs. There was no effect of time or group, although there was a significant interaction effect which is displayed in Figure 15. There was no significant difference in other-positive beliefs across time points for the positive imagery (F (2, 14) = 2.14, p =.18[3], η_p^2 = .23) or the negative imagery (F (2, 14) = 2.08, p = .16, η_p^2 = .23) groups. There was a significant difference across time points for the control group (F (2, 14) = .4.59, p = .03, η_p^2 = .40), although post-hoc tests were non-significant (ps > .017).

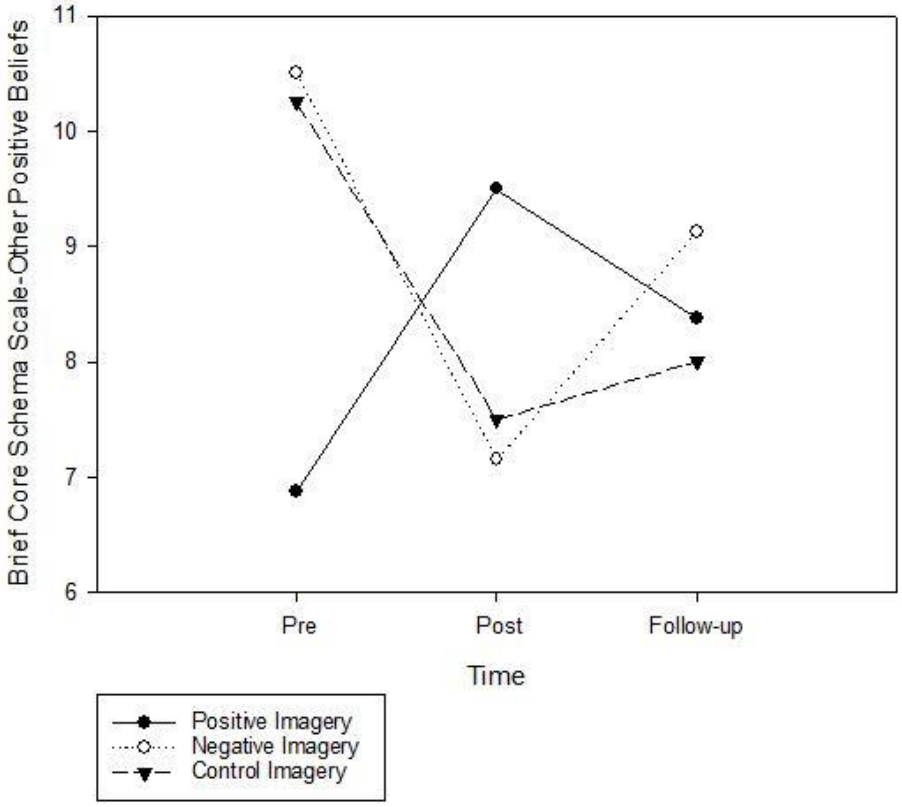

Figure 15. Interaction effect on other-positive beliefs.

[3] *P* value reported is mean of Greenhouse-Geisser and Huynh-Feldt values due to violation of sphericity of within-group variances.

2.4. Discussion

The current study had three aims; to replicate the study by Bullock et al. (2016) and extend the investigation through use of a control group and one week follow up; to investigate the impact of imagery on self and other beliefs; and finally, to investigate the effect of imagery on trait measures of paranoia, anxiety, self-esteem and self-compassion. The robust methodology was successfully employed following piloting of a neutral interpersonal stimulus, although uptake to the study was poor. A significant, large effect of imagery was found on levels of state paranoia, anxiety, self-compassion, self-esteem and negative affect, though not positive affect as found by Bullock et al. (2016). Additionally, significant effects of imagery were found on self and other positive beliefs and trait levels of paranoia and anxiety.

2.4.1. Overview of Effects.

State measures. The significant group by time interactions on state paranoia, anxiety, self-compassion, self-esteem and negative affect provide further support for Bullock et al.'s (2016) finding that mental imagery affects these variables, and are consistent with literature demonstrating that mental imagery impacts emotion (Holmes & Mathews, 2010). However, the current study did not replicate all of the effects described by Bullock et al. (2016) as hypothesised.

Negative imagery significantly impacted state measures of paranoia, anxiety, self-esteem and negative affect. Significant increases in anxiety and negative affect following negative imagery replicate the effects of Bullock et al. (2016), and in a novel finding, anxiety scores were found to decrease at one week follow-up, suggesting this effect is not maintained following repeated negative imagery practice. Although negative imagery was found to impact paranoia and self-esteem over time, post-hoc tests were non-significant and so this impact cannot be explained further in the current study.

Positive imagery did not affect anxiety, positive or negative affect as found by Bullock et al. (2016), however effects were found on paranoia, self-esteem and self-compassion. Positive imagery did not affect paranoia post-imagery; however it did result in lower levels of state paranoia following repeated induction of the image over one week. Post-hoc tests were non-significant for the self-esteem and self-compassion

analyses, therefore the nature of the effects of positive imagery on these measures cannot be identified.

The control imagery did not impact any state measures other than self-compassion, however post-hoc analyses were non-significant and so the nature of this effect cannot be concluded in the present study.

Self and other beliefs. In a novel finding, there was an effect of imagery on self and other positive beliefs, but not self and other negative beliefs. Positive imagery resulted in significantly different self-positive scores over time, and control imagery had an effect on other-positive beliefs over time, however as post-hoc tests were non-significant the sources of these effects are not identified from this study.

Trait paranoia, anxiety, self-esteem and self-compassion. Imagery was found to have a significant effect on levels of trait paranoia and anxiety, but not self-esteem or self-compassion. Positive imagery significantly impacted trait levels of anxiety and paranoia, with trait paranoia scores decreasing following repeated induction of the image. Post-hoc tests for trait anxiety were non-significant, and so the source of the effect of positive and negative imagery over time cannot be concluded from this study. The control imagery did not impact trait paranoia, anxiety, self-compassion or self-esteem.

2.4.2. **Theoretical Implications.** Taken together, the results support existing literature demonstrating that mental imagery impacts levels of paranoid ideation (Bullock et al., 2016; Lincoln et al., 2013; Schulze et al., 2013) and emotions (Bullock et al., 2016; Holmes & Mathews, 2010), whilst the effect of mental imagery on self and other beliefs is novel. The imagery intervention was found to impact state levels of paranoia as well as theoretically related variables of anxiety, negative affect, self-esteem and self and other beliefs. This supports existing research demonstrating an impact of experimental manipulations on not only levels of paranoid ideation, but also on variables theorised to be relevant to the onset and maintenance of persecutory beliefs as predicted by the threat-anticipation model of persecutory delusions (Freeman et al., 2002). Based on this model, one hypothesis that follows from these results is that the experience of mental imagery directly serves as a "precipitant" stimulus to paranoid beliefs. Alternatively, as imagery was also found to impact anxiety, negative affect, self-esteem and self and other beliefs, it is possible that mental imagery serves to impact paranoid beliefs indirectly via the effect on these factors which are hypothesised to maintain paranoid ideation in the threat-

anticipation model (Freeman et al., 2002). However, the current study was underpowered to detect the direction of many of the post-hoc analyses and was not designed to explore mediational effects, making inferences about the support or undermining of these hypotheses impossible. Nevertheless, the finding of large effects on state measures of the variables stipulated in the threat- anticipation model suggests that further research into the effects of mental imagery on these variables may hold considerable implications regarding the role of mental imagery in paranoid ideation, as well as informing and evaluating the threat-anticipation model of persecutory delusions specifically.

The significant impact of negative imagery on emotions was accompanied by a significant change in paranoid ideation as predicted by theoretical models and previous research (Bullock et al., 2016), however the post-hoc tests that could determine the source and direction of changes in paranoia were non-significant, meaning conclusions about the impact on paranoia cannot be drawn from this study. The impact of positive imagery on paranoia in the absence of any affective changes, however, does not support the threat-anticipation model (Freeman et al., 2002) or previous research (Bullock et al., 2016), and raises questions about the relationship between paranoia, emotions and positive mental imagery in non-clinical populations.

Follow-up effects. The immediate effects of negative imagery on emotions were not sustained, and negative affect in fact decreased from post-imagery to follow-up. Conversely, a beneficial effect of positive imagery was found on paranoia over time. The reduction in state and trait paranoia over time regardless of condition is consistent with the finding of Ascone et al. (2017), who found that paranoid ideation reduced over time in a clinical sample following an imagery intervention, regardless of experimental condition. Taken together, the effects at follow-up found in this study suggest it is possible that the process of repeated guided imagery may have some beneficial effects in high non-clinical paranoia groups. The prolonged attentional focus or the voice of the researcher may serve in a similar manner to the impact of mindfulness techniques, which can be effective in reducing distress in clinical samples (Ellett, 2013). However, the lack of an effect of the control imagery suggests this alone is unlikely. Alternatively, non-clinical populations may either habituate to the emotional valence of negative mental imagery, akin to what has been found in therapeutic image exposure (Pearson et al., 2015), or employ cognitive skills to manipulate the meaning of the image to a non-threatening level, the hypothesised mechanism of change in imagery rescripting (Brewin et al., 2010). These processes were

not assessed in the current study, and these findings warrant further investigation into how the effects of negative mental imagery are reduced in non-clinical samples. Finally, this reduction in scores over time may reflect aspects of the experimental design. The participants were a non-clinical sample, and it is possible that the imagery was not sufficiently emotional to impact negative emotions in the longer term. Alternatively, as participants practised the image for a final time the day before the final laboratory session, there may have been a transient effect of the imagery immediately after the practice, even though this was not sustained to the following day. Further investigation employing an experience-sampling methodology may inform further understanding of these effects.

The control imagery was found to impact self-compassion and other-positive beliefs, although it had no impact on any of the other measures. This offers preliminary support for the use of faces with neutral expressions as control stimuli in studies of mental imagery in paranoia, however it should be noted that these analyses were underpowered to detect significant results. In a similar manner to the piloting of the control images, scores in the control imagery group slightly increased in negative affect and anxiety, and decreased in positive affect, and it is possible that a more sufficiently powered study may have found some significant effects for the control group.

The impact of imagery on paranoia in the absence of changes in negative beliefs is somewhat counter-intuitive, given the centrality of threat in the theory of persecutory delusions (Freeman et al., 2002) and of the negative sense of self in the negative imagery condition. However, it is possible that negative self and other beliefs are not fundamental to paranoid ideation in non-clinical populations. The significant effect of positive imagery on positive self-beliefs, in combination with a reduction in paranoia over time, suggests that it may be an absence of positive beliefs that serves to maintain paranoid ideation as opposed to the presence of negative beliefs, although the current study was not designed to explore this possibility.

The effect of imagery on trait measures of paranoia and anxiety may suggest that repeated image induction causes changes at a dispositional as well as state level. However, this mirroring of state effects may demonstrate contamination of the trait measures resulting from completing state and trait versions at the same time; effectively rendering "trait" measures additional state measurements of these constructs. Alternatively, it is possible that the trait measures employed in this study may not have been stable measures

of the constructs under investigation. It is noteworthy that 36.6% of participants in the current study and 36.2% of the sample in the Bullock et al. (2016) study that attended the laboratory no longer met the trait cut-off on the PS, raising questions about the stability of the measure and/ or the construct of trait-level paranoia.

2.4.3. Limitations. The major limitation of the study is the small sample size, which meant the analyses were underpowered to detect significant effects. Therefore, despite large effect sizes being found for many of the variables, inferences regarding the precise nature of the impact of the intervention cannot be drawn from the current study. Additionally, it is possible that the non-significant interaction effects may have reached significance in a larger sample. Due to insufficient recruitment the consistency of the measures employed was not assessed, further reducing the potential inferences as some results may be subject to inconsistency in the measures used. These issues substantially limit the theoretical and clinical implications that can be drawn from the current project.

Despite sufficient levels of participation in the initial screening, the small subsequent sample size reflects considerable attrition throughout the stages of the study, which may indicate some limitations in the recruitment and experimental procedures. Firstly, the sample were selected based on scoring within a predetermined "high" range on a measure of paranoid ideation. Thus, by very nature of meeting the screening criteria the target population endorsed numerous interpersonal threat beliefs. It is possible that this population may therefore be anxious or reticent about engaging in face to face and/or experimental studies with unfamiliar people or ambiguous study descriptions, and consequently not respond to the invitation to attend. Future studies could overcome this possibility by either including more detail regarding the experimental stage in the advert, or by inviting all those that complete the screening stage to participate in the experiment and dividing the sample into low, average and high scorers at the analysis stage as opposed to using a neutral control group. Secondly, whilst it was anticipated that a high number of participants would be accessed by employing a student sample, this did not equate to a sufficient sample in the experimental stages. Future studies could open participation to include the general population, which may not only increase sample numbers but also serve to increase the generalisability of the results. Similarly, the experimental stages were conducted by a single researcher at a single site, and if future studies could access more researchers and/ or multiple research sites, this could also increase the potential sample size and generalisability of the results. Two email reminders and a seven-day cut off in

which to respond to the email invitation were employed to facilitate participation projections and to serve as a motivator to respond if wishing to participate, however, it is possible that this may have prevented participants from making contact should they have not accessed their email during the week period. Whilst non-clinical samples are routinely recruited to inform the understanding of clinical experiences of paranoia, it is likely that the prescribed induction of an image as in this study does not reflect the experience or emotional valence of the intrusive images experienced in persecutory delusion, and therefore the results may not be generalisable to clinical samples.

Finally, the demands of participation in this study were high compared when compared to online-only survey designs that were also open to the target population. The use of online video tutorials as opposed to laboratory attendance was discussed as a means of reducing the demands of the study, although this was not considered ethically appropriate in case participants had a negative reaction to the experimental conditions. However, future studies could instead reduce demand through limiting number of variables assessed and including state only measures post-imagery.

The proposal to reduce experimental demands to increase participation raises the additional question of the benefit of using trait measures in the design. As previously mentioned, the construct of trait paranoia is questionable given the rate of participants that were no longer eligible at the second screening stage, although this could be due to the consistency of the measure which was not measured due to insufficient sampling. Whilst trait measures were employed with the intention of detecting any dispositional changes over time, their inclusion at each time point increased participant burden and it is unlikely that the current design was of sufficient length to detect such changes. The completion of state and trait measures within close proximity increases the possibility of shadowing effects, as is reported for the S-Anxiety and T-Anxiety scales (Spielberger, 1983), and calls into question whether the trait items were reliable and valid measures of trait levels of the target constructs or whether they were subject to priming effects from completing the state measures first. If trait measures are included in future studies, these limitations could be overcome by collecting trait measures at the initial screening and follow up stages only. However, given the early stages of research into this area and the limited contribution of the trait measures to the theoretical understanding of paranoid ideation, it is recommended that future research focus on state measure only, which would not only decrease participant

burden and time demands, but also determine the presence of any transient, state-level changes prior to anticipating any changes at a trait level.

The decision to employ ANOVA analyses was justified, although the results should be interpreted with caution given the non-normal distributions and assumption violations described. The lack of investigation into cognitive and emotional processes during the follow-up week means that the process by which the effects of imagery were maintained or extinguished in non-clinical samples is not clear. This information could inform the theoretical understanding of how mental imagery functions in paranoid ideation, as well as how imagery interventions could be used in the treatment of persecutory delusions.

The experimenter was not blind to the condition of participants, and this, along with experimenter presence during questionnaire completion, may have contaminated the experimental context by creating demand effects. Participants were informed as to whether the imagery exercise was being recorded or not and this, along with the experimenter presence during questionnaire completion, could have served as an ambiguous experimental event, in turn potentially influencing participants' responses. The decision to employ a fixed order of presentation for the questionnaires was justified by the aim to reduce response biases in the state measures, however non-randomized presentation has increased the possibility of order effects in the results. The status of the sample's mental health was not assessed, and as this has been found to influence results in some other studies (Lincoln et al., 2013) it is a potentially confounding variable in the results, and the norms on which high-paranoia cut offs were calculated were reported in 1992, and may not represent "high" levels of non-clinical paranoia in contemporary student samples.

Finally, the selection of the control group stimuli was based on a very small sample and the faces were not matched for ethnicity, age or gender, which may have influenced participants' emotional responses to the faces. The validation procedure for the NimStim© faces involved a series of 672 faces being presented sequentially with participants required to select a label for the face from multiple option response set. It is possible that when presented in isolation of this context, the neutral faces may be perceived as either more threatening or friendly. Additionally, the potentially ambiguous nature of the face and the control imagery task may have triggered a paranoid interpretation bias as has been in demonstrated in paranoia-prone individuals (Green et al., 2011). To summarise, whilst reasonable steps were taken to employ a neutral image in the control group, the results may

have been contaminated by individual interpretation biases, individual differences in demographic variables and their matching or mismatching with the stimulus face, and/ or the validity of the faces as "neutral" when presented in isolation of other faces and a fixed response option.

2.4.4. Research Implications. The current findings support existing literature into the impact of mental imagery insofar as effects were found on both paranoid ideation and hypothesised maintenance factors (Bullock et al., 2016; Lincoln et al., 2013). However, given that the effects by Bullock et al. (2016) were not directly replicated in this study, further replication studies of existing mental imagery manipulations as well as further exploration of these effects are warranted. Larger samples are required, along with mediational analyses to inform theoretical understanding of how mental imagery may serve to increase or decrease persecutory ideation and associated maintaining variables. Further long-term studies that employ an experience sampling methodology could inform understanding of the processes by which the effects of imagery are maintained or extinguished. However, poor uptake to the study suggests that increased payment for participation may be required for studies investigating repeated image exposure in non-clinical populations. The impact of imagery on mood states and self and other beliefs are theoretically sound variables for further research to focus on, given the results of this study and their probable role in the maintenance theory of persecutory delusions (Freeman et al., 2002) and other disorders (Holmes et al., 2008; Weßlau & Steil, 2014).

Taken together with the findings of Bullock et al. (2016), there is evidence to suggest that positive mental imagery can have beneficial psychological effects in high paranoid, non-clinical samples, and future research should consider investigating this effect in clinical samples. The current study would suggest that positive beliefs as opposed to negative beliefs may be relevant in paranoia, although the relationship between beliefs, imagery and paranoia requires further experimental investigation. The longer-term impact of mental imagery induction remains largely unexplored. The results of the current study suggest that some unmeasured cognitive processes may be occurring following repeated induction of positive or negative mental image in non-clinical samples, and serve to extinguish the negative effects of negative imagery, whilst resulting in a beneficial effect of positive imagery over time. Cognitive processes, specifically those hypothesised to effect change in imagery interventions (i.e. reappraisal or habituation) warrant further investigation in the impact of mental imagery in non-clinical paranoia.

2.4.5. Clinical Implications. The results of this study add to growing evidence for the relationship between mental imagery and paranoia and associated maintaining variables, suggesting mental imagery should be explored in the formulation and treatment of clinical paranoia. Furthermore, changes in paranoia appear to be accompanied by changes in mood states and self and other beliefs, suggesting therapeutic interventions that target either reappraisal of self and other meanings as in imagery rescripting (e.g. Morrison, 2004) or image exposure as used in Serruya and Grant (2009) may be of therapeutic benefit. However, many post-hoc analyses were underpowered to detect significant effects, so the nature of this relationship is unclear. The only experimental study using a clinical sample experiencing persecutory delusions specifically did not find an experimental effect of compassionate imagery on levels of paranoia (Ascone et al., 2017), raising questions about the effect of specific types of mental imagery in clinical samples. However, their results did demonstrate an effect of time on levels of paranoia across both groups, suggesting imagery-based interventions may be helpful in reducing symptomology in clinical samples, and this trend was seen in the non-clinical sample in this study, though this may reflect a beneficial effect of focused attention or interpersonal experience rather than imagery per se. The impact of imagery on paranoia remains vastly under-researched, however the large effect sizes yielded from a brief imagery manipulation suggests mental imagery techniques could be incorporated into clinical interventions, however these effects require further investigations in clinical samples.

2.4.6. Conclusions. The current study found effects of interpersonal mental imagery on paranoia, anxiety, affect, self-esteem and self-compassion, and generated a novel finding of an impact on self and other beliefs. Changes in negative emotions were accompanied by changes in paranoia following negative imagery as hypothesised by the threat anticipation model of persecutory delusions, however changes in paranoia following positive imagery were not accompanied by affective changes, suggesting further research into the relationship between paranoia, hypothesised maintenance factors and mental imagery is required. The results are limited by small and homogenous student sample and non-parametric data. Further research into the impact of mental imagery and the associated mechanisms of change are warranted.

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Appendices

Appendix A: Ethics Approval of Latest Amendment.

Your Ethics Amendment (Ethics ID:27896) has been reviewed and approved

ERGO [ergo@soton.ac.uk]ReplyReply AllForwardActions

To:

Bennetts A.C.

16 June 2017 22:49

Submission Number 27896:

This email is to confirm that the amendment request to your ethics form (Mental Imagery in Non-Clinical Paranoia: The Roles of Self-Compassion and Core Schemas (Amendment 9)) has been approved by the Ethics Committee.

You can begin your research unless you are still awaiting specific Health and Safety approval (e.g. for a Genetic or Biological Materials Risk Assessment)

Comments

None

Click here to view your submission

Coordinator: Alison Bennetts

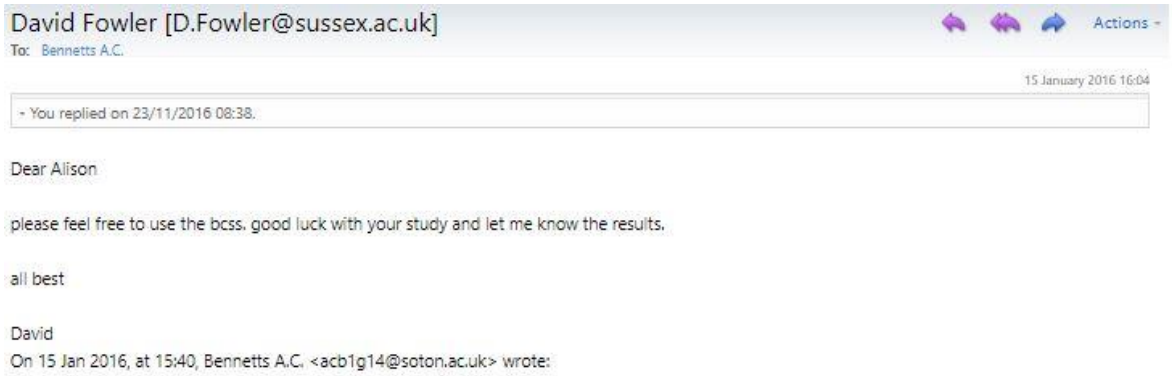
ERGO : Ethics and Research Governance Online

http://www.ergo.soton.ac.uk

DO NOT REPLY TO THIS EMAIL

Appendix B: Scale Permissions.

B.1. Permission to use the Brief Core Schema Scales (BCSS).



David Fowler [D.Fowler@sussex.ac.uk]

To: Bennetts A.C.

Actions

15 January 2016 16:04

- You replied on 23/11/2016 08:38.

Dear Alison

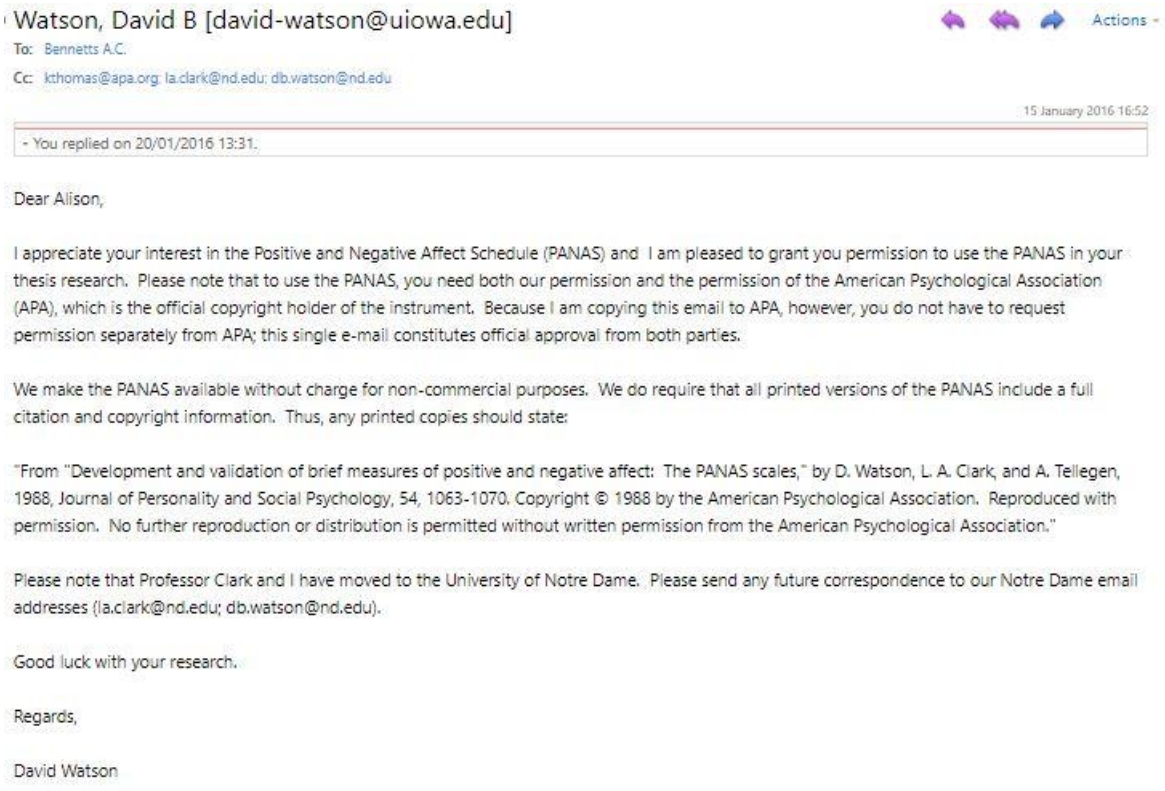
please feel free to use the bcss. good luck with your study and let me know the results.

all best

David

On 15 Jan 2016, at 15:40, Bennetts A.C. <acb1g14@soton.ac.uk> wrote:

B.2. Permission to use the Positive and Negative Affect Scale (PANAS).



Watson, David B [david-watson@uiowa.edu]

To: Bennetts A.C.

Cc: kthomas@apa.org; la.clark@nd.edu; db.watson@nd.edu

Actions

15 January 2016 16:52

- You replied on 20/01/2016 13:31.

Dear Alison,

I appreciate your interest in the Positive and Negative Affect Schedule (PANAS) and I am pleased to grant you permission to use the PANAS in your thesis research. Please note that to use the PANAS, you need both our permission and the permission of the American Psychological Association (APA), which is the official copyright holder of the instrument. Because I am copying this email to APA, however, you do not have to request permission separately from APA; this single e-mail constitutes official approval from both parties.

We make the PANAS available without charge for non-commercial purposes. We do require that all printed versions of the PANAS include a full citation and copyright information. Thus, any printed copies should state:

"From "Development and validation of brief measures of positive and negative affect: The PANAS scales," by D. Watson, L. A. Clark, and A. Tellegen, 1988, Journal of Personality and Social Psychology, 54, 1063-1070. Copyright © 1988 by the American Psychological Association. Reproduced with permission. No further reproduction or distribution is permitted without written permission from the American Psychological Association."

Please note that Professor Clark and I have moved to the University of Notre Dame. Please send any future correspondence to our Notre Dame email addresses (la.clark@nd.edu; db.watson@nd.edu).

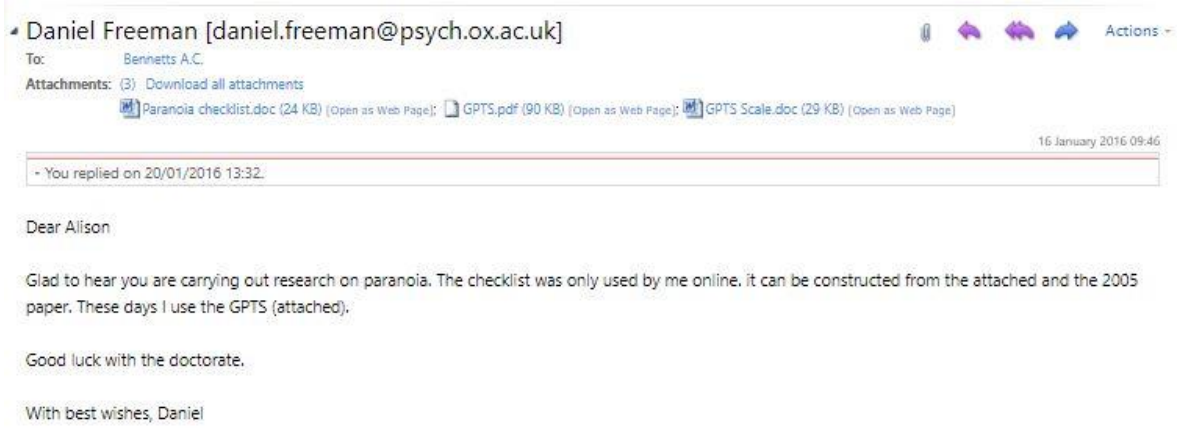
Good luck with your research.

Regards,

David Watson

Appendix B

B.3. Permission to use the Paranoia Checklist (PC).



Daniel Freeman [daniel.freeman@psych.ox.ac.uk]

Actions

To: Bennetts A.C.

Attachments: (3) Download all attachments

Paranoia checklist.doc (24 KB) (Open as Web Page); GPTS.pdf (90 KB) (Open as Web Page); GPTS Scale.doc (29 KB) (Open as Web Page)

16 January 2016 09:46

- You replied on 20/01/2016 13:32.

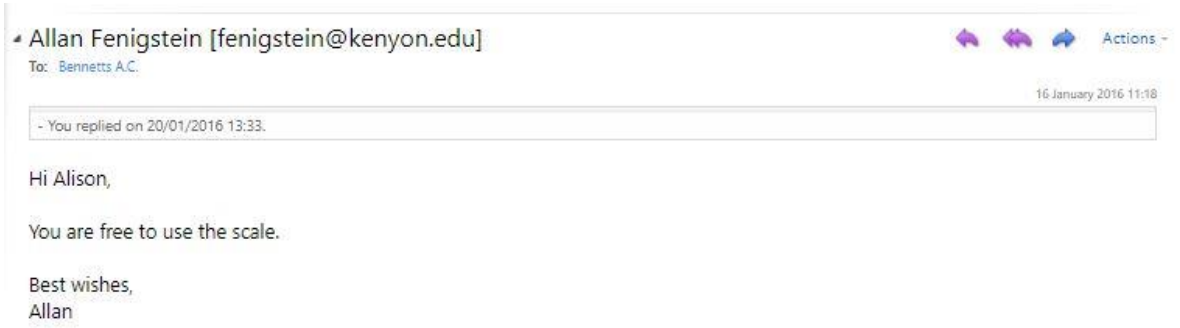
Dear Alison

Glad to hear you are carrying out research on paranoia. The checklist was only used by me online. it can be constructed from the attached and the 2005 paper. These days I use the GPTS (attached).

Good luck with the doctorate.

With best wishes, Daniel

B.4. Permission to use the Paranoia Scale (PS).



Allan Fenigstein [fenigstein@kenyon.edu]

Actions

To: Bennetts A.C.

16 January 2016 11:18

- You replied on 20/01/2016 13:33.

Hi Alison,

You are free to use the scale.

Best wishes,
Allan

Appendix C: License for State and Trait Anxiety Inventory (STAI).

mind garden

www.mindgarden.com

To whom it may concern,

This letter is to grant permission for the above named person to use the following copyright material for his/her thesis or dissertation research.

Instrument: ***State-Trait Anxiety Inventory for Adults***

Authors: ***Charles D. Spielberger, in collaboration with R.L. Gorsuch, G.A. Jacobs, R. Lushene, and P.R. Vagg***

Copyright: ***1968, 1977 by Charles D. Spielberger***

Up to 5 sample items from this instrument may be reproduced for inclusion in a proposal, thesis, or dissertation.

The entire instrument may not be included or reproduced at any time in any other published material.

Sincerely,

Robert Most
Mind Garden, Inc.
www.mindgarden.com

Appendix D: Daily Practice Scripts.

Positive and Negative Conditions:

Please close your eyes and re-create that situation that you described in the session at the university. (5 sec) I want you to consider the image you have of yourself as vividly as possible, whilst I guide you through the details of the situation. (5 sec)

Focus on what is happening in the image that you can see (10 sec)

Where are you in the situation you are thinking about? (5 sec)

Focus on the surroundings and what details you can see (10 sec)

What are you doing in the image? (5 sec)

Think about what you would be seeing or noticing if you were watching the scene on TV or a screen. (10 sec)

What sounds can you hear? (5 sec)

Focus on who you are with in the image (5 sec)

What are other people doing? (10 sec)

What do you look like to the other people in the situation? (10 sec)

Focus on your thoughts in that situation (15 sec)

Think about the sensations you can feel in your body when you think about this image (10 sec)

I want you to hold the image of the situation for a little while longer. (5 sec)

Think about yourself in that situation (15 sec)

I want you to start bringing yourself back into the present moment. (5 sec) Become aware of where you are in the room, and start moving your fingers and toes. (5 sec)

Now open your eyes.

Appendix D

Control Condition:

Please close your eyes and re-create the image of the face that you were asked to imagine in the session at the university. (5 sec) I want you to consider the image you have as vividly as possible, whilst I guide you through details of the image. (5 sec)

Focus on the face that you can see (10 sec)

What do you notice about the face? (5 sec)

Focus on the details you can see (10 sec)

What expression does the person in the image have? (5 sec)

Think about what you would notice about the person's face if you saw them (10 sec)

Focus on the shape of the person's face and how each feature sits within it (10 sec)

What might other people notice if they saw the face? (10 sec)

Focus on your thoughts about the face (15 sec)

Think about the sensations you can feel in your body as you think about this image (10 sec)

I want you to hold the image of the face for a little while longer. (15 sec)

I want you to start bringing yourself back into the present moment. (10 sec) Become aware of where you are in the room, and start moving your fingers and toes.

(5 sec)

Now open your eyes.

Appendix E: Daily Practice Sheet.

UNIVERSITY OF Southampton

Study title: Investigation into Mental Imagery, Mood, and Beliefs
Daily practice sheet (Version 11; 16th June 2017)
Researcher: Alison Bennetts
ERGO ID: 27896

Image prompt:

Planned practice time:

Please complete the chart below and bring the sheet to your second session at the university. If you feel you are experiencing any adverse effects from the practice, please cease practice and discuss this with the researcher at your second session.

	Day					
	1 (day following lab attendance)	2	3	4	5	6
Practice completed						
Time and duration of actual practice						

Time and date of second session at university:

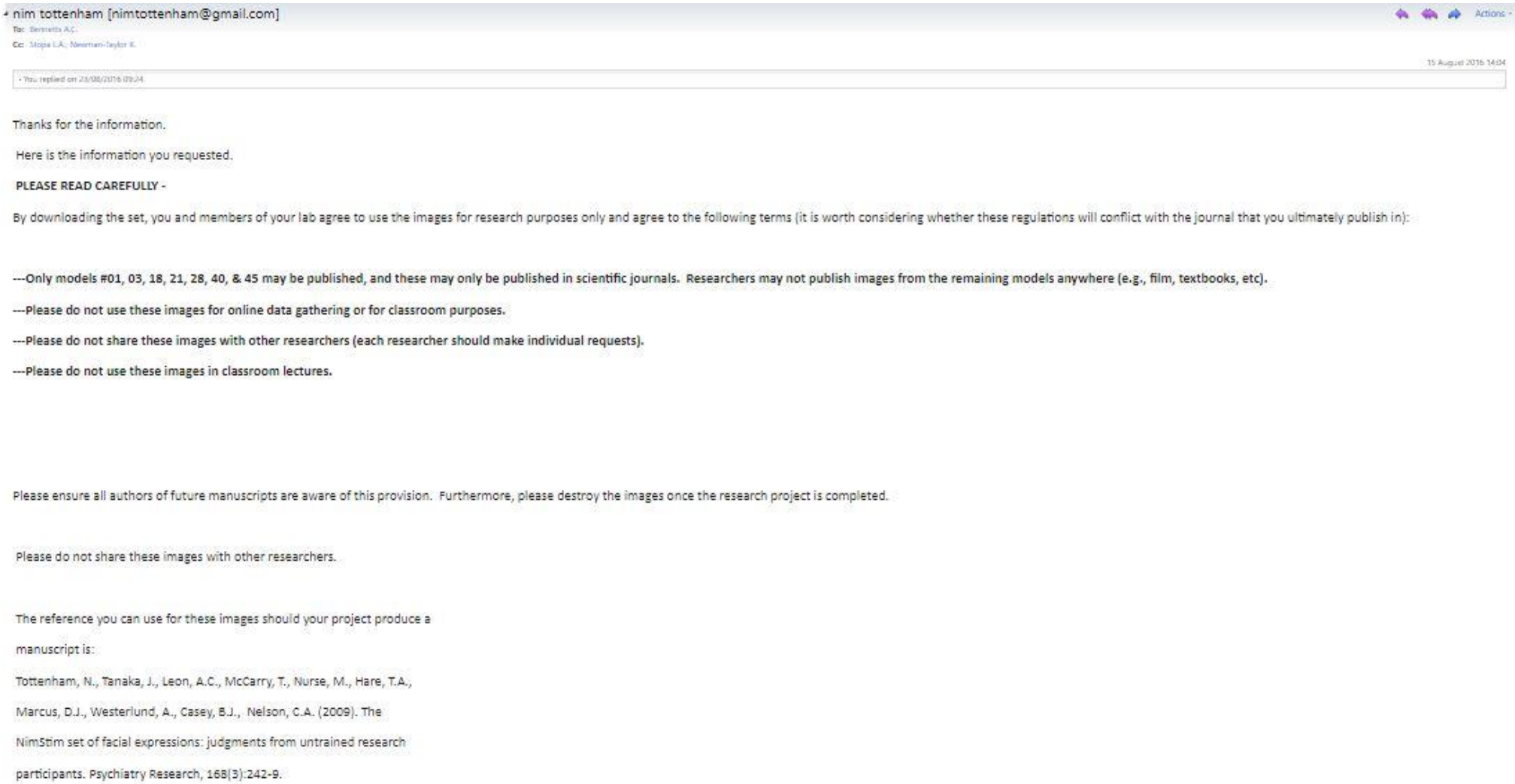
For office use only:
Participant number:

Appendix F: Control Stimuli Piloting.

Five celebrity faces from a magazine were chosen based on a clear picture of the whole face being visible. A group of people known to the experimenter were asked to rate the level of positive vs. negative emotional valence they experienced in response to the face from -10 (very negative) to +10 (very positive). A score between -3 and +3 was deemed as not creating a substantial emotional reaction and two images scoring in this range were considered for further piloting.

The same procedure was then repeated using four neutral faces from the NimStim© Set of Facial Expressions (Tottenham et al., 2009; images downloaded from www.danlab7.wixsite.com/nimstim, with permissions; see Figure 1). These faces were selected based on an equal representation of gender and a range of ethnicities. As two of the NimStim© faces fell within the desired range, all other photos were discarded from the project, as the unknown NimStim© faces were deemed less likely to evoke an emotional response.

An opportunity sample was recruited (N = 3), and asked to complete the PANAS, take part in an imagery exercise, and then repeat the PANAS and rate how easy the image was to hold in mind from 0 (very difficult) to 10 (very easy). The imagery exercise involved the draft control imagery script and using either image A or image B as a stimulus. Two of the three participants initially recruited rated their sense of self as negative in response to image B, and so image A was utilised for all three participants. PANAS and ease ratings are displayed in Table 1. Image A was chosen for use in the study. To utilise image B as a standby stimulus in cases where participants rated their sense of self as negative in response to image A, it was necessary to ensure it did not create a substantial change in mood. A further opportunity participant that rated their sense of self as neutral in response to image B was therefore recruited to the pilot. No substantial changes to mood were noted, though the ease of holding the image was less than for image A. Image B was therefore retained as a back-up stimulus.



nim tottenham [nimtottenham@gmail.com]

Actions

15 August 2016 14:04

Thanks for the information.

Here is the information you requested.

PLEASE READ CAREFULLY -

By downloading the set, you and members of your lab agree to use the images for research purposes only and agree to the following terms (it is worth considering whether these regulations will conflict with the journal that you ultimately publish in):

---Only models #01, 03, 18, 21, 28, 40, & 45 may be published, and these may only be published in scientific journals. Researchers may not publish images from the remaining models anywhere (e.g., film, textbooks, etc).

---Please do not use these images for online data gathering or for classroom purposes.

---Please do not share these images with other researchers (each researcher should make individual requests).

---Please do not use these images in classroom lectures.

Please ensure all authors of future manuscripts are aware of this provision. Furthermore, please destroy the images once the research project is completed.

Please do not share these images with other researchers.

The reference you can use for these images should your project produce a manuscript is:

Tottenham, N., Tanaka, J., Leon, A.C., McCarry, T., Nurse, M., Hare, T.A., Marcus, D.J., Westerlund, A., Casey, B.J., Nelson, C.A. (2009). The NimStim set of facial expressions: judgments from untrained research participants. Psychiatry Research, 168(3):242-9.

Figure 1. Permissions to use NimStim© faces.

Table 1. *PANAS and Ease of Holding Image Ratings for the NimStim© Faces.*

Respondent	Face	PANAS[1] pre	PANAS post	Pre-Post change	Ease of Holding Image
A	A	PA =35	PA = 28	PA = -7	9
		NA = 17	NA = 18	NA = +1	
B	A	PA = 29	PA = 23	PA = -6	8
		NA = 12	NA = 11	NA = +1	
C	A	PA = 20	PA = 17	PA = - 3	8
		NA = 10	NA = 10	NA = 0	
D	B	PA = 38	PA = 40	PA = +2	6
		NA = 10	NA = 11	NA = +1	

[1]PA = Positive Affect, NA = Negative Affect

Appendix G: Information Sheet Screening Stage One

Participant Information Sheet – Screening stage one (Version 7; 16th June 2017)

Study Title: Investigation into Mental Imagery, Mood, and Beliefs

Researcher: Alison Bennetts **ERGO ID: 27896**

Supervisors: Katherine Newman-Taylor

Lusia Stopa

Please read this information carefully before deciding to take part in this research. If you are happy to participate you will be asked to click the radio button below (online completion) or to sign a consent form (completing with researcher present) confirming your consent to take part.

What is the research about?

The current research is being carried out as part of my Doctorate in Clinical Psychology qualification. The research aims to investigate mental imagery, mood and beliefs which is increasingly an area of interest in psychology.

Why have I been chosen?

This stage of the study is open for anyone to participate in. Some people that complete the questionnaire will be invited to take part in later stages of the study, though not everyone will be invited to the later stages. Selection for the later stages will be based on scores on this questionnaire.

What will happen to me if I take part?

You will be asked to complete some basic demographic information (age, gender, ethnicity) and provide an email address that you are willing to be contacted by if you are invited to take part in the later stages. If you provide an email address, your answers to the screening survey will be linked to your email, and you are consenting to be contacted regarding participation in the later stages. You will then be asked to complete a questionnaire consisting of 20 questions. This is not expected to take you more than 5 minutes. You will then either be contacted via email to participate in the later stage, or assigned your payment and not hear anything further from us. If you are not invited to participate in the later stages, you will not be contacted other than to arrange cash payment if the survey was completed online.

Are there any benefits in my taking part?

For completion of this screening stage you will be given one credit or 75p (cash payment limited). *If you wish to be paid 75p, you must specify this in the space provided, and provide an email address so that cash payment can be arranged if completing screening online.*

Are there any risks involved?

There are no foreseen risks to taking part in the study.

Will my participation be confidential?

If you provide an email address, your answers will be linked to it so that you can be contacted regarding the trial. If you are not eligible for further participation, your answers will be entered into a database where you are identified by participant number only. If you attend the later stages, your answers will be entered into a database where you are identifiable by participant number only. No email addresses or names will be included in the final database. Paper forms with email addresses on will be stored in a locked cabinet on campus and shredded when your participation is complete (i.e. after screening stage if not eligible for participation, after laboratory stages if taking part in experimental stages).

What happens if I change my mind?

You are consenting to take part in the study voluntarily, and you have the right to withdraw at any point in the study. If you decide to withdraw from the study, there will be no impact on your grade or treatment within the university.

What happens if something goes wrong?

If participating in this study raises any issues or concerns for you, we recommend that you contact one of the following resources:

Enabling Services (The University of Southampton):

Visit www.southampton.ac.uk/edusupport/mental_health_and_wellbeing/index.page

or call +44(0)23 8059 7488 or email firstsupport@soton.ac.uk

The Samaritans

Visit www.samaritans.org/ or call 116 123 (free 24/7)

If you feel your participation has caused ongoing distress, please contact your G.P. Alternatively, you can contact Steps to Wellbeing, which is the Improving Access to Psychological Therapies service for Southampton:

www.steps2wellbeing.co.uk or call 0800 612 7000

If you have any concerns about your participation in this study or would like to raise a complaint about any aspect of the study, you can contact The Chair of the Ethics Committee, Psychology, University of Southampton, SO17 1BJ, UK. Phone: +44 (0)23 8059 3856, email fshs-rso@soton.ac.uk

Where can I get more information?

You can contact myself or either of my supervisors on the details below should you require further information about the study:

Alison Bennetts (Researcher): acb1g14@soton.ac.uk

Dr Katherine Newman-Taylor (Supervisor): K.Newman-Taylor@soton.ac.uk

Dr Lusia Stopa (Supervisor): L.Stopa@soton.ac.uk

Appendix H: Screening Stage Two Information Sheet and Consent Form.

H.1: Information Sheet.

Participant Information Sheet 1 – Screening stage two (Version 11; 16th June 2017)

Study Title: Investigation into Mental Imagery, Mood, and Beliefs

Researcher: Alison Bennetts **ERGO ID: 27896**

Supervisors: Katherine Newman-Taylor

Lusia Stopa

Please read this information carefully before deciding to take part in this research. If you are happy to participate you will be asked to sign a consent form.

What is the research about?

The current research is being carried out as part of my Doctorate in Clinical Psychology qualification. The research aims to investigate mental imagery, mood and beliefs which is increasingly an area of interest in psychology.

Why have I been chosen?

You have been chosen to participate in the second screening based on your scores on the initial screening.

What will happen to me if I take part?

You will be asked to complete a questionnaire consisting of 20 questions. This is not expected to take you more than 5 minutes. You will then be invited to participate in the experimental stage, or given your credit/payment and debriefed.

Are there any benefits in my taking part?

For completion of this screening stage you will be given three credits or £3.25 (cash payment limited).

Are there any risks involved?

There are no foreseen risks to taking part in the study.

Will my participation be confidential?

The answers you provide to this survey will be entered into a database where you will be identifiable by participant number only.

What happens if I change my mind?

You are consenting to take part in the study voluntarily, and you have the right to withdraw at any point in the study. If you decide to withdraw from the study, there will be no impact on your grade or treatment within the university.

What happens if something goes wrong?

If participating in this study raises any issues or concerns for you, we recommend that you contact one of the following resources:

Enabling Services (The University of Southampton):

Visit www.southampton.ac.uk/edusupport/mental_health_and_wellbeing/index.page

or call +44(0)23 8059 7488 or email firstsupport@soton.ac.uk

The Samaritans

Visit www.samaritans.org/ or call 116 123 (free 24/7)

If you feel your participation has caused ongoing distress, please contact your G.P. Alternatively, you can contact Steps to Wellbeing, which is the Improving Access to Psychological Therapies service for Southampton:

www.steps2wellbeing.co.uk or call 0800 612 7000

If you have any concerns about your participation in this study or would like to raise a complaint about any aspect of the study, you can contact The Chair of the Ethics Committee, Psychology, University of Southampton, SO17 1BJ, UK. Phone: +44 (0)23 8059 3856, email fshs-rso@soton.ac.uk

Where can I get more information?

You can contact myself or either of my supervisors on the details below should you require further information about the study:

Alison Bennetts (Researcher): acb1g14@soton.ac.uk

Dr Katherine Newman-Taylor (Supervisor): K.Newman-Taylor@soton.ac.uk

Dr Lusia Stopa (Supervisor): L.Stopa@soton.ac.uk

H.2. Consent Form.

CONSENT FORM 1– Screening stage two (Version 11; 16th June 2017)

Study title: Investigation into Mental Imagery, Mood and Beliefs

Researcher name: Alison Bennetts

ERGO Study ID number: 27896

RGO reference number: *N/A*

Please initial the box(es) if you agree with the statement(s):

I have read and understood the Participant Information Sheet 1 (Version 11; 16th June 2017) and have had the opportunity to ask questions about the study ☐

I agree to take part in this research project and agree for my data to be used for the purpose of this study ☐

I understand my participation is voluntary and I may withdraw at any time without my legal rights being affected ☐

Name of participant (print name)……

Signature of participant……..

Date……

Name of person taking consent (print name and designation)

……

Signature of person taking consent……..

Date……

Appendix I: Information Sheet and Consent Form for Experimental Stage.

I.1. Information Sheet.

Participant Information Sheet 2– Experimental stage (Version 11; 16th June 2017)

Study Title: Investigation into Mental Imagery, Mood, and Beliefs

Researcher: Alison Bennetts **ERGO ID:** 27896

Supervisors: Katherine Newman-Taylor

Lusia Stopa

Please read this information carefully before deciding to take part in this research. If you are happy to participate you will be asked to sign a consent form.

What is the research about?

The current research is being carried out as part of my Doctorate in Clinical Psychology qualification. The research aims to investigate mental imagery, mood and beliefs which is increasingly an area of interest in psychology.

Why have I been chosen?

We aimed to recruit a large sample from the initial screening, however we have only invited some of the sample to participate in the experimental trial. You were invited to participate in the research as you scored within a certain range on the screening questionnaire.

What will happen to me if I take part?

This is an experimental study, and each participant will be allocated to one of three conditions. You will be asked to complete a set of pen and paper questionnaires before being guided through an imagery exercise. You will then need to practice the image daily over the next six days, and complete a tick box record to say you have completed the imagery exercise on each day. The daily practice involves listening to a guided imagery script that lasts around five minutes. You will then be asked to return to the laboratory on the seventh day. When you return to the laboratory, you will be asked to repeat the set of pen and paper questionnaires, return the practice record and participate in a different short imagery exercise. You will then receive debriefing information about the study. Some participants may be excluded during the imagery exercise if they do not meet inclusion criteria for the task. If this happens, you will be allocated the full 12 credits (or £12.25) for the current stage of the study, though will not earn the remaining 12 (or £12) for the daily practice and second laboratory session. The first laboratory session lasts around one hour (including the

second screening stage you have just completed) and the second is expected to last no more than 30 minutes.

Are there any benefits in my taking part?

You will be offered course credit or payment in return for participation. Cash payment is limited. Participation in the experimental stage, *including daily image practice and the second screening you have just completed*, will yield a maximum of 24 credits or £24.25 (inclusive of the 3 credits/ £3.25 for completion of the second screening you have just completed).

Are there any risks involved?

There are no foreseen risks to taking part in the study. There is the potential that you may experience a negative mood or experience negative thoughts, however if this should occur it is expected that these will be transient. You will be fully debriefed at the end of the study, and details of support should you feel this is necessary are given in the "What happens if something goes wrong?" section below. If you notice any significant aversive effects from practicing the image, please do not continue and inform the researcher at the second laboratory session.

Will my participation be confidential?

Data collected in the study will have person identifiable data removed. Your data will be referred to by your participant number only, and will be stored on password protected computers. Consent forms will be stored in a locked drawer on the university premises.

What happens if I change my mind?

You are consenting to take part in the study voluntarily, and you have the right to withdraw at any point in the study. If you decide to withdraw from the study, there will be no impact on your grade or treatment within the university.

What happens if something goes wrong?

If participating in this study raises any issues or concerns for you, we recommend that you contact one of the following resources:

Enabling Services (The University of Southampton):

Visit www.southampton.ac.uk/edusupport/mental_health_and_wellbeing/index.page

or call +44(0)23 8059 7488 or email firstsupport@soton.ac.uk

The Samaritans

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www.steps2wellbeing.co.uk or call 0800 612 7000

If you have any concerns about your participation in this study or would like to raise a complaint about any aspect of the study, you can contact The Chair of the Ethics Committee, Psychology, University of Southampton, SO17 1BJ, UK. Phone: +44 (0)23 8059 3856, email fshs-rso@soton.ac.uk

Where can I get more information?

You can contact myself or either of my supervisors on the details below should you require further information about the study:

Alison Bennetts (Researcher): acb1g14@soton.ac.uk

Dr Katherine Newman-Taylor (Supervisor): K.Newman-Taylor@soton.ac.uk

Dr Lusia Stopa (Supervisor): L.Stopa@soton.ac.uk

I.2. Consent Form.

CONSENT FORM 2– Experimental stage (Version 11; 16th June 2017)

Study title: Investigation into Mental Imagery, Mood and Beliefs

Researcher name: Alison Bennetts

ERGO Study ID number: 27896

RGO reference number: *N/A*

Please initial the box(es) if you agree with the statement(s):

I have read and understood the Participant Information Sheet 2 (Version 11; 16th June 2017) and have had the opportunity to ask questions about the study ☐

I agree to take part in this research project and agree for my data to be used for the purpose of this study ☐

I understand my participation is voluntary and I may withdraw at any time without my legal rights being affected ☐

A sample of the imagery exercises will be audio recorded for ensuring consistency in the delivery of instructions. I agree to my participation in the imagery exercise to be audio recorded. ☐

Name of participant (print name)……

Signature of participant……..

Date……

Name of person taking consent (print name and designation)

……

Signature of person taking consent……..

Date……

Appendix J: Debriefing Sheets.

J.1. Screening Stage Two Debriefing Sheet.

UNIVERSITY OF Southampton

Mental Imagery in Non-Clinical Paranoia: The Roles of Self-Compassion and Core Schemas

(Investigation into Mental Imagery, Mood and Beliefs)

ERGO ID: 27896

Debriefing Statement – *Screening Stage 2* (Version 7; 16th June 2017)

The aim of this research was to investigate the impact that mental imagery has on mood, non-clinical paranoia, self/other beliefs and self-compassion. You were invited to participate in the experimental stage of the trial due to your score on the screening questionnaire. This questionnaire was a measure of trait paranoia. High levels of trait paranoia does not mean that you have mental health difficulties or a clinical problem. However, studies that use a sample that has high levels of non-clinical paranoia can inform our understanding of the psychological process that relate to suspiciousness or mistrust. This understanding can ultimately influence our understanding and treatment of clinical cases of paranoia. In the online screening, you scored over a certain score that made you eligible for the study. However, your score on the same questionnaire today has is not as high which means you are no longer eligible to take part.

The study aimed to investigate how exposure to a positive, negative or control mental image may influence mood and levels of paranoia. As you are not taking part in the experimental stage, you have not been exposed to any of these conditions. Previous research has shown positive or negative interpersonal mental self-imagery can effect mood and levels of paranoia (Bullock, Newman-Taylor & Stopa, 2016). This study aimed to replicate these findings and, in addition, to investigate how the impact of mental imagery may be mediated by levels of self-compassion and self/other beliefs.

Your data will only be included to report on how many people met criteria, and participated, in each stage of the study. You are not eligible to participate in the screening stages of the study for a second time. The results of this study will not include your name or any other identifying characteristics. The reason we did not disclose that levels of paranoia were a feature in the study was that we did not wish it to influence your responses to the questionnaires. You may have a copy of this summary if you wish.

If you have any further questions please contact me, Alison Bennetts at:

acb1g14@soton.ac.uk

Alternatively, you may wish to contact one of the supervisors of the project:

Dr Katherine Newman-Taylor (Supervisor): K.Newman-Taylor@soton.ac.uk

Dr Lusia Stopa (Supervisor): L.Stopa@soton.ac.uk

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www.steps2wellbeing.co.uk or call 0800 612 7000

Thank you for your participation in this research.

Signature _____ Date _____

Name

If you have questions about your rights as a participant in this research, or if you feel that you have been placed at risk, you may contact the Chair of the Ethics Committee, Psychology, University of Southampton, Southampton, SO17 1BJ. Phone: +44 (0)23 8059 3856, email fshs-rso@soton.ac.uk

If you are interested in reading more about the subject, please see the references below:

Bullock, G., Newman-Taylor, K., and Stopa, L. (2016). The role of mental imagery in non-clinical paranoia. *Journal of Behavior Therapy and Experimental Psychiatry, 50*, 264-268. http://dx.doi.org/10.1016/j.jbtep.2015.10.002

Freeman, D., Garety, P. A., Kuipers, E., Fowler, D., & Bebbington, P. E. (2002). A cognitive model of persecutory delusions. *British Journal Of Clinical Psychology, 41(4)*, 331-347. doi:10.1348/014466502760387461

J.2. Control Manipulation Debriefing Sheet.

UNIVERSITY OF Southampton

Mental Imagery in Non-Clinical Paranoia: The Roles of Self-Compassion and Core Schemas

(Investigation into Mental Imagery, Mood and Beliefs)

ERGO ID: 27896

Debriefing Statement – *Control Imagery Condition – Manipulation Check*
(Version 7; 16th June 2017)

The aim of this research was to investigate the impact that mental imagery has on mood, non-clinical paranoia, self/other beliefs and self-compassion. You were invited to participate in the experimental stage of the trial due to your score on the screening questionnaire. This questionnaire was a measure of trait paranoia. High levels of trait paranoia does not mean that you have mental health difficulties or a clinical problem. However, studies that use a sample that has high levels of non-clinical paranoia can inform our understanding of the psychological process that relate to suspiciousness or mistrust. This understanding can ultimately influence our understanding and treatment of clinical cases of paranoia.

The study aimed to investigate how exposure to a positive, negative or control mental image may influence mood and levels of paranoia. Previous research has shown positive or negative interpersonal mental self-imagery can effect mood and levels of paranoia (Bullock, Newman-Taylor & Stopa, 2016). This study aimed to replicate these findings and, in addition, to investigate how the impact of mental imagery may be mediated by levels of self-compassion and self/other beliefs. You were randomly allocated to the control condition. It was important that people in this condition rated their sense of self as *neutral* whilst holding the mental image, in order to distinguish the control group from the positive and negative conditions (in which people rate their sense of self as positive or negative). As you did not report a neutral sense of self in response to the control condition, you no longer meet criteria for the study.

Your data will only be included to report on the characteristics of the experimental groups prior to manipulation. You are not eligible to participate in the screening stages of the study for a second time. The results of this study will not include your name or any other identifying characteristics. The reason we did not disclose that

levels of paranoia were a feature in the study was that we did not wish it to influence your responses to the questionnaires. You may have a copy of this summary if you wish.

If you have any further questions please contact me, Alison Bennetts at:

acb1g14@soton.ac.uk

Alternatively, you may wish to contact one of the supervisors of the project:

Dr Katherine Newman-Taylor (Supervisor): K.Newman-Taylor@soton.ac.uk

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Thank you for your participation in this research.

Signature _____ Date _____

Name

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If you are interested in reading more about the subject, please see the references below:

Bullock, G., Newman-Taylor, K., and Stopa, L. (2016). The role of mental imagery in non-clinical paranoia. *Journal of Behavior Therapy and Experimental Psychiatry, 50*, 264-268. http://dx.doi.org/10.1016/j.jbtep.2015.10.002

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J.3. Positive Condition Debriefing Sheet.

UNIVERSITY OF Southampton

Mental Imagery in Non-Clinical Paranoia: The Roles of Self-Compassion and Core Schemas

(Investigation into Mental Imagery, Mood and Beliefs)

ERGO ID: 27896

Debriefing Statement –*Positive Imagery Condition* (Version 11; 16th June 2017)

The aim of this research was to investigate the impact that mental imagery has on mood, non-clinical paranoia, self/other beliefs and self-compassion. You were invited to participate in the experimental stage of the trial due to your score on the screening questionnaire. This questionnaire was a measure of trait paranoia. High levels of trait paranoia does not mean that you have mental health difficulties or a clinical problem. However, studies that use a sample that have high levels of non-clinical paranoia can inform our understanding of the psychological process that relate to suspiciousness or mistrust. This understanding can ultimately influence our understanding and treatment of clinical cases of paranoia.

The study aimed to investigate how exposure to a positive, negative or control mental image may influence mood and levels of paranoia. Previous research has shown positive or negative interpersonal mental self-imagery can effect mood and levels of paranoia (Bullock, Newman-Taylor & Stopa, 2016). This study aimed to replicate these findings and, in addition, to investigate how the impact of mental imagery may be mediated by levels of self-compassion and self/other beliefs. You were randomly allocated to the positive condition. We asked you to practice this image in order to investigate the impact that repeated induction of positive/negative/control imagery has on these outcomes over time. The imagery exercise you have just completed is a positive visualisation exercise aimed to buffer any negative impact of you practising this mental image.

It is expected that the experimental conditions will differ on the post experimental measures of emotion, paranoia, beliefs and self-compassion. It is also expected that levels of self-compassion and self/other beliefs will meditate the impact of

imagery on mood and paranoid thinking. Your data will help our understanding of how self-compassion, beliefs, self-esteem and mood relate to levels of non-clinical paranoia. This understanding will help to inform theories of paranoid ideation, and of how mental imagery may be utilised in the treatment of clinical paranoia.

Once again results of this study will not include your name or any other identifying characteristics. The reason we did not disclose that levels of paranoia were a feature in the study was that we did not wish it to influence your responses to the questionnaires. You may have a copy of this summary if you wish.

If you have any further questions please contact me, Alison Bennetts at:

acb1g14@soton.ac.uk

Alternatively, you may wish to contact one of the supervisors of the project:

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Thank you for your participation in this research.

Signature _____ Date _____

Name

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J.4. Negative Condition Debriefing Sheet.

UNIVERSITY OF Southampton

Mental Imagery in Non-Clinical Paranoia: The Roles of Self-Compassion and Core Schemas

(Investigation into Mental Imagery, Mood and Beliefs)

ERGO ID: 27896

Debriefing Statement – *Negative Imagery Condition* (Version 11; 16th June 2017)

The aim of this research was to investigate the impact that mental imagery has on mood, non-clinical paranoia, self/other beliefs and self-compassion. You were invited to participate in the experimental stage of the trial due to your score on the screening questionnaire. This questionnaire was a measure of trait paranoia. High levels of trait paranoia does not mean that you have mental health difficulties or a clinical problem. However, studies that use a sample that have high levels of non-clinical paranoia can inform our understanding of the psychological process that relate to suspiciousness or mistrust. This understanding can ultimately influence our understanding and treatment of clinical cases of paranoia.

The study aimed to investigate how exposure to a positive, negative or control mental image may influence mood and levels of paranoia. Previous research has shown positive or negative interpersonal mental self-imagery can effect mood and levels of paranoia (Bullock, Newman-Taylor & Stopa, 2016). This study aimed to replicate these findings and, in addition, to investigate how the impact of mental imagery may be mediated by levels of self-compassion and self/other beliefs. You were randomly allocated to the negative condition. We asked you to practice this image in order to investigate the impact that repeated induction of

positive/negative/control imagery has on these outcomes over time. The imagery exercise you have just completed is a positive visualisation exercise aimed to buffer any negative impact of you practising this mental image.

It is expected that the experimental conditions will differ on the post experimental measures of emotion, paranoia, beliefs and self-compassion. It is also expected that levels of self-compassion and self/other beliefs will meditate the impact of imagery on mood and paranoid thinking. Your data will help our understanding of how self-compassion, beliefs, self-esteem and mood relate to levels of non-clinical paranoia. This understanding will help to inform theories of paranoid ideation, and of how mental imagery may be utilised in the treatment of clinical paranoia.

Once again results of this study will not include your name or any other identifying characteristics. The reason we did not disclose that levels of paranoia were a feature in the study was that we did not wish it to influence your responses to the questionnaires. You may have a copy of this summary if you wish.

If you have any further questions please contact me, Alison Bennetts at:

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J.5. Control Condition Debriefing Sheet.

UNIVERSITY OF Southampton

Mental Imagery in Non-Clinical Paranoia: The Roles of Self-Compassion and Core Schemas

(Investigation into Mental Imagery, Mood and Beliefs)

ERGO ID: 27896

Debriefing Statement – *Control Imagery Condition* (Version 11; 16th June 2017)

The aim of this research was to investigate the impact that mental imagery has on mood, non-clinical paranoia, self/other beliefs and self-compassion. You were invited to participate in the experimental stage of the trial due to your score on the screening questionnaire. This questionnaire was a measure of trait paranoia. High levels of trait paranoia does not mean that you have mental health difficulties or a clinical problem. However, studies that use a sample that has high levels of non-clinical paranoia can inform our understanding of the psychological process that relate to suspiciousness or mistrust. This understanding can ultimately influence our understanding and treatment of clinical cases of paranoia.

The study aimed to investigate how exposure to a positive, negative or control mental image may influence mood and levels of paranoia. Previous research has

shown positive or negative interpersonal mental self-imagery can effect mood and levels of paranoia (Bullock, Newman-Taylor & Stopa, 2016). This study aimed to replicate these findings and, in addition, to investigate how the impact of mental imagery may be mediated by levels of self-compassion and self/other beliefs. You were randomly allocated to the control condition. We asked you to practice this image in order to investigate the impact that repeated induction of positive/negative/control imagery has on these outcomes over time. The imagery exercise you have just completed is a positive visualisation exercise aimed to buffer any negative impact of you practising this mental image.

It is expected that the experimental conditions will differ on the post experimental measures of emotion, paranoia, beliefs and self-compassion. It is also expected that levels of self-compassion and self/other beliefs will meditate the impact of imagery on mood and paranoid thinking. Your data will help our understanding of how self-compassion, beliefs, self-esteem and mood relate to levels of non-clinical paranoia. This understanding will help to inform theories of paranoid ideation, and of how mental imagery may be utilised in the treatment of clinical paranoia.

Once again results of this study will not include your name or any other identifying characteristics. The reason we did not disclose that levels of paranoia were a feature in the study was that we did not wish it to influence your responses to the questionnaires. You may have a copy of this summary if you wish.

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Appendix K: Overview of Prorated Data.

Table 1. *Frequency of Prorated Data by Measure and Condition.* [1]

Group	Participants with Missing Data	Measure				
		Post-imagery Brief Core Schema Scale			Post-imagery Paranoia Scale	Follow-up State Self-esteem Scale
		Self-negative	Self-positive	Other positive		
Positive	1	N= 1	N = 1	N= 0	N = 0	N = 0
Negative	3	N = 0	N = 0	N = 1	N = 1	N = 1
Control	0	N = 0	N = 0	N = 0	N = 0	N = 0

[1] *Single item of scale or subscale only missing in all cases.*

Appendix L: Overview of Normal Distribution Violations.

Table 1. *Overview of Normal Distribution Violations.*

Measure	Group	Time point[1]	Normality Test Violation[2]			
			Outliers	Skew Z-score[3] (≥ 1.96)	Kurtosis Z-score[3] (≥ 1.96)	Shapiro-Wilk *p* (≥.05)
Age	Positive	Pre	Y (n = 1)	2.54	2.80	.013
	Negative		Y (n = 1)	3.73	5.33	<.001
Image vividness	Positive	Post	Y (n = 1)	N	N	N
Paranoia Checklist	Positive	Post	Y (n = 1)	1.97	2.05	N
	Control		Y (n = 1)	-2.63	3.06	.016
Paranoia Scale	Positive	Pre	Y (n = 1)	N	N	N
	Control	Post	Y (n = 1)	-2.10	2.41	N
State Self-compassion Scale	Control	Pre	Y (n = 1)	N	N	N
Self-compassion Scale	All groups	Pre	Y (n = 2)	N	N	.045
		FU	Y (n = 3)	2.18	N	.007

Appendix L

State Self-esteem Scale	Positive	Pre	Y (n = 1)	N	N	N
		Post	Y (n = 1)	N	N	N
Rosenberg Self-esteem Scale	Positive	Pre	Y (n = 1)	-2.38	2.95	N
	Control	Post	Y (n = 1)	2.07	N	N
		FU	Y (n = 1)	2.14	2.27	N
Trait Anxiety Inventory	Control	Pre	Y (n = 1)	N	N	N
Positive and Negative Affect Scale (PANAS) -Positive affect	Positive	Pre	Y (n = 1)	N	N	N
	All groups		Y (n = 1)	N	N	N
	All groups	Post	Y (n = 1)	N	N	N
	Control	FU	Y (n = 1)	2.21	2.31	N
	All groups	FU	Y (n = 1)	N	N	N

Appendix L

PANAS – Negative affect	All groups	Pre	Y (n = 1)	N	N	.033
	Positive	Post	Y (n = 1)	2.31	2.10	.026
	Control		Y (n = 1)	2.28	2.04	N
	All groups		N	N	N	.037
	All groups	FU	N	2.38	N	.012
Brief Core Schema Scales (BCSS) – Self-positive	Positive	Pre	Y (n = 1)	N	N	N
	All groups		N	N	N	.08
	Positive	FU	N	N	N	.029
	All groups	FU	N	N	N	.011
BCSS – Self-negative	All groups	Post	N	2.11	N	.009
	All groups	FU	Y (n = 1)	3.05	2.68	.001
BCSS- Other- positive	All groups	Pre	Y (n = 1)	2.09	1.96	N
	Control	Post	Y (n = 1)	N	N	N
	All groups	FU	Y (n = 1)	N	N	N

[1] *Pre = pre-imagery; Post = post-imagery; FU= Follow-up;* [2] *Y = yes; N = no;* [3] *Rounded to two decimal places*