Using Working Models of Attachment to Understand Paranoia in the General Population

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Thesis declaration form

I confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

Signature:

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Overview

The focus of this thesis is on paranoia and the factors that are thought to influence its development and maintenance. This thesis consists of three parts.

Part one presents a systematic literature review on the evidence for a hostile attribution bias in paranoia. No systematic review has yet considered the extent to which this social cognitive bias is associated with paranoia. The evidence for this relationship is considered in the context of both clinical and non-clinical populations. The results supported hostility bias as being significantly associated with the specific experience of paranoia, rather than the broad diagnosis of psychosis.

Part two is an empirical paper on attachment style as a predictor of paranoia in a non-clinical population. The results supported the relationship between paranoia and hostility bias, as expected, but in the context of attachment style this relationship was no longer significant. As per our hypotheses, attachment anxiety and attachment avoidance were both highly significant predictors of paranoia, suggesting that hostility bias was an expression of attachment style. Findings are discussed in relation to the evidence base, new directions for future research and clinical practice recommendations.

Part three is a critical appraisal discussing conceptual issues, development of the methodology and reflections on the research process.

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Part 1: Literature Review

The Evidence for a Hostile Attribution Bias in Paranoia

Abstract

Aims: To appraise the current literature for evidence of a hostile attribution bias (HAB) in people experiencing paranoia, both as a clinically defined construct and in the general population. This would have implications for our understanding of social perception in psychosis.

Method: A systematic search of the literature was conducted using the databases of PsycINFO, Web of Science and Medline. Studies were included if they utilised a measure of both paranoia and hostile attribution bias. In total 12 studies were included.

Results: All 12 studies supported a significant association between HAB and paranoia. Further research questions clarified a significant association between HAB and sub-clinical paranoia in non-clinical samples. However, for individuals at risk of or currently experiencing psychosis this relationship appeared to be more pronounced. Sampling within clinical psychosis groups, the association between HAB and paranoia was strongest in those with persecutory delusions.

Conclusions: There was consistent evidence for an association between HAB and paranoia, with this relationship existing across both clinical and non-clinical groups. However, the increased strength of this association in high-risk psychosis groups and currently psychotic individuals (compared to non-clinical groups) has been linked to a biased attribution style specific to psychosis.

Introduction

Perceived threat and the presence of a persecutor are the two key features of paranoia (Freeman & Garety, 2000). Clinical paranoia involves pervasive persecutory delusions of intended harm from others and extreme mistrust (Combs & Penn, 2004), usually with weak ties to the reality of others' intentions (Combs, Penn & Fenigstein, 2002; Freeman & Garety, 2000). The study of paranoia has recently shifted towards a symptom-specific approach, contrary to the common study of broad symptom groups such as schizophrenia (Chadwick, Birchwood, & Trower, 1996), given that paranoia appears to exist on a continuum much like other positive symptoms (Freeman, Pugh, Vorontsova, Antley & Slater, 2010). This would mean that delusions in psychosis represent the severe end of a continuum of paranoia which is experienced by the general population, but to a lesser degree (Freeman, 2007). Persecutory thinking can therefore be studied in its own right, rather than as a symptom of mental illness (Bentall, 1990). Non-clinical paranoia is also characterised by self-referential biases, perceptions of ill will and beliefs in external control/influence (Fenigstein, 1997), but occurs in non-clinical populations in the context of everyday situations (Fenigstein & Vanable, 1992). People with both clinical and non-clinical paranoia show common thinking styles on measures of cognition, reasoning and emotion, supporting the exploration of paranoia as something that is experienced on a continuum of severity (described in Combs, Finn, Wohlfahrt, Penn & Basso, 2013). It is helpful to think about the individual social cognitive biases associated with paranoid thinking (of both a clinical and non-clinical nature). Social cognition is defined as "the cognitive processes involved in how people think about themselves, other people, social situations, and interactions" (Penn, Corrigan, Bentall, Racenstein & Newman, 1997, p. 114). Social cognition is thought to comprise of Theory of

Mind (ToM), social perception, social knowledge, emotional processing and attributional biases (see Green et al., 2008b), which in combination determine how one processes a social encounter. Social cognition is known to be impaired in psychosis (Penn, Addington & Pinkham, 2006).

Attribution styles & paranoia

One form of social cognition that has been studied in paranoia is attribution style. Attribution styles are pervasive patterns for generating causal explanations of positive and negative events (Bentall, 2001) and the intentions of others around us (Crick & Dodge, 1994), which may be a precursor to the formation of persecutory delusions. Research into social cognitive biases in paranoia typically focuses on the presence of a persecutor, but not on the perception of threat. Presence of a persecutor is assessed by recording the direction of attribution e.g. whether the event is seen to be caused by oneself, others or the situation. Measures commonly used are the Attributional Style Questionnaire (ASQ; Peterson et al., 1982) and the Internal, Personal, Situational Attributions Questionnaire (IPSAQ; Kinderman & Bentall, 1996). External personal attribution (blaming others for negative events) is thought to play a significant role in both clinical (e.g. Blackwood, Howard, Bentall & Murray, 2001; Garety & Freeman, 1999; Kinderman & Bentall, 1997) and non-clinical (e.g. Kinderman & Bentall, 1996) paranoia. Blaming others may be a default bias for some people, with situational explanations requiring more cognitive effort (Langdon, Corner, McLaren, Ward & Coltheart, 2006).

ToM & paranoia

Generating a personalising explanation of events is more likely when one experiences difficulty in accurately constructing the mental states of others (Frith, 2004). Such ToM skills require the accurate attribution of others' mental states,

enabling an individual to explain and predict behaviour (Premack & Woodruff, 1978). People with persecutory delusions were found to be impaired when inferring the intentions of others (Garety & Freeman, 1999; Moritz & Woodward, 2005), and Jeon et al. (2013) have evidenced ToM deficits as a primary contributor to the attribution of hostile intentions in healthy populations. This implies that ToM and paranoia are linked in a manner that can be present in but not exclusive to psychosis. In support of this idea, in a study of schizophrenia patients, a ToM deficit was observed only in those with persecutory delusions (Langdon, Siegert, McClure & Harrington, 2005). This indicated that interpersonal attribution biases were linked to paranoia, and not psychosis in general.

Hostile attribution bias

Hostile attribution & paranoia. The consequences of misattributing the intentions of others and perceiving threat where there is none are therefore essential in our understanding of paranoia as a whole. A theoretical focus on the locus of social cognitive biases (external or internal attribution) can explain only so much, because no insight is gathered on the personal interpretation of events or how the actions of others are understand/misunderstood. More recently the literature has considered this core feature of paranoia; perceiving hostility where none exists (Freeman & Garety, 2004). People who perceive hostility from others in negative events are more likely to anticipate threat with persecutory symptoms (Bentall, Corcoran, Howard, Blackwood & Kinderman, 2001). Similarly, negative self-esteem and the anticipation of future threatening events predicted paranoia (Bentall et al., 2008; Bentall et al., 2009). When individuals perceive others' intentions as hostile in the absence of appropriate cues, they can be described as exhibiting a hostile attribution bias (HAB; Baron & Richardson, 1994).

Ambiguity. However, it is only recently that research has incorporated ambiguity into models of paranoia, considering how persons with paranoid ideation make sense of unclear social scenarios (Combs et al., 2009; Freeman, 2007), which measures such as the ASQ and IPSAQ do not consider. Ambiguity is important in eliciting paranoia because it tasks the individual with filling in the gaps, which requires them to draw on available explanations from past experiences or to exercise their ToM/mentalize another's position. Theoretical accounts of persecutory delusions propose that individuals with these experiences will find ambiguous situations difficult to interpret, making sense of them as hostile and threatening (Freeman et al., 2005). This has been explained by some as a "need for closure" which paranoid and remitted participants scored significantly higher for in comparison to healthy controls (Bentall & Swarbrick, 2003), or as an intolerance of uncertainty linked to paranoia (White & Gumley, 2010). Although these conclusions can aid our understanding of the role of ambiguity, they do not explain the central role of perceived threat that characterises paranoia. HAB is crucial in understanding how paranoia develops, because research indicates that paranoid individuals are accurate at judging clearly defined intentions, but quickly move to a negative explanation in the absence of sufficient information (Turkat, Keane & Thompson-Pope, 1990).

Measuring HAB. HAB is distinct from hostility and aggression as state personality traits (simply acting and responding to others in a hostile way) because it is about an individual's appraisal of others' intentions rather than behaviours of the self. To explore this, there are two broad models of study: those that use generative methods and those that use endorsement methods. The Ambiguous Intentions Hostility Questionnaire (AIHQ, Combs, Penn, Wicher & Waldheter, 2007b) is a

measure which was developed to assess a person's attribution style (e.g. perceived hostility, blaming others, and aggression reaction bias) in scenarios where a negative event happening to them was ambiguously, intentionally or accidentally framed. The AIHQ has been used in several studies of HAB, for example multi-episode, chronic schizophrenia patients with persecutory delusions were found to have a greater tendency for perceiving hostility in ambiguous scenarios versus psychiatric controls with schizophrenia and healthy controls, and this bias was a significant predictor of overall paranoid ideation (Combs et al., 2009). Some research has evidenced a HAB in both first-episode schizophrenia and participants identified as ultra high risk for psychosis (An et al., 2010) but without consideration of the individual symptoms of paranoia experienced by the participants in their groups. It is important to consider that groups defined by diagnoses such as paranoid schizophrenia may be comprised of participants who do not currently experience persecutory delusions/ideation (Combs & Penn, 2004) making it difficult to accurately attribute an increased HAB to specific diagnoses. Greater consideration of the symptoms experienced by clinical groups used in such research (as in Combs et al., 2009) clarifies whether HAB is increased as a result of being part of the clinical group, experiencing paranoid ideation, or both. There is evidence that social cognitive deficits are evident in those who are at risk of developing psychosis (see Niendam, Jalbrzikowski & Bearden, 2009), suggesting a similar need to consider if HAB is specifically linked to paranoia or to psychosis in general. HAB in ambiguous situations was found to be a significant predictor of non-clinical paranoia (Combs et al., 2007b), supporting the idea that paranoia exists on a continuum of experiences rather than as a diagnostic category (Chadwick et al., 1996). The continuum approach of measuring paranoia specifically could yield more useful results across all experimental groups. Overall

there appears to be evidence for an association between HAB and paranoia, which is more commonly researched in the context of psychosis/schizophrenia research. It is currently not clear whether an increased HAB is best understood as an epiphenomenon of psychosis, or if it is best explained by its relationship to the specific symptom of paranoid thinking, which is measurable across all populations. In a similar way, research has identified a 'jumping to conclusions bias' (JTC bias) which was associated specifically with delusional symptomatology (Fine, Gardner, Craigie & Gold, 2007), suggesting that paranoid individuals gather less evidence before coming to conclusions. The current review sought to bring clarity to this question.

Although they are similarly defined constructs, HAB and paranoia are studied individually in the literature. In summary, paranoia is generally conceptualised as a pervasive sense of perceived harm from others. HAB, however, is conceptualised as a social cognitive bias that is activated in response to specific stimuli, leading to an inaccurate personalising attribution of hostile intentions. The conceptual overlap between HAB and paranoia is apparent, but no review has yet summarised the literature on their association, and the extent to which one may be an expression of the other.

Clinical implications of the relationship between HAB and paranoia

Schizophrenia research has linked problems with social cognition to difficulties in general social and community functioning (Couture, Penn & Roberts, 2006; Pinkham & Penn, 2006). Perceiving others' intentions as threatening in social situations is also likely to impact on willingness to engage in social behaviours (Combs & Penn, 2008). There is a documented link between persecutory delusions and an increased risk of violence (Link, Andrews & Cullen, 1992; Wessely et al.,

1993), though it is not clear which social cognitive processes best explain this relationship. Elevated levels of paranoia have been linked to (i) an increased perception of hostility in ambiguous situations (feeling as though someone means me harm) and (ii) a greater tendency to blame others for negative outcomes in ambiguous situations (believing an action was intentional and holding them responsible). Both of these effects were due to a lack of contextual cues regarding intention (Combs et al., 2007b). Some research has focused on the link between HAB and explicit hostile behaviour, meaning those who perceive others as hostile are more likely to retort with an overt hostile response because they believe they have been intentionally wronged. A meta-analysis by de Castro, Veerman, Koops, Bosch and Monshouwer (2002) demonstrated a robust significant relationship between hostile attribution and aggressive behaviour in children. They also discussed a problematic cycle whereby childrens' hostile attributions of intent can cause aggression, create more problematic social interactions and thus limit opportunities for future non-aggressive prosocial learning (Dodge, 1999). This insight from the child literature suggests that a HAB could feed into social difficulties in later life. In clinical samples it may explain the rigidity with which paranoia can be experienced and held on to, because the underlying attribution processes are self-confirming where they limit the possibility for alternative perspectives or learning of ToM skills.

In the adult inpatient population the AIHQ is predictive of violence and aggression among people with schizophrenia (Waldheter, Jones, Johnson & Penn, 2005). Responses on the scale are linked to actual behaviour, with the AIHQ showing sensitivity to social cognition treatment programmes for schizophrenia (Penn et al., 2005). People who are aggressive, with or without mental health problems, exhibit a HAB in ambiguous situations compared to non-aggressive

individuals (Harris, Oakley & Picchioni, 2014). Given the link to aggression, a better understanding of perceived hostility may lead to effective methods to reduce aggression among persons with paranoia and psychosis (see Combs et al., 2007a, for an example). Social cognitions such as a HAB provide potential targets for therapeutic interventions to improve both general social functioning as well as limiting aggressive behaviours in people experiencing increased clinical or non-clinical paranoia.

Research Questions

This review evaluated the evidence for a hostile attribution bias in paranoia. This included both clinical and non-clinical populations, with paranoia treated as a continuum experience and epiphenomena of psychosis, rather than as a diagnostic criteria. More specifically, it addressed the following questions:

1. Primarily, across all studies, is there an association between hostile attribution bias and paranoia?
2. Is there evidence for an increased association between hostile attribution bias and paranoia in people who are at risk of psychosis versus healthy populations?
3. Is the association between hostile attribution bias and paranoia stronger for people with psychosis than for non-psychotic individuals?
4. Is there a significant difference in the association between hostile attribution bias and paranoia for psychotic samples who present with or without paranoid features?
5. Is there a significant difference in the association between hostile attribution bias and paranoia for healthy samples who present with or without paranoid features?

Method

Search Strategy

A systematic search of the literature was conducted to identify publications which investigated HAB and paranoia (see Figure 1). The electronic databases PsycINFO, Medline, and Web of Science were searched. Search terms focused on two areas of interest: paranoia and HAB (see Table 1), and included publications from the beginning of records until 19th January 2015.

Both keyword and title searches were conducted in each database. Limits were set on the databases to include only journal articles published in English. Where two words were searched as an item, they were required to appear adjacent to one another.

One search was conducted, specifying that articles include at least one term from the first domain and at least one term from the second domain. Hand searches were also conducted according to the inclusion and exclusion criteria stated below.

Table 1
Literature search terms

Paranoia	Hostile attribution bias
Paranoi*	Hostil*
Persecut*	Hostile attribution bias*
	Hostile bias*
	Hostile attribut*

* = truncated to allow for multiple endings of words.

To determine which articles met inclusion criteria, titles were read initially. If it was still unclear then abstracts were read, and if any uncertainty remained the entire article was read.

Inclusion and Exclusion Criteria

Inclusion criteria:

- Adults only.
- Published in English language only.
- Studies must contain empirical measures of hostile attribution and paranoia.
- Studies which represented hostile attribution bias regarding the intentions of others, rather than as a general personality trait.
- Studies in which the interaction imagined by the participant was between an adult participant and an imagined other adult, or a real other adult.

Exclusion criteria:

- Studies where adults' reaction to children/adolescents (or vice versa) was the relationship of interest.
- Studies in which participants' hostile behaviour towards others was studied (e.g. expression of verbal or physical hostility), rather than their hostile attribution bias. This would be the experience of acting in a hostile way, rather than the expectation for others to be hostile towards oneself.
- Studies in which experimental manipulation of participants could influence results e.g. where researchers primed or manipulated the affect of participants to be different to their usual self, or where treatment was involved as part of a treatment study.

Quality Assessment

Selected studies were rated for their methodological quality using a critical appraisal checklist adapted from the scale devised by Kmet, Lee and Cook (2004). Six items were chosen to assess the studies, with each factor rated as either high quality (++), medium quality (+), poor quality (0), or not applicable (n/a).

Results

Summary of systematic search

The database search combining at least one term from the first domain with at least one term from the second domain identified a total of 1,434 articles. Of these, nine publications met the specified inclusion criteria. Searching the reference lists of retrieved articles identified a further three studies. A flowchart of study selection is presented in Figure 1.

Table 2 reports on all selected studies. There were 12 publications in total, all of which collected quantitative data. The final 12 studies were conducted in three different countries, with three in the UK, eight in the USA and one in South Korea. All studies used a cross-sectional methodology. Generative methods were employed in seven studies, with endorsement methods used in five studies.

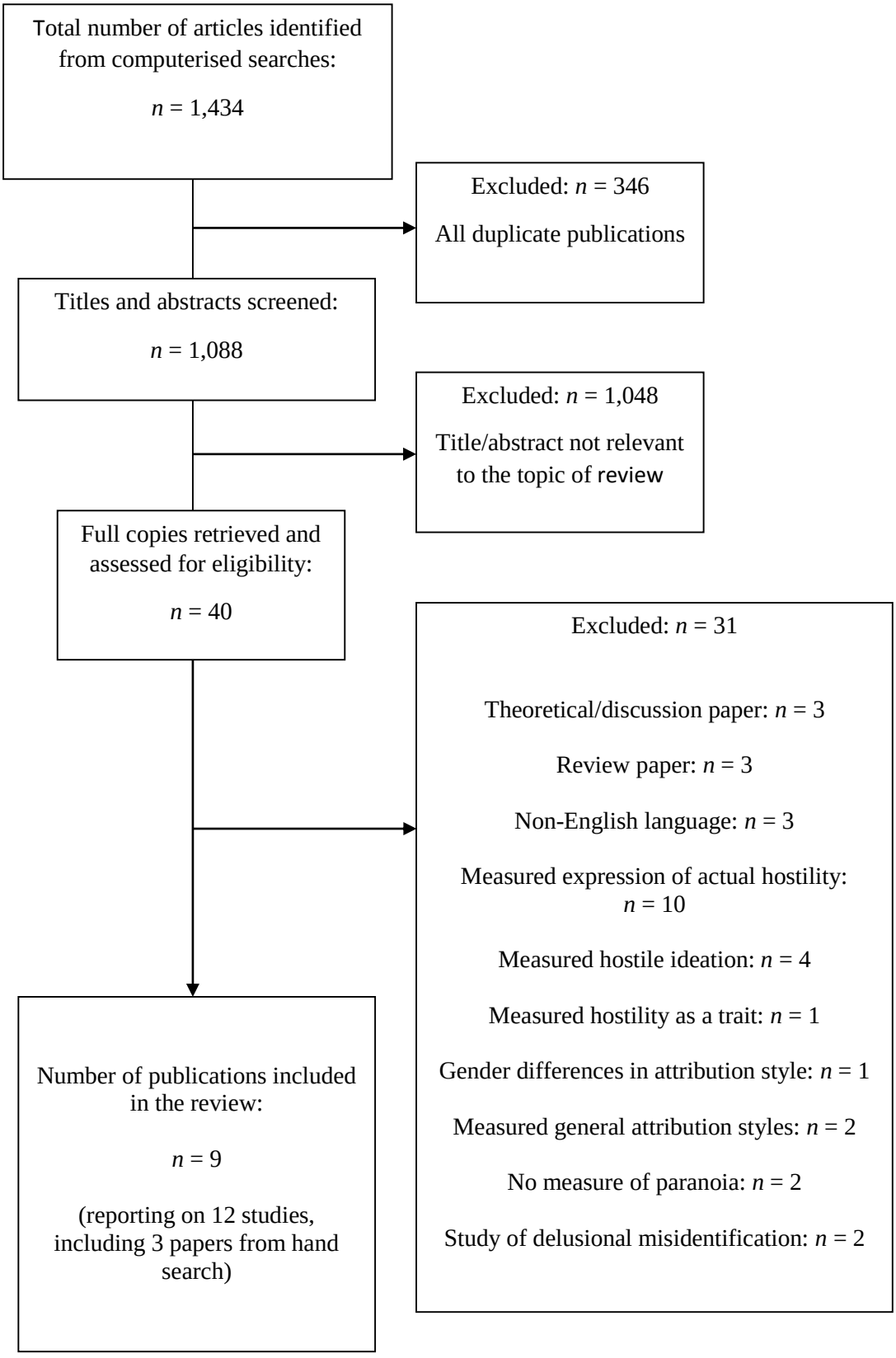
Demographics. There were 1,541 participants in the 12 included studies. Based on data from 11 studies, the mean age of the participants was 28.6 years. No data were provided on the age of 36 participants for one study (study 10). There was an observed divide in means of age across the 12 studies. Broadly, the studies featured a mean of approximately 20 years or 40 years.

Based on the data of 10 studies, 54% (n = 753) of participants were male and 46% (*n* = 651) were female. No data regarding gender were provided for 137

participants in two studies (studies 2 and 8). All studies but one (study 11) included mixed gender samples.

One study used a clinical sample only, six used a non-clinical sample and five studies used a mixed sample of clinical and non-clinical participants. Consequently, the results show a subtle difference in emphasis on the relationship between paranoia and HAB. Some divided a healthy sample via its characteristics, assessing level of non-clinical paranoia to create a high vs. low paranoia comparison. Other studies took pre-defined samples of clinical/non-clinical groups. Some studies focused on HAB in psychosis as a diagnostic category to be compared against non-psychotic individuals, whilst other studies presented paranoia as a continuum of experience (existing in healthy samples too). The studies can also be divided by their primary focus, with nine studies broadly investigating social perception in relation to paranoia, and three studies investigating the mechanisms of perceived racism in African-American men. Those studies which investigated the thinking styles of African-Americans in the context of racism provided evidence for the distinct qualities of interpersonal paranoia as separate from a general state of cultural mistrust.

Figure 1
Flowchart of study selection



Interpretation of results

Table 2 presents the selected studies and their support for the key research questions. Appendix A presents a more detailed summary of the key findings. The research questions were reviewed as follows:

1. Is there an association between HAB and paranoia? There was a significant association between HAB and paranoia in all twelve of the studies. This basic relationship appeared to exist consistently across different measures and in different samples (clinical and non-clinical) and contexts. For example, a simple illustration of the basic association can be found in study 4 which used a large non-clinical sample to draw broad correlations between paranoia and HAB, finding a medium association. This study also found AIHQ hostility bias for ambiguous situations to be a significant individual predictor of paranoia in a regression model. When a non-clinical sample was divided into high and low paranoia and comparisons were drawn between the two groups, persons with high nonclinical paranoia reported higher levels of perceived hostility, $d = 1.00$, illustrating an alternative method for evidencing the research question. A theme across the chosen studies was for ambiguous scenarios to expose a HAB in more paranoid individuals (rather than intentional or accidental contexts), with ambiguity used in studies 1-10. Study 8 accounted for the association between HAB and paranoia as part of a wider relationship, describing HAB as a moderator of Ideas of Reference (IOR) and paranoia in an at-risk of psychosis schizotypal group. All 12 chosen studies were in support of the main association between paranoia and HAB, so methods of testing the relationship were discussed through an explanation of the evidence for variants on this via the secondary research questions:

2. Is there evidence for an increased association between HAB and

paranoia in people who are at risk of psychosis versus healthy populations? Two studies directly investigated the relationship between paranoia and HAB in a high-risk psychosis group. Study 1 compared an ultra high-risk (UHR) schizophrenia group against a first episode schizophrenia group and healthy controls. The first episode group recorded a large association between paranoia and HAB. In the UHR group a medium association was found between paranoia and HAB. This was not found within the control group. Hence, the authors concluded that in the early prodromal stages of psychosis individuals show signs of a HAB associated with paranoid symptoms, which is a part of the course of psychosis onset. The presence of a HAB linked to paranoid thinking was reported as an association exclusive to psychotic experiences.

Study 8 classified a healthy population as either schizotypal personality or control participants, creating a divide justified on the understanding that schizotypal personalities are at an elevated risk of psychosis (Lenzenweger, 2006; Meehl, 1962, 1990). The relationship between HAB and paranoia was only present in the schizotypal group.

3. Is the association between HAB and paranoia stronger for people with psychosis than for non-psychotic individuals? For ease of reference, the term "psychosis" will be used when referencing studies discussing schizophrenia or other psychosis-related diagnoses where more appropriate to the aims of this review (Bentall, 2004). Some studies conceptualise HAB as part of a wider thinking style associated with psychosis. Four of the studies compared individuals with psychosis against healthy groups. Study 1 found healthy controls to have no association between HAB and paranoia, where it was present for both high-risk for psychosis and first-episode psychosis groups. Study 9 found that depressed and control groups

did not differ on perceived negative intention, with the psychosis group scoring significantly higher than the depressed psychiatric controls, indicating that this was a bias particularly associated with psychosis. Study 7 elaborated on this finding further, with the observation that paranoid participants produced more responses featuring negative intent of others than healthy participants, whilst healthy controls produced more responses featuring positive intent than those in the paranoid group. This was explained as an availability for negative explanations in paranoia accompanied by a state of confusion whereby ambiguity cannot be resolved.

The comparison of psychosis and healthy groups allowed a broad comparison, though the use of paranoid participants in study 7 raises the question of whether it was the diagnosis of psychosis or the paranoid features specifically that were responsible for the increased HAB.

4. Is there a significant difference in the association between HAB and paranoia for psychotic samples with and without paranoid features? When clinical controls were utilised, the relationship between HAB and paranoia was clearer. Three studies supported the theory that paranoid features specifically increased HAB within psychosis. Study 3 identified that among psychosis participants paranoid features were a predictor for identifying HAB, rather than the broad diagnosis itself. A schizophrenia group with persecutory delusions showed a significantly higher HAB than a group of people who had schizophrenia without persecutory delusions and a group of non-clinical controls. In this case there was no significant impact on HAB based on having schizophrenia, but instead HAB was dependent on having paranoid features. Hence, the importance of exploring clinical groups with and without paranoia (see below). In study 9 a deluded group scored higher means on intentionalising hostility than those in the non-deluded group,

hallucinating group and non-hallucinating group, however the authors did not report the significance of these differences so they cannot be taken as evidence. Study 12 differentiated between different sub-types of paranoia amongst a group of psychiatric patients. Pathological and confluent paranoia (pathological paranoia combined with cultural mistrust) groups scored significantly higher in HAB than did participants with cultural paranoia (a measure of cultural mistrust and perceived racial discrimination on the part of African-American males) or no paranoid symptoms at all. From this it would appear that paranoia (distinct from cultural mistrust) is a key predictor of HAB in itself.

5. Is there a significant difference in the association between HAB and paranoia for healthy samples with or without paranoid features? To demonstrate the relationship between paranoia and HAB as a continuum, it should also be observable in some healthy populations without psychotic diagnoses. Three studies (4, 5 and 11) evidenced the general relationship between paranoia and HAB across non-clinical samples. The remaining three non-clinical studies addressed this research question more specifically, by dividing their participants into high and low paranoia groups for direct comparison. High-paranoia non-clinical participants were significantly more likely to perceive negative hostile intent in ambiguous situations (studies 2, 6 and 10). A high paranoia non-clinical group were as successful as low paranoia non-clinical group at identifying clear intentions, and were actually more accurate at correctly identifying hostile intention, but when intentions were ambiguous they made more errors (study 10). This indicated that in non-clinical populations those who are more paranoid can make accurate judgments of hostile social cues, but when faced with ambiguity they show a tendency/availability for negative explanations of others' behaviour. In study 6 the high paranoia group were

more likely to demonstrate a general state of distrust, feeling under scrutiny and believing that they were being influenced during tasks in response to neutral or ambiguous experimenter behaviour. The studies addressing this research question support a relationship between paranoia and HAB, and it is possible that this association was not detected when comparing broad groups of people with psychosis against healthy controls due to confounding variables.

Table 2

Studies investigating evidence for a hostile attribution bias in paranoia

	Author(s) & Date	Country	Sample	Age (years)	Gender	Methodology	Measure of Paranoia	Measure of Hostile Attribution	Research Question				
									1	2	3	4	5
1	An et al. (2010)	South Korea	39 normal controls 24 ultra high risk (UHR) for psychosis 20 young first-episode schizophrenia patients.	Normal controls: M 19.7 (SD = 3.5) UHR: M 20 (SD = 3.9) First episode: M 21.30 (SD = 5)	38 m/45 f	Clinical interviews administered by single psychiatrist to assess psychopathology. Participants then completed a questionnaire pack.	Paranoia Scale (Fenigstein & Vanable, 1992)	Ambiguous Intentions Hostility Questionnaire (AIHQ; Combs et al., 2007b)	+	+	+	n/a	n/a
2	Combs et al. (2013)	USA	Undergraduate sample of 26 high non-clinical and 31 low non-clinical (assessed by Paranoia Scale, Fenigstein & Vanable, 1992).	High paranoia: M 22.1 (SD = 4.6) Low paranoia: M 22.5 (SD = 5.8)	High paranoia: 20% m/80% f Low paranoia: 10% m/90% f	Participants completed measures in a single 2-hour session.	Paranoia/ Suspiciousness Questionnaire (PSQ; Rawlings & Freeman, 1996) Paranoia Scale (Fenigstein & Vanable, 1992)	Ambiguous Intentions Hostility Questionnaire (AIHQ; Combs et al., 2007b)	+	n/a	n/a	n/a	+

	Author(s) & Date	Country	Sample	Age (years)	Gender	Methodology	Measure of Paranoia	Measure of Hostile Attribution	Research Question				
									1	2	3	4	5
3	Combs et al. (2009)	USA	32 persons with persecutory delusions 28 persons without persecutory delusions (psychiatric controls) 50 healthy participants.	Clinical: M 41.8 (SD = 9.5) Psychiatric controls: M 43 (SD = 10.9) Controls: M 22.1 (SD = 4.8)	Clinical: 17 m/15 f Psychiatric controls: 9 m/19 f Controls: 9 m/41 f	Participants were administered clinical measures then completed self-report measures (1.5-2.5 hours).	Paranoia Scale (Fenigstein & Vanable, 1992) Personality Assessment Inventory persecutory ideation subscale (PAI-P; Morey 1991)	Ambiguous Intentions Hostility Questionnaire (AIHQ; Combs et al., 2007b)	+	n/a	n/a	+	n/a
4	Combs et al. (2007b)	USA	322 college students.	M 19.55 years (SD = 1.23)	166 m/156 f	Participants completed a packet of questionnaires (2 hours).	Paranoia Scale (Fenigstein & Vanable, 1992) Paranoia/Suspiciousness Questionnaire (PSQ; Rawlings & Freeman, 1996)	Ambiguous Intentions Hostility Questionnaire (AIHQ; Combs et al., 2007b)	+	n/a	n/a	n/a	+

	Author(s) & Date	Country	Sample	Age (years)	Gender	Methodology	Measure of Paranoia	Measure of Hostile Attribution	Research Question				
									1	2	3	4	5
5	Combs et al. (2006)	USA	128 African American college students (37 private, 50 historically African American and 41 state funded).	M 20.5 (SD = 3)	32 m/96 f	Participants completed questionnaires and study measures (1.5hrs).	Paranoia Scale (Fenigstein & Vanable, 1992) Personality Assessment Inventory persecutory ideation subscale (PAI-P; Morey 1991)	Ambiguous Intentions Hostility Questionnaire (AIHQ; Combs et al., 2007b)	+	n/a	n/a	n/a	+
6	Combs & Penn (2004)	USA	60 undergraduates (classified as either high or low paranoia via Paranoia Scale, Fenisgtein & Vanable, 1992)	High paranoia: M 20.3 (SD = 3.4) Low paranoia: M 21.2 (SD = 2.3)	19 m/41 f	Participants completed a series of measures with interviewer.	Paranoia Scale (Fenigstein & Vanable, 1992)	In vivo social perception task (participants rated intentions of researcher during interview).	+	n/a	n/a	n/a	+

	Author(s) & Date	Country	Sample	Age (years)	Gender	Methodology	Measure of Paranoia	Measure of Hostile Attribution	Research Question				
									1	2	3	4	5
7	Huddy et al. (2012)	UK	21 paranoid participants 21 healthy controls	Paranoid: M 41 (SD = 10.5) Control: M 40.3 (SD = 9.4)	37 m/5 f	Measures and mental simulation task completed with researcher.	The Psychotic Symptom Rating Scale delusions subscale (Haddock et al., 1999)	Mental Simulation Task (MST; Huddy et al., 2012)	+	n/a	+	n/a	n/a

	Author(s) & Date	Country	Sample	Age (years)	Gender	Methodology	Measure of Paranoia	Measure of Hostile Attribution	Research Question				
									1	2	3	4	5
8	Morrison & Cohen (2014)	USA	80 undergraduates (classified as either 'schizotypy' or 'control' via Schizotypal Personality Questionnaire-Brief Revised, Cohen, Mathews, Najolia & Brown, 2010): 44 individuals with psychometrically defined schizotypy 36 controls	Schizotypy: M 19.45 (SD = 1.58) Control: M 19.97 (SD = 6.27)	Shizotypy: 22.73% m/f 77.27% Control: 30.56% m/ 69.44% f	Participants completed computer-based measures in laboratory setting.	Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983)	Ambiguous Intentions Hostility Questionnaire (AIHQ; Combs et al., 2007b): "Hostility index" scored for the five ambiguous scenarios only (as indicated by Combs et al, 2007b)	+	+	n/a	n/a	n/a

	Author(s) & Date	Country	Sample	Age (years)	Gender	Methodology	Measure of Paranoia	Measure of Hostile Attribution	Research Question				
									1	2	3	4	5
9	Peters et al. (2014)	UK	265 individuals with psychosis 34 with depression 33 healthy controls	Psychosis: M 37 (SD = 10.6) Depression: M 44.9 (SD = 10.2) Control: 32.7 (SD = 10.7)	182 m/150 f	Participants completed set of measures.	Psychotic Symptoms Ratings Scales (PSYRATS; Haddock et al., 1999)	Ambiguous Intentions Hostility Questionnaire (AIHQ; Combs et al., 2007b): Accidental and ambiguous scenarios only	+	n/a	+	n.s	n/a
10	Turkat et al. (1990)	UK	39 undergraduates (classified as 18 paranoid personalities and 18 normal controls via Symptom Checklist-90 Revised; Paranoid Ideation (PI) subscale (SCL 90R; Derogatis, 1978)	No data available	6 m/30 f	Participants completed measures, then viewed 16 video vignettes about social exchanges and attempted to identify the intentions of the characters.	Symptom Checklist-90 Revised; Paranoid Ideation (PI) subscale (SCL 90R; Derogatis, 1978)	Vignette Task - perception of intentions (from Dodge, 1986): 16 Vignettes showing hostile, accidental, prosocial or ambiguous intentions. P's rated using choices according to these four intention styles.	+	n/a	n/a	n/a	+

	Author(s) & Date	Country	Sample	Age (years)	Gender	Methodology	Measure of Paranoia	Measure of Hostile Attribution	Research Question				
									1	2	3	4	5
11	Whaley (2004)	USA	114 African American men	M 38.09 (SD = 10.34)	114 m	Measures administered by clinical interviewers.	Paranoia Scale (Fenigstein & Vanable, 1992)	Perceived Hostility of Others (PHO) scale from the Psychiatric Epidemiology Research Interview (PERI; Dohrenwend et al., 1980)	+	n/a	n/a	n/a	+

	Author(s) & Date	Country	Sample	Age (years)	Gender	Methodology	Measure of Paranoia	Measure of Hostile Attribution	Research Question				
									1	2	3	4	5
12	Whaley (2002)	USA	177 psychiatric patients (classified via Paranoia Scale, Fenigstein & Vanable, 1992; Cultural Mistrust Inventory, Terrell & Terrell, 1981): 48 non-paranoid 45 pathological paranoia 40 cultural paranoia 42 confluent paranoia	M 39.16 (SD = 9.32)	124 m/53 f	Clinical interview and measures completed.	Paranoia Scale (Fenigstein & Vanable, 1992)	Perceived Hostility of Others (PHO) scale from the Psychiatric Epidemiology Research Interview (PERI; Dohrenwend et al., 1980)	+	n/a	n/a	+	n/a

Key: (+) = significant result in support of research question, (n.s.) = non-significant result in support of research question, (n/a) = not assessed

Quality Assessment

The selected studies generally met a high standard in the quality assessment (Table 3), with 100% reaching high quality on criteria 1, 2 and 5, and 92% of studies meeting high quality on criteria 3 and 4. Criteria 6 was the lowest scoring criteria, with 75% of studies meeting a high quality standard. These results allowed for a good level of confidence in using the studies to answer the stated research questions.

Study 6 was deemed medium quality in its use of an outcome measure which was less clearly defined. Study 10 failed to meet criteria on two dimensions, with a poor score for failing to report a description of the sample demographics and a failure to include confounding variables in its analyses. Studies 2 and 12 were also poorly rated for not attempting to control for confounding variables.

The current literature for an association between HAB and paranoia was promising in its quality. The majority of research into this area is of a good standard, though the available studies are few in number and use varying methods which are difficult to draw comparisons between. The AIHQ is a model of HAB measurement which has been established to meet validity and reliability criteria by the research team responsible for its creation. This is the closest to a standardised measure available for others to incorporate HAB into their research (see discussion for further detail on methods for generating HAB and paranoia). Although the majority of the studies made a good effort to control for confounding variables, there were several issues which were predicted to have been of relevance, outlined in the confounding variables section of the discussion.

Table 3

Quality assessment of selected studies

Study No./ Author(s)	1 Study design evident and appropriate?	2 Method of subject/comparison group selection OR source of information/input variables described and appropriate?	3 Subject (and comparison group, if applicable) characteristics sufficiently described?	4 Outcome and (if applicable) exposure measure(s) well defined and robust to measurement/ misclassification bias? Means of assessment reported?	5 Analytic methods described/ justified and appropriate?	6 Controlled for confounding?
1. An et al. (2010)	++	++	++	++	++	++
2. Combs (2013)	++	++	++	++	++	0
3. Combs et al. (2009)	++	++	++	++	++	++
4. Combs et al. (2007b)	++	++	++	++	++	++
5. Combs et al. (2006)	++	++	++	++	++	++
6. Combs & Penn (2004)	++	++	++	+	++	++

Study No./ Author(s)	1 Study design evident and appropriate?	2 Method of subject/comparison group selection OR source of information/input variables described and appropriate?	3 Subject (and comparison group, if applicable) characteristics sufficiently described?	4 Outcome and (if applicable) exposure measure(s) well defined and robust to measurement/ misclassification bias? Means of assessment reported?	5 Analytic methods described/ justified and appropriate?	6 Controlled for confounding?
7. Huddy et al. (2012)	++	++	++	++	++	++
8. Morrison & Cohen (2014)	++	++	++	++	++	++
9. Peters et al. (2014)	++	++	++	++	++	++
10. Turkat et al. (1990)	++	++	0	++	++	0
11. Whaley (2004)	++	++	++	++	++	++
12. Whaley (2002)	++	++	++	++	++	0
% high quality	100	100	92	92	100	75

Key: (++) = high quality, (+) = medium quality, (0) = poor quality

Discussion

Review of research questions

Paranoia and HAB. The primary research question was supported to some degree by all 12 studies, providing evidence for an association between HAB and paranoia. The additional research questions explored this further, taking into account how the two variables of interest changed in their relationship across different samples, to understand if this was a continuum-based association.

High-risk for psychosis. As referenced, schizotypal personalities are thought to represent a high-risk group for psychosis. Study 8 found the association between psychosis and HAB within schizotypal personalities but not controls. In further detail, study 1 found a significant relationship between paranoia and HAB only in a psychosis or high-risk sample, and not in a non-clinical sample. This raised further questions as to how and why a period of high-risk for psychosis could transition individuals from expressing no HAB to developing one. See section on future research below.

Psychosis vs. non-clinical controls. Study 1 found an association between HAB and paranoia within a psychosis group and a high-risk psychosis group, but not within a non-clinical control group. Studies 7 and 9 used different methods: These two studies compared means for psychosis vs control groups to highlight a significantly increased rate of perceived hostility in the psychosis group. This difference evidenced a stronger association between paranoia and HAB in clinical samples, but not did not account for whether the association between paranoia and HAB still existed in non-clinical populations at a lower level. The evidence for this specific question (is a HAB higher for or even exclusive to people with psychosis?) must be reviewed in the context of confounding variables due to such a broad

comparison of clinical vs non-clinical population, which is likely to overlook unmeasured differences between the two groups (see confounding variables section).

HAB in psychosis with/without paranoid features. In further detail, studies which utilised psychosis control groups have evidenced that HAB is highest in those specifically experiencing paranoid features. This implied that HAB is related specifically to the paranoid thinking in psychosis groups, rather than to psychosis as a whole. Again, confounding variables should be considered within this relationship, in particular to acknowledge the differences between sub-types of psychosis such as specific symptoms associated or treatments indicated. Problems could arise when choosing a sample based on diagnosis (e.g. paranoid schizophrenia), because actual levels of paranoia are not measured and these would vary naturally across time and within such diagnostic groups, meaning some may not be currently paranoid at the time of testing. Studies which broadly contrast psychosis and control groups are likely to naturally include higher levels of paranoia as a whole but fail to attribute differences in HAB to this factor. One way to account for this is to ensure a paranoia measure is employed to all participants, rather than making the assumption that levels of paranoia are currently present and equal across that group. Study 1 accounted for level of paranoia in analyses, so in this case it can be acknowledged that HAB and psychosis were not associated because of increased paranoia alone.

HAB and paranoia in non-clinical populations. Studies purely investigating non-clinical groups have demonstrated that HAB is increased in those who can be deemed high in non-clinical paranoia versus low non-clinical paranoia. Those studies which compared clinical and non-clinical samples may have overlooked that the association between paranoia and HAB can exist in non-clinical samples too. The literature appears to support an increased HAB in psychosis and the

effect of healthy versus control groups cannot be overlooked. We can only hypothesise that there could be higher paranoia levels in these clinical groups. It was clear in all 12 studies that when paranoia levels were higher there was a stronger association to HAB. More evidence is needed from within clinical groups to investigate the possibility of finding another unknown factor responsible for HAB being generally increased in psychosis. Without more research into the differences between psychosis groups with and without paranoid features we cannot fully account for the increased HAB in psychosis versus control groups. Overall, though, there is a strong case for the role of paranoia as a variable associated with HAB in all individuals.

Additional observations. In addition to answering the specific research questions, further detail regarding the nature of the association between HAB and paranoia was summarised. As implied in the literature, ambiguous situations were found to be most useful in eliciting a HAB. Increased paranoia does not cloud one's judgment and create hostility in response to positive interactions which are clearly defined, e.g. thinking someone means you harm when they have made positive gestures, but rather it leads to difficulty when making sense of unclear scenarios. When the intentions of others are not explicit, appearing ambiguous and undefined, paranoid ideation is more likely to lead to a negative and personalising explanation. Study 7's methodology provided some insight as to why this happens: paranoid individuals completing mental simulation tasks showed an availability for negative explanations of others' intentions, as well as finding it more difficult to draw on positive explanations for them.

Confounding variables. The relationships of interest were likely to be subject to confounding variables because broad psychosis groups were recruited in

some studies. The research questions which were most likely to have been affected are question 2 (psychosis vs non-clinical) and question 3 (high-risk for psychosis vs non-clinical) because they used psychiatric groups and compared them against non-psychiatric groups. People classified as psychotic will be subject to multiple confounding variables due to non-genetic risk factors associated with this group such as ethnic minority status (Cantor-Graae & Selten, 2005), childhood trauma (Read, van Os, Morrison, Ross, 2005) and substance use e.g. cannabis use (Henquet, Murray, Linszen & van Os, 2005). We should also consider the effects of receiving treatments such as psychiatric medication and the negative experiences associated with being a mental health patient. Psychosis is associated with lower health-related quality of life across multiple objective physical domains too (Foldemo et al., 2014). Being formally classified as having a mental health problem such as psychosis might affect HAB via the experience of being labelled, stigmatised and legally obliged to follow care plans, which is likely to build on the perception of others treating you differently. Beliefs of being singled out by others, particularly where others are in a dominant social position, might contribute to the belief that others intend you harm (i.e. a HAB).

The association between HAB and high-risk for psychosis may represent the start of a process similar to psychosis, or it may alternatively be a distinct phase in itself. It is less clear to distinguish between high-risk for psychosis and non-clinical groups because of the understanding that high-risk groups could potentially transition into having a clinical mental health problem. There is also the further complication of those who experience mild psychotic symptoms with no formal psychosis, and those who enter a prodromal period which bridges a future more developed psychosis. Although many people experience psychotic symptoms at a non-clinical

level, 84% of these will go on to experience no further psychotic symptoms (Hanssen, Bak, Bijl, Vollebergh & van Os, 2005). When psychotic experiences do occur they can be transient. There are confounding factors to consider for those who do not reach criteria for formal diagnosis: Risk factors affecting non-clinical psychosis proneness include developmental stage, social adversity (as a child or adult), psychoactive drug use, male gender and migrant status (van Os, Linscott, Myin-Germeys, Delespaul & Krabbendam, 2009). However, some confounders will have less impact on a high-risk group, such as formal psychiatric treatments e.g. medication and institutionalisation. Any comparison between at-risk/prodromal psychosis and non-clinical groups should account for the difficulties with grouping such populations with confidence.

Implications for clinical practice

Although the direction of causality is not yet supported, the evidence for the primary research question suggests that attending to a person's attribution style and their endorsement of a HAB could predict or evidence an emerging tendency towards paranoid thinking. Conversely, individuals evidencing paranoid thinking might be expected to appraise interactions with an underlying HAB, allowing us to predict how thinking and behaviour will be shaped when persecutory delusions are formed.

HAB as a measure of change. The AIHQ has shown sensitivity to changes following social cognition treatment programmes in schizophrenia (Penn et al., 2005), and may be useful in clinical settings both as an assessment tool and as an outcome measure, although in this study we did not examine sensitivity to change. While longer measures such as the AIHQ may be inappropriate for use in all routine clinical settings, there may be scope for exploring the hostile attribution thinking style in therapeutic work with paranoia.

HAB as a mechanism of change. If it is indeed a specific thinking style significantly associated with paranoia, then people with persecutory delusions could benefit from interventions which target hostile attributions. An et al. (2010) recommended that a session of therapeutic work should focus on hostile attribution style with people presenting in the early stages of psychosis, to prevent later distress in social situations as an episode evolves, or in anticipation of later episodes. Social cognitions can be a focus of psychosocial interventions when using standardised measures (Green et al., 2004). Social cognitive interventions such as training programmes can consequently lead to improvements in social cognitive measures (Horan, Kern, Green & Penn, 2009) and adaptive functioning (Roncone et al., 2004), including in inpatient populations (Penn et al., 2005; Combs et al., 2007a). However, client goals may be centred around broader social improvements and cognitive targets may be inappropriate for some people, or unachievable due to a requirement that such treatments are consistently implemented.

Psychoeducation, behavioural changes and coping strategies. There may be benefits to simply offering clients psychoeducation regarding their social cognitions, such as learning how and when a HAB is triggered. Benefits for an awareness of perceived hostility might be the general improvement of interpersonal functioning e.g. leaving the house more often and increasing social activities. A specific target for mental health professionals may be the reduction of aggressive responses to challenging interactions with others. Consequently, services could prioritise violence reduction for individuals whose persecutory delusions can put them at risk of harm from others or others at risk of harm from them.

The relationship between HAB and paranoia was evidenced in the literature, but beyond this causality cannot be commented on. We can hypothesise that a HAB,

when occurring with paranoia, is likely to reinforce negative beliefs about the intentions of others and reduce opportunities to disprove persecutory beliefs. In schizophrenia populations this has been linked to the subjective expectation for negative or threatening stimuli based on an objective history of negative emotional experiences (Rado, 1953; Walker et al., 1993). Consequently, children at high-risk of psychosis (through a family history) were found to exhibit higher distress in response to previous negative life events over time, perhaps due to less adaptive appraisals and coping mechanisms (Cullen, Fisher, Roberts, Pariante & Laurens, 2014). In relation to paranoia, this may contribute to the tendency to perceive hostility in negative ambiguous scenarios where contextual cues are absent, with past negative experiences drawn upon more easily (Huddy et al., 2012) and with conviction, whilst current coping strategies remain underdeveloped. Awareness of such a cycle could promote behavioural change and increase opportunities for positive experiences in this clinical population.

Limitations

Sample recruitment. Half of the studies selected used control groups to evidence differences between clinical and non-clinical populations. The five papers using only a non-clinical sample could be criticised for convenience sampling e.g. undergraduates, but they arguably made efforts to distinguish between high and low ends of the paranoia continuum within the sample of choice, where the relationship between paranoia and HAB was still observable and significant. There is a need for more representative non-clinical samples in paranoia research. Similarly, in the Whaley (2002) study that used a clinical group only, there was a clear distinction made between sub-types of paranoia each with their own relationships to HAB. As a comment on all clinical populations represented in the 12 studies, it may be possible

that those who are the most paranoid would be unlikely to take part in research (Freeman, 2007). Consequently, we might hypothesise that the relationship between paranoia and HAB would be even more evident with those who are experiencing the top end of paranoia.

Sample classification. Methods for classification of samples differed across the literature. Three studies look at associations across a single group (studies 4, 5 and 11). Four studies took the approach of comparing pre-determined patient groups with 'healthy' controls (studies 1, 3, 7 and 9). Five studies characterised a sample by classifying participants on entry (studies 2, 6, 8, 10 and 12), which could include divisions of high or low paranoia, paranoia yes or no, or even based on paranoia type. This makes comparisons across findings more complex, hence an attempt in this review to answer a series of narrowing research questions, distinguishing where the relationship between HAB and paranoia existed and did not. The most useful classification approach for this review was the division into groups of high and low paranoia on entry to the study (as in studies 2 and 6, with non-clinical samples), because paranoia levels were then designated for that specific time. This approach also supported the theoretical continuum of paranoia, advocated in the literature. Paranoia is not exclusive to psychosis, and exists to some extent in all individuals. It could also be variable in its effect on an individual, whereby a person classified as clinically paranoid might not currently endorse persecutory ideas in the same way across time. This is important for the current review topic because it reduces the ability to claim that HAB is associated with paranoia and not another feature of that diagnostic group.

Sample demographics. The broad division of two age means (20 years and 40 years) across the twelve studies could be said to have an impact on the

generalisability of findings (for example, where the focus on a younger age range would be largely attributable to the routine recruitment of undergraduates). Clinically, this age mean would be more likely to represent an at risk or first episode psychosis population. Gender was well matched across studies, although study 11 featured a male-only sample. The paranoid subtype of schizophrenia has been found to be more common in females during chronic stages of the illness, though no such differences exist in first-episode cases (Zhang et al., 2012).

Generative vs. endorsement. Those studies using generative methodologies attempted to engage participants in relevant imagined scenarios to activate and expose paranoid thinking. Considering the suspiciousness known to characterise social interactions in paranoia, only one study (study 6) gathered data on participants' perceptions of the researcher, using this as a 'live' assessment which may have been more meaningful to participants than imagined scenarios, possibly increasing ecological validity. High sub-clinical paranoia participants in this study reported feeling that their performance was being analysed and influenced, and they consequently perceived the researcher as less trustworthy, reducing external validity. Such information was not gathered in other tasks, where it may well have been useful. The effect of the researcher/participant relationship was expected to have had a greater effect in study 6 when the participant was directed to bring attention to the relationship between themselves and the research assistant. This was an intentionally provocative approach which could have tapped into a more anxiety provoking and realistic sense of paranoia. It is worth noting that the tasks themselves may have activated interpersonal anxieties during participation for some people, and ideally measures would have been completed in a private setting. There was also no account in the final 12 studies for the stress of putting participants through an ambiguous

assessment process where they would not have been fully briefed until the end of participation. Participants would have tolerated, to some degree, the potential of being negatively assessed by a researcher who could not provide reassurance. Under such conditions it might have been increasingly difficult for more paranoid participants to concentrate on the tasks required of them.

Cross-sectional vs prospective. All 12 selected studies utilised a cross-sectional methodology, with single-session participation. The evidence for the research question indicated a strong association between a HAB and paranoia, but there is no evidence to allow us to predict that people who are 'healthy' with a higher than average HAB will go on to develop paranoia or psychosis. Attribution biases have been shown to have an impact on how we model treatment course in paranoia, for example the JTC bias has been found to moderate the effects of treatment on symptomatology (Menon, Mizrahi & Kapur, 2008). It is also misleading to suggest that groups are stable over time in their presentation of paranoia, as discussed under sample recruitment and confounding variables.

Difficulties with conceptualising HAB. The high number of studies yielded in the initial search was expected given the common usage of "hostility" and "attribution" in the literature. The conceptualisation of HAB was a difficult process given that the term "hostility" was often referred to in the literature in reference to acting or behaving in an overtly hostile manner e.g. the tendency to act violently. There is, in psychosis research, a significant emphasis on predicting violence. However, for the purpose of this review it was important to establish this earlier theoretical concept of a thinking style that may well lead to such actions when people are paranoid; a tendency to perceive hostility when it is not there, rather than a tendency to act with hostility. This was distinct from other studied phenomena such

as the tendency to orient towards threat or be more attentive towards others' hostile behaviour. Emotion perception studies, specifically the recognition of anger, were another area which did not qualify under the criteria for this review.

Research into attribution styles also linked to a well established but irrelevant literature base where internal vs. external attribution has been emphasised, rather than the specific nature of said attribution process.

Small literature base. The limited measures available for studying HAB can account for the relatively small amount of literature available on this topic. The described difficulties with consistently conceptualising HAB could have led to an over-sensitivity in the exclusion criteria, meaning that some relevant studies were not identified. This is a growing area of interest, with the AIHQ emerging as the most comprehensive measure in its differentiation between intentional, accidental and ambiguous intentions across both close and impersonal exchanges with others. This subtle distinction between implied intentions across normal everyday scenarios is theoretically more informed than the narrower approach of the PHO, which asked brief, specific questions and did not elicit any narrative. The vignette task of study 10 tapped into the different implied intentions but provided participants with a forced choice selection. Study 6 used the least structured assessment of HAB, with general enquiries about participants' perception of the researcher. Overall this review is the first to summarise the limited attempts that have been made to measure HAB and link it in its association to paranoia.

Future research

Future research into the evidence for a HAB in paranoia should capitalise on the validity of the AIHQ as a task/measure for appropriately eliciting prospective interpersonal ambiguity around negative experiences and comparing it to both clear

intent and accidental intent. In correlating the AIHQ with paranoia, the measure of paranoia itself should be applied to all participants in a sample, to distinguish between actual current delusional ideation at the time of testing. Crucially, it is unclear exactly why prodromal and currently psychotic states of mind increase the association between HAB and paranoia, giving the impression in some research of a HAB existing only in clinical paranoia, when non-clinical samples show the association to exist and vary according to levels of non-clinical paranoia. There is limited published literature on social cognitive performance in the high-risk for psychosis population (Thompson, Bartholomeusz & Yung, 2011), indicating a need for more clarity. Future research should clarify the role of HAB in the course of psychosis. The literature infers a relationship of increasing HAB from high-risk to early episode psychosis, perhaps via a prodromal transition where such attributions are increased.

We recommend that further interest should be invested in combining the sample types utilised in the chosen studies. An ideal methodology at this stage would compare healthy controls (classified as high and low non-clinical paranoia on entry to research) and a clinical sample including psychosis patients classified as either experiencing persecutory delusions or not on entry to research. Such a comparison could bring clarity to the research questions presented within this review of the literature. Samples should ideally attempt to include a broad age range and equal gender ratio across all participants. There is limited evidence of this association in non-clinical samples recruited from the general population and not convenience sampled from undergraduate groups. In clinical samples there is a strong case for differentiating not only between the types of positive symptoms currently experienced (e.g. paranoia yes or no), but also between different types of paranoia

currently experienced (as in study 12 where sub-types were presented e.g. confluent paranoia, cultural paranoia and pathological paranoia). Future research could remove the additional confounding effect of participants' relationship to the researcher, for example by allowing participants to complete measures alone and without observation.

The AIHQ is the only HAB-specific tool at this point in time. It may be justified to introduce ideas from similar research, for example to expand upon the use of scenarios and increase ecological validity through more meaningful engagement with material. An awareness of a present relationship under testing conditions may be unfeasible and too distressing for some. However, in terms of the mental simulation of future episodic events, Huddy et al. (2012) discussed the difference between reading a statement and needing to elaborate on a scenario, with the latter being far less common in research and yet eliciting greater engagement with ambiguous threatening material in participants. The reading and writing format of the AIHQ may limit its ability to feel real to participants, as it is both an objective measure (including self-rated endorsement responses) and a scenario task (qualitative responses rated by researchers) combined. Where resources permit, virtual reality studies can be used to identify the causes of paranoid thinking in the general population (Freeman et al., 2008) as they are helpful in creating neutral and consistent settings from which to measure attribution of events.

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Part 2: Empirical Paper

Using Working Models of Attachment to Understand Paranoia in the General Population

Abstract

Aims: The relationship between attachment style and paranoia is not fully understood. It is believed that attachment models are activated when an individual perceives threat. We explored associations between attachment style, paranoia and perceptions of hostility and blame in response to negative interpersonal scenarios, with the aim of exploring the relationship between these variables.

Participants: 221 non-clinical participants aged 19-65 years from the general population recruited via a rolling monetary incentive online.

Method: Participants completed a 30-50 minute single-session online. This study used a correlational design with the variables of interest being one validated measure of attachment styles (ASQ; Feeney, Noller, & Hanrahan, 1994), one of psychotic-like experiences (Green et al. Paranoid Thoughts Scales, 2008a), and one scenario-based measure of hostile intentions (AIHQ; Combs, Penn, Wicher & Waldheter, 2007b). Demographics and a measure of mood (HADS; Zigmond & Snatih, 1983) were also collected.

Results: The predicted associations between attachment style and paranoia were supported. Ambiguous scenarios on the AIHQ were associated with paranoia, but accidental and intentional contexts were not. The previously evidenced role of hostility bias was no longer a significant predictor of paranoia when entered into a regression model, where attachment style (most significantly attachment anxiety) was a significant predictor of paranoia, as was blame.

Discussion: Previous research has evidenced hostility bias and blame as being associated with one another, with both acting as predictors of paranoia. In the current study, hostility bias was no longer a significant predictor of paranoia when controlling for attachment style, though blame continued to be. It was suggested that hostility bias might be an expression of attachment style. We proposed a model which linked to previous research regarding the formation of paranoia. Implications were discussed for the role of working models of attachment in clinical work with paranoia. Mentalization was promoted as a crucial skill for addressing possible attachment anxiety underlying paranoid thinking. To continue to explore these relationships, we suggested a series of adaptations which could improve the development of the AIHQ in future research.

Introduction

Paranoia is characterised by interpersonal distrust and social withdrawal, based on the belief that harm will occur to oneself (Freeman & Garety, 2000) and leading to a constant sense of threat (Freeman, Garety, Kuipers, Fowler & Bebbington, 2002). Persecutory delusions are the most likely delusion type to be acted upon (Wessely et al., 1993), and can be a predictor of hospitalisation when present (Castle, Phelan, Wessely & Murray, 1994). Cognitive models of paranoia (e.g. Garety, Kuipers, Fowler, Freeman & Bebbington, 2001) are perhaps over-emphasised in the literature, where early attachment models could also be highly influential. Hence, there is a current trend to use attachment theory to formulate and understand psychotic experiences (see Gumley, Taylor, Schwannauer & MacBeth, 2014).

Attachment and paranoia. Early attachments provide a basis for the development of social cognitive capacities (Bowlby, 1969), with cognitive attachment models that begin in one's childhood remaining influential in adulthood (Collins & Read, 1994). Adult attachment theory states that working models of attachment inform our feelings, behaviour, direct attention and memory, whilst providing access to the beliefs and ideas that individuals hold about themselves (Bartholomew & Horowitz, 1991). Attachment security influences an individual's ability to connect with others and cope with affective or stressful problems (e.g., Kobak & Sceery, 1988). It continues to influence interpersonal situations throughout adulthood as these attachment styles are increasingly resistant to change, guiding personal relationship choices and behaviour towards others in situations even with new contexts and people (Bowlby, 1973). General profiles of behaviour can be linked to the following three broad attachment styles identified by Ainsworth, Blehar, Waters and Wall (1978): 'Secure', 'Avoidant', and 'Anxious-ambivalent'.

Disruption of early relationships has been linked to an increase in vulnerability to later psychosis, for example in a longitudinal study of unwanted pregnancies this risk was found to be four times higher (Myhrman, Rantakallio, Isohanni, Jones & Partanen, 1996). Research such as that of Berry, Barrowclough and Wearden (2008) has drawn links between attachment style and interpersonal difficulties in psychosis, which are commonly experienced in this population (Bellack, Morrison & Mueser, 1989), whilst additionally linking attachment avoidance to psychotic symptomology in clinical samples. Attachment styles also seem to be related to psychotic-like symptoms in the general (non-clinical) population (Berry, Band, Corcoran, Barrowclough & Wearden, 2007). Research has begun to investigate specific symptoms and attachment style. For example, Pickering, Simpson and Bentall (2008) found insecure attachment to be a predictor of paranoia, but not of another common psychotic symptom; hallucinations. When controlling for paranoia, the relationship between attachment style and hallucinations was no longer significant. Recent research has supported these findings, with insecure attachment predicting paranoia, but not hallucinations in a psychosis sample (Wickham, Sitko & Bentall, 2015). These findings are theoretically supported because attachment is not incorporated into cognitive models of the causes of hallucinations (Bentall, 2000).

Why working models of attachment are important in understanding paranoia. Working models of attachment might explain why feeling persecuted (paranoia) can lead to distress and avoidance/safety seeking behaviours. They act as 'relational schemata', allowing a person to form predictions and expectations of new situations (Baldwin, Fehr, Keedian, Seidel & Thomson, 1993). Working models are triggered when an individual feels under threat (Collins, 1996; Mikulincer,

Birnbaum, Woddis & Nachmias, 2000; Mikulincer, Gillath & Shaver, 2002; Mikulincer, Shaver & Pereg, 2003; Shaver & Mikulincer, 2002). Collins (1996) evidenced the influence of working models on the interpretation of social events in two studies: In the first of these, 135 participants were asked to complete open-ended scenarios of romantic interpersonal events in a scenario explanation task. This required that they make sense of the scenarios, creating explanations, describing their own hypothetical behaviour and expressing the emotions they would feel (the emotional impact of the situation). Their responses were coded for the negative intentions of others. This information was combined with scores on an adapted attachment measure, which showed that different attachment styles could predict different imagined responses. Attachment style appeared to predispose people to think, feel and behave differently in response to the same relationship events. These responses were mediated by an individual's explanation patterns and their emotional distress: For example, preoccupied adults consistently responded to the scenario events with strong negative emotional responses, whereas securely attached adults exhibited much lower levels of negative affect. Explanation patterns for participants with insecure attachment styles were thought to account for this difference, whereby insecure attachment was associated with the belief that their partner's behaviour would have negative implications for themselves and their relationship.

Mentalization and theory of mind: Expressions of attachment style in paranoia. A key part of the attachment system is an individual's capacity for mentalization (Fonagy & Target, 2006). Mentalization is the ability to assume and consider the mental states of others (Bateman & Fonagy, 1999), thus enabling us to interpret the actions of others as well as learning to predict their intentions. Attachment relationships provide "a practice ground for the acquisition of

mentalization, a kind of sanctuary" (Fonagy & Target, 2008, pp26), but mentalization simultaneously fosters secure attachments (Allen, Fonagy & Bateman, 2008). Therefore the two are linked and one's 'healthy' attachment experiences can enable acquisition of the mentalization skills needed for 'healthy' social interactions, as well as vice-verca. There are two extremes of ineffective mentalizing which can relate to paranoid thinking, as outlined by Fonagy and colleagues (Fonagy, Gergely, Jurist & Target, 2002): If concrete and stimulus-bound (non-mentalizing/mindblindness) an individual may experience 'psychic equivalence' and be unable to differentiate between internal states and the external world e.g. believing somebody is after you without any evidence (a persecutory delusion). If an individual is prone to distorted mentalizing (excrementalizing; Allen et al., 2008) this is likely to lead to paranoia through a failure to ground imagination in reality at all e.g. believing that others think I am a loser, because I am out alone. Indeed, vulnerability to psychosis has been explained as an impairment in mentalizing, which may have a mediating role in the formation of hallucinations and paranoia in psychosis (Versmissen et al., 2008). Secure attachment and a capacity to mentalize are crucial in the development of 'healthy' non-paranoid thinking styles.

Theory of Mind (ToM) is measured as an individual's ability to attribute mental states to themselves and others, so that they may explain and predict behaviour (Premack & Woodruff, 1978). By definition this is something that paranoid people find difficult, with a key feature of this thinking being the perception of threat where there is none (Freeman & Garety, 2004). Frith (1992) proposed a deficit in ToM as underpinning delusional thinking, hypothesising that the skill was "lost" during acute psychosis, though this has more recently been understood as a vulnerability factor for psychosis due to the deficit also being observable in at-risk

for psychosis groups (Versmissen et al., 2008). People with schizophrenia specifically experiencing persecutory delusions have been found to exhibit a deficit in ToM (Langdon, Siegert, McClure & Harrington, 2005). ToM is a form of inductive reasoning whereby individuals refer to similar past situations in an attempt to infer the mental states of others in the present (Corcoran 2001, 2003). Mentalization and ToM are similar concepts and have been framed as forms of reflective functioning which are developed successfully through a secure attachment style (Fonagy & Target, 1997). They are two important mechanisms exhibited during difficult interpersonal interactions. These specific skills are often impaired in people with psychosis (Brüne, 2005). If paranoid individuals have an anxious attachment style they may be more likely to draw on negative experiences when referencing the mental states of others, as well as failing to generate positive or reasonable explanations for others' behaviour.

Ambiguity and paranoia. It has been increasingly found that paranoid thoughts are formed in ambiguous scenarios (e.g. Combs et al, 2009; Combs et al., 2007; Freeman et al., 2007). The cognitive model of persecutory delusions suggests that when situational cues are lacking, a scenario is more difficult to interpret and provides an opportunity to misperceive the intentions of others as hostile and threatening (Freeman, Dunn et al. 2005; Freeman & Garety, 2003; Turkat, Keane & Thompson-Pope, 1990). Huddy, Brown, Boyd and Wykes (2012) used an open-ended task to index explanation patterns in people with high levels of paranoid thinking. They sought to capture the two key features of paranoia in a single variable – threat and the presence of a persecutor (Freeman & Garety, 2000). Huddy et al. (2012) used imaginary future scenarios which were designed to be intentionally ambiguous with implied negative content. In this instance participants were tasked

with completing the middle content of a story, after being given the beginning and end. Paranoid individuals generated less positive intent and greater negative intent in others, compared to the 'healthy' sample, consistent with a hostility bias. They also experienced higher levels of distress in the scenarios. Attachment was not examined by Huddy et al. (2012), making it difficult to determine if the frequency of positive or negative content generated was associated with attachment patterns. The mental simulation approach was more suited to studying social perception than the Collins methodology because it allowed participants to provide the full range of appraisals that reflect their attachment style. In Collins et al. (1996) the events were framed with an unambiguous negative outcome ("your partner left you standing alone") which clearly frames the other's intentions and behaviour as negative. Within Bowlby's (1969) framework felt security was intimately tied to maintaining a sense of protection from threat, including the potential for a positive helpful attitude from others (Pietromonaco & Barrett, 2000).

Social-cognitive biases in paranoia: Hostility bias. A core feature of paranoia is the tendency to infer or perceive hostility where there is none (Freeman & Garety, 2004), leading to a sense of threat and causing high levels of psychological distress (Lincoln, 2007). The AIHQ was created as a measure of hostile social-cognitive biases in paranoia. Given increasing evidence for a hostile attribution bias in paranoia (e.g. Combs et al., 2007; Combs 2009; Combs, Finn, Wohlfahrt, Penn & Basso, 2013), the AIHQ provides an opportunity to activate and consider the importance of social-cognitive biases in the appraisal of others' intentions. Using a similar approach to that of Collins (1996), the AIHQ required participants to imagine interpersonal situations and provide their own explanations for the actions of others. These scenarios were non-romantic and applied to everyday

interactions, but included an implied negative theme which was either intentional, accidental or ambiguous. Again, college students were recruited. Scores were generated for Blame (was it on purpose, how angry would you feel and how much would you blame them?), Hostility Bias (imagined hostile intent of the other) and Aggression Bias (how aggressively would they respond?). The AIHQ showed good levels of reliability in both internal consistency and inter-rater scoring. It was positively correlated with paranoia and hostility, but not with measures of psychosis proneness. This evidenced the AIHQ as a measure of hostility and blame rather than of the general unusual beliefs and experiences present in psychosis. The ambiguous items showed the most consistent relationships with paranoia. The AIHQ has been used to show that people with persecutory delusions show greater perceptions of hostility, blame and aggression when compared with both psychiatric and non-psychiatric controls during unclear social scenarios (Combs et al., 2009). Conversely, when intentions are clear, both paranoid personalities and normal controls can correctly attribute the intentions of others (Turkat et al., 1990). Ambiguous scenarios are therefore focal for exploring paranoia.

Investigating paranoia with non-clinical samples. The understanding of psychotic experiences existing on a continuum of normal experiences (Johns & van Os, 2001: Verdoux & van Os, 2002) provides justification for exploring the relationship between paranoia and attachment styles across the general population, which is important because the association between self-reported attachment style and self-reported paranoid thinking is yet to be examined. Psychotic-like experiences in non-clinical or sub-clinical populations are highly associated with risk factors for psychosis (Kelleher & Cannon, 2011). The relationship between attachment and general psychotic-like symptoms is known to be as prominent in non-clinical

populations (Berry et al., 2007; Pickering et al., 2008). There is also the additional benefit of removing potential confounding influences e.g. the effects of the psychopathology and secondary effects of diagnoses such as stigma (Tiliopoulos & Goodall, 2009). Although Collins (1996) recruited with opportunistic sampling of University Undergraduates, for the current study a general adult population was sought.

Aims

The relationship between certain attachment styles and paranoia is being identified (see systematic review by Gumley et al., 2014), but the nature of these relationships is not understood. Hence the general aim of the study was to elicit interpersonal construals and link them to predicted consequences in thoughts, emotions and behaviours. We therefore sought to expand on the original work by Collins (1996) to explore the role of attachment styles in day-to-day interactions with others, using the AIHQ scenarios to elicit varying degrees of implied intention from an imagined other (accidental, intentional or ambiguous). Specifically, we explored how attachment style related to both paranoia and hostility bias, hypothesising that attachment would underlie both. Consequently, the evidenced relationship between hostility bias and paranoia was expected to disappear when controlling for attachment style.

Hypotheses

1. Greater paranoid thinking (where responses endorsed threatening or negative intentions perceived to be directed towards the respondent, as rated by the Green et al. Paranoid Thoughts Scales; GPTS, 2008a) will be associated with (i) attachment anxiety and possibly avoidance (both as measured by the

Attachment Style Questionnaire; ASQ; Feeney, Noller & Hanrahan, 1994), (ii) hostility bias in ambiguous scenarios and (iii) blame in all scenarios.

2. Attachment anxiety (measured by the ASQ) will be associated with (i) hostility bias (measured by the AIHQ) in ambiguous scenarios only and (ii) blame in all scenarios.

3. The association between paranoid thinking (as measured by the GPTS) and (i) hostility bias in ambiguous scenarios and (ii) blame in ambiguous scenarios (both measured by the AIHQ) will no longer be significant after controlling for attachment style (measured by the ASQ), which will remain a significant predictor.

Method

Design

This study used a correlational design with the variables of interest being one validated questionnaire of attachment styles, one of psychotic-like experiences, and one of hostile intentions in ambiguous situations. All participants completed a series of questionnaires under the same conditions: in an online survey hosted by Opinio through University College London at the following address: https://opinio.ucl.ac.uk/s?s=33222. Opinio is a survey publishing tool which allows online surveys to be built and distributed easily in the general public via an internet link.

Participants

Inclusion criteria for this study were that participants be 18-65 years of age and resident in the UK at the time of participation. Exclusion criteria were if a

potential participant was currently seeking help for a mental health or substance misuse problem.

Two hundred and twenty one participants were recruited for this study. The demographic composition of the sample is presented in Table 1. The mean age of participants was 36.4 years (SD = 12). The sample was predominantly female (78%), White British (76%), and educated to at least Undergraduate level (85%). Whilst 26% of the sample reported having ever sought help for a mental health difficulty, 43% reported having previously received some form of psychological help.

The completion rate for this study was 84% for those who started the survey. Those participants who partially completed the survey were subsequently excluded from the study (n = 44). Of those who completed the survey, two participants were excluded from the study as they were above the upper age limit of 65 years. Two participants did not fully complete the AIHQ by giving no response to the open-ended questions. It was decided that these participants would not be included in any analyses involving the AIHQ, because total scores and means could not be calculated. Where internet network or time limitations prevented participants from full completion of the survey, participants could email themselves a link to resume at a later point in time. Three participants experienced difficulties with this, requiring the principal investigator to re-open their survey using their time stamp and ID number. Three participants requested further information regarding the study's findings. These were shared via a condensed summary report after finalising the project.

Table 1
Summary of participant demographics

Variable	Mean (*SD*)	Range
N	221	
Age (years)	36.4 (12)	19-65
	N (%)	
% Male	48 (22)	
% White British	168 (76)	
Educated to undergraduate level or higher	188 (85)	
Employed or in full-time education	204 (92)	
% Ever sought help for mental health	58 (26)	
% Ever received psychological help	95 (43)	

Measures

i) Demographics. The following demographics were collected: age, sex, ethnicity and education level. Participants were also asked to disclose if they had ever formally sought help for a mental health difficulty, and if they had ever received any form of psychological help (from a selection of options).

ii) Hospital Anxiety and Depression Scale (HADS) (Zigmond & Snaith, 1983). The HADS was included as a reliable measure for anxiety and depression. The HADs yields two scores ('anxiety' and 'depression') which are calculated in terms of a diagnostic cut-off for caseness. In this study the general population sample was not expected to qualify for caseness, and instead was divided via a median split to create high/low groups for both anxiety and depression. For depression the median score was 2, with a bivariate mean of .43 (*SD* = .5). For anxiety the median score was 6, with a bivariate mean of .47 (*SD* = .5).

iii) Ambiguous Intentions Hostility Questionnaire. The AIHQ is comprised of 15 short vignettes of negative interpersonal events, spanning intentional, accidental and ambiguous situations (Appendix B). After reading each scenario, participants completed self-report questions to describe their internal and external responses. This

was scored under the dimensions of (i) hostility bias (why did they think the other person acted in this way; answered in free-text and rated by researcher for degree of hostility perceived in the others' intentions), (ii) blame score (to what extent did they blame the other person for acting in that way; answered in response to three Likert scales which were combined to create a mean score) and (iii) aggression bias (what they would do in response; answered in free-text and rated by researcher for degree of aggression). Previous published versions of the AIHQ choose to report aggression when relevant to the study hypotheses, but in this case it was not reported. The AIHQ showed good levels of internal consistency for intentional ($\alpha = .85$), ambiguous ($\alpha = 0.86$) and accidental scenarios ($\alpha = .84$).

iv) Attachment Style Questionnaire (ASQ) (Feeney et al., 1994). The ASQ is a self-report measure of attachment style across general relationships, rather than romantic or specific close relationships. It can provide five subscales: confidence, discomfort with closeness, relationships as secondary, need for approval, and preoccupation with relationships, however in this study it was utilised for its ability to detect (i) attachment avoidance and (ii) attachment anxiety. This measure is based on Bartholomew and Horowitz's (1991) four-category typology of attachment states, which expanded on the original three categories outlined by Ainsworth et al. (1978). The ASQ has reached acceptable internal consistency for the two-dimension model (see Feeney et al., 1994), with reported levels of $\alpha = .86$ (Alexander, Feeney, Hohaus & Noller, 2001).

v) Green et al. Paranoid Thoughts Scales (GPTS) (2008a). The GPTS is a multi-dimensional measure of persecutory ideas developed for use across the general population-psychopathology continuum. This was used to assess ideas of (i) persecution (e.g. certain individuals have had it in for me) and (ii) social reference

(e.g. I spent time thinking about friends gossiping about me) in a simple self-report format. These scores were collapsed into the alternative total score due to their strong correlation with one another and an interest in this study for paranoia as a single construct. The GPTS has good internal reliability for its total score in non-clinical samples **(**α = .95).

Pilot

Two male and two female participants were recruited as pilot participants for the online survey before it went live, including two people above the upper age limit to test the application of the online model across the age range. Pilot participants were asked to provide feedback via email under the following headings: completion time, the need for a break, clarity of instructions, ease of completion, intrusiveness of the survey, quality of debrief and general comments on the process. Completion time ranged from 30-55 minutes, with breaks not needed. Participants responded to the questions above with feedback that instructions, participation and debriefing were clear and straightforward.

Pilot participants took an interest in the subject matter, with some clear awareness of the "paranoia" emphasis from early in the study. This was not, however, perceived as intrusive or inappropriate. In its piloted structure the survey was perceived as a test of paranoia. The order of questionnaires was changed based on feedback and researcher discussions regarding demand characteristics (Orne, 1962) whereby it was thought that the explicit paranoia scale (GPTS) should be moved to the end of the study to prevent participants from completing the AIHQ scenarios cautiously or with suspicion. The AIHQ was moved so that it was the first measure to be completed after the demographics and the HADS, with the justification that it required the most active concentration.

Procedure

Participants were recruited to this study using incentivised recruitment methods. A snowballing method was employed (Gardner, 2009), whereby all participants were encouraged to circulate the study and invite others to join. A £25 cash incentive was offered to each of the six most successful recruiters to the study. A single prize draw was also offered to all participants for £100 in their choice of vouchers. Participants could complete the study without providing contact deals and thus choosing not to be entered into the prize draw. Circular emails were sent to mailing lists and the study was advertised using the social networking site Facebook, with all participants encouraged to repeat this process.

Participants who sought to join this study were directed to the online survey hosted by Opinio and then completed all questionnaires in the order presented: demographics, HADS, AIHQ, ASQ and GPTS. Approximate time for completion was estimated at 30-50 minutes, based on pilots and previous use of these measures.

Upon completion, participants were thanked for their participation and provided with a debriefing page (Appendix C). This included a more detailed explanation of the purpose of the study, a reminder of their right to withdraw, and details of the incentives on offer should they circulate the study details.

Power Analysis

Combs et al. (2007) reported a correlation of .29 between AIHQ hostility bias and paranoia, which is a medium effect (Cohen, 1992). To find a similar medium effect with $p < .01$would require $n = 125$. As we were examining multiple correlations across measures we aimed for double this size.

Ethical Considerations

This study was approved by the University College London Ethics committee of the Division of Psychology and Language Sciences (Project ID number: CEHP/2014/519, Appendix D). Before commencing the survey, participants read an information sheet which served as both a consent form and cover page for this survey (Appendix E). This page outlined the purpose of the study and its content. It also informed participants that they were free to withdraw at any time from the study and without penalty, and that all data would be treated in accordance with the Data Protection Act 1998 and as strictly confidential. Entry to the study followed a "click through" consent process with two stages: the first stage involved screening where participants continued if they agreed that they met inclusion for the study, then on a second page they were required to tick a box stating their eligibility. Participants could choose to provide contact details if they wished to participate in the prize draw. Data collection was organised to protect participant confidentiality. Upon retrieval of data from Opinio, personal details were separated from survey responses and stored in a separate secure file, to ensure anonymity. This file was password protected and accessible only by the principal researcher. The study did not feature any explicit reference to acute harm of self or others that would elicit memories of past abuse or violence. Participants were encouraged to contact the principal researcher should they have outstanding concerns.

Planned analyses

We first sought to establish inter-rater reliability for Part A of the AIHQ, Hostility Bias scoring. Descriptive statistics were reported for all variables, with skewness anticipated for the HADS, GPTS and AIHQ items in light of the participants coming from a non-clinical population. Non-parametric statistics were

employed where violation of normality was detected. Alpha levels were reported for blame score items. We tested for significant differences across AIHQ contexts to ensure that they were significantly different from one another and operating as expected. The ranked order should be as follows for both hostility bias and blame (Combs et al., 2007): intentional > ambiguous > accidental). We next chose to determine the discriminant and convergent validity of the scales for both paranoia and attachment style.

Non-parametric correlations were run as planned between all key variables. Two logistic regressions were run for hostility bias ambiguous and for Blame ambiguous. Hostility bias ambiguous was converted to a bivariate variable (high and low), as were the HADS items, due to these variables being skewed. Hostility bias ambiguous and blame ambiguous were independently run alongside attachment styles and the HADS as predictors of total paranoia. Likelihood ratio tests were also run for all predictors.

Results

Inter-rater reliability

The principal researcher rated all qualitative responses for the AIHQ Part A (hostility bias). A second clinician rated the first five and last five responses for each of the 15 items in the AIHQ (150 second-ratings in total). For hostility bias the intraclass correlation coefficient (ICC) between raters ranged between 0.63 and 1.00 for the individual items, with a median of 0.92.

Descriptive and summary scores

Mean and standard deviation scores for all measures are presented in Table 2. Eight of the key variables were skewed: HADS depression (skewness = 8.34), HADS anxiety (skewness = 3.16), GPTS Social Reference (skewness = 9.3), GPTS

Persecution (skewness = 18.74), GPTS total score (skewness = 12.48), hostility bias ambiguous (skewness = 7.54), hostility bias accidental (skewness = 13.56), blame intentional (skewness = -5.85) and blame accidental (skewness = 5.42). Non-parametric tests were used for all of the main analyses. Reported correlations were Spearman's tests. Data was not complete for AIHQ scores, with *n* = 219 reported for some AIHQ analyses.

Blame scores showed acceptable levels of internal consistency for ambiguous (α = .64), intentional (α = .71) and accidental (α = .71) contexts. Hostility item total correlations were calculated for each context type, with ranges of .14-.28 for ambiguous, .1-.22 for intentional and -.01-.06 for accidental scenarios (see discussion for further detail regarding context alpha levels).

Table 2
Summary of measures

Measure	Mean (*SD*)	Sample range
HADS Depression	2.9 (2.72)	0-13
HADS Anxiety	6.4 (3.72)	0-20
ASQ Avoidant Attachment	3.0 (0.7)	1.5-5
ASQ Attachment Anxiety	3.2 (0.67)	1.4-5.1
GPTS Social Reference	24.4 (10.22)	16-59
GPTS Persecution	19.7 (7.29)	16-64
GPTS Total Score	44.2 (16.39)	32-119
AIHQ Index scores		
Blame Ambiguous	2.5 (0.58)	1.1-4.5
Blame Intentional	4.1 (0.55)	1.2-5.2
Blame Accidental	1.9 (0.5)	1-4.2
Hostility Ambiguous	1.4 (0.41)	1-3
Hostility Intentional	2.1 (0.36)	1-3.4
Hostility Accidental	1.1 (0.16)	1-1.8

AIHQ context differences

We expected to find significant differences across the contexts of intentional, accidental and ambiguous. A Friedman test indicated that there was a statistically

significant difference across AHIQ contexts for hostility bias $\chi 2$ (2, n = 219) = 369.6, p < .001. This significant difference was also found across the AIHQ contexts for blame $\chi 2$ (2, n = 220) = 405.99, p < .001.

We expected to find a ranking of contexts for both blame and hostility bias, with intentional scenarios rating higher than ambiguous, and in turn accidental items rating the lowest. A series of Wilcoxon Signed Rank Tests were run to determine if the differences between contexts were ordered as expected for the AIHQ: For hostility, ambiguous was significantly lower than intentional, z = -12.12, p < .001, accidental was significantly lower than intentional, z = -12.82, p < .001, and accidental was significantly lower than ambiguous, z = -10.01, p < .001. The rankings for hostility contexts were as expected. The rankings for blame contexts were also as expected: For blame, ambiguous was significantly lower than intentional, z = -12.83, p < .001, accidental was significantly lower than intentional z = -12.86, p < .001, and accidental was significantly lower than ambiguous, z = 12.07, p < .001.

Correlations for key constructs

There was a strong, positive correlation between the two GPTS subscales of Social Reference and Persecution, rs = .69, n = 221, p < .001, indicating that they had similarly tapped into the construct of paranoia as a whole. Based on this association, the combined total score of paranoia was justified for use in the research analyses. GPTS total score is known to correlate well with other paranoia measures and its use is suggested by its creators (Green et al., 2008a). A single paranoia score reduced the number of comparisons needed.

There was a moderate, positive correlation between the two attachment scales of avoidant attachment and attachment anxiety, *rs* = .44, *n* = 221, *p* < .001, indicating that they showed some association but still appeared to measure separate constructs.

Main Analyses

Paranoia and attachment style. As expected, there was a strong, positive correlation between paranoia and attachment anxiety. The predicted possible association between paranoia and avoidant attachment was also supported, with a moderate, positive correlation between the two variables (see Table 3). The difference between these two correlations was tested using Steiger's Z, evidencing them not to be significantly different, $Z_H = 1.79$, $p = .07$. Given that these are established concepts treated individually in the literature and that these scales were designed to be reported independently, attachment anxiety and attachment avoidance were kept as two separate constructs in the analyses.

Table 3
Correlations between total score paranoia and attachment style

Measure	GPTS Paranoia Total Score
ASQ Attachment Anxiety	.51**
ASQ Avoidant Attachment	.40**

***p* < .01

Paranoia and hostility bias. Paranoia was expected to show an association with hostility bias only in ambiguous scenarios. Consequently, a small positive correlation was found between paranoia and hostility bias for ambiguous scenarios. No significant association was found between paranoia and hostility bias for intentional scenarios, or accidental scenarios. Paranoia was significantly associated with hostility bias exclusively in an ambiguous context. This was predicted based on

the literature, and provided grounds to continue with analyses using only the AIHQ hostility bias ambiguous score (see Table 4).

Table 4
Correlations between total score paranoia and hostility bias across contexts

Measure	GPTS Paranoia Total Score
Hostility Bias Ambiguous	.20*
Hostility Bias Intentional	.09
Hostility Bias Accidental	.13

*$p < .05$

Paranoia and blame. Paranoia was expected to show an association with blame in all contexts. This hypothesis was supported (see Table 5).

Table 5
Correlations between total score paranoia and blame across contexts

Measure	GPTS Paranoia Total Score
Blame Ambiguous	.35**
Blame Intentional	.2**
Blame Accidental	.29**

**$p < .01$

Attachment anxiety and hostility bias. It was predicted that attachment anxiety would be associated with hostility bias only in ambiguous scenarios. This was supported (see Table 6), with a small positive correlation between these two variables. As expected, hostility bias in both intentional and accidental scenarios was not correlated with paranoia.

Table 6
Correlations between attachment anxiety and hostility bias across contexts

Measure	ASQ Attachment Anxiety
Hostility Bias Ambiguous	.21*
Hostility Bias Intentional	.14
Hostility Bias Accidental	.12

*$p < .05$

Attachment anxiety and blame. It was predicted that attachment anxiety would be associated with blame in all contexts. This hypothesis was supported (see Table 7).

Table 7
Correlations between attachment anxiety and blame across contexts

Measure	ASQ Attachment Anxiety
Blame Ambiguous	.38**
Blame Intentional	.21**
Blame Accidental	.19**

**$p < .01$

The influence of mood and anxiety. Spearman correlations were run for the key variables of interest (paranoia, avoidant attachment, attachment anxiety, hostility bias for ambiguous scenarios and blame for ambiguous scenarios) with the addition of the two HADS items, to see if there was an association and reason to believe that depression or anxiety were confounding the relationships between the other variables (see Table 8). HADS depression was significantly positively correlated with all other variables. There was a significant positive correlation between HADS anxiety and all other variables, except hostility bias ambiguous.

Table 8
Correlations for all key variables and HADS

Measure	ASQ Avoidant Attachment	ASQ Attachment Anxiety	GPTS Paranoia Total Score	Hostility Bias Ambiguous	Blame Ambiguous	HADS Depression	HADS Anxiety
HADS Depression	.46**	.42**	.35**	.15*	.27**		.56**
HADS Anxiety	.32**	.56**	.44**	.11	.25**	.58**	

*$p < .05$, **$p < .01$

Hostility bias and paranoia: controlling for attachment style, mood and anxiety. The total GPTS score was skewed, so it was divided via a median split into two groups of low and high paranoia, to enable a logistic regression (see Table 9). Three of the independent variables were also skewed and therefore divided via a median split into bivariate variables: Hostility Bias for ambiguous scenarios, HADS depression and HADS anxiety. The model contained five independent variables (HADS depression low or high, HADS anxiety low or high, avoidant attachment, attachment anxiety and hostility bias ambiguous low or high). The full model was statistically significant $\chi 2$ (5, n = 221) = 61.43, $p < 0.001$, indicating that it was able to differentiate between respondents who were either high or low paranoia. The model as a whole explained between 24% (Cox and Snell R square) and 31% (Nagelkerke R square) of the variance in total paranoia, and correctly classified 71% of cases as either high or low paranoia. Only two of the independent variables made a unique statistically significant contribution to the model (avoidant attachment and attachment anxiety). Hostility bias in ambiguous scenarios was a non-significant predictor of paranoia when controlling for the other key variables.

Table 9
Likelihood ratio chi-square for variables predicting paranoia using hostility bias ambiguous

	B	S.E.	Chi-square	df	p	Odds Ratio
HADS Depression (low or high)	.47	.35	1.82	1	.18	1.6
HADS Anxiety (low or high)	.21	.36	.33	1	.57	1.23
Avoidant Attachment	.71	.26	7.8	1	.01	2.03
Attachment Anxiety	1.05	.31	12.33	1	.00	2.85
AIHQ Hostility Bias Ambiguous (low or high)	.32	.34	.91	1	.34	1.38

Blame and paranoia: controlling for attachment style, mood and anxiety. Again, GPTS total score, HADS depression and HADS anxiety were split into

bivariate variables. The model contained five independent variables (HADS depression, HADS anxiety, avoidant attachment, attachment anxiety and blame ambiguous). The full model was statistically significant $\chi 2$ (5, n = 221) = 64.7, p < .001, indicating that it was able to differentiate between respondents who were either high or low paranoia. The model as a whole explained between 25% (Cox and Snell R square) and 34% (Nagelkerke R square) of the variance in total paranoia score, and correctly classified 71% of cases as either high or low paranoia. Three of the independent variables made a unique statistically significant contribution to the model (avoidant attachment, attachment anxiety and blame ambiguous). In this model blame ambiguous remained a significant predictor, where under the same conditions hostility bias ambiguous did not.

Table 10
Likelihood ratio chi-square for variables predicting paranoia using blame ambiguous

	B	S.E.	Chi-square	df	p	Odds Ratio
HADS Depression (low or high)	.39	.35	1.2	1	.28	1.47
HADS Anxiety (low or high)	.19	.36	.28	1	.6	1.21
Avoidant Attachment	.66	.27	6.02	1	.01	1.93
Attachment Anxiety	.95	.32	9.6	1	.00	2.59
Blame Ambiguous	.76	.31	6.45	1	.01	2.13

Discussion

Summary of findings

The central hypothesis for this study was that attachment style would predict paranoid thinking. Specifically, it was postulated that attachment anxiety (more than, but also as well as attachment avoidance) would be a significant and reliable predictor of paranoia, with this predictive power reducing the otherwise important influences of mood, anxiety and hostility bias to non-significant levels. The literature suggests that attachment styles inform our expectations and predictions of social

situations (Baldwin et al., 1993), and will be activated as working models during times of perceived threat. It was therefore expected that hostility bias, a style of attribution, could ultimately be accounted for by this broader pervasive measure of interpersonal relationship style.

In keeping with the current literature for paranoia, a hostility bias was evident only in ambiguous scenarios. However, hostility bias ambiguous maintained no significant predictive power in the context of attachment style and paranoia. In the second regression model hostility bias was replaced with blame, and blame remained a significant predictor. The blame variable encapsulated the extent to which an individual felt an incident was intentional, how much they would blame them for it, and the extent to which they would feel angry. This variable represented several concepts which relate to feeling aggrieved rather than attacked or threatened, and had a different role to that of hostility bias in this study that was not explained by attachment style.

As would be expected, anxiety had a strong significant association with attachment anxiety. Anxiety and depression correlated at a highly significant level with all of the key variables, except for their weakest associations which were with hostility bias. Here, depression was associated weakly and to a lower significance level, and anxiety had no relationship at all to hostility bias. Hostility bias has emerged as the least influential variable in both its broad correlations and its significance as a predictor of paranoia.

Blame and hostility bias relate differently to paranoia. In the AIHQ's conception it was found that both hostility bias ambiguous and blame were significant predictors of paranoia (Combs et al., 2007). Later, blame ambiguous was found to be a significant predictor of paranoia where hostility bias ambiguous was

not (Combs et al., 2009). The current study revealed the same finding, which supported the idea that blame ambiguous and hostility bias ambiguous had a different relationship to paranoia. Indeed, while they were highly correlated with one another (see Table 8), in the current study's regression model, blame ambiguous remained a significant predictor of paranoia when entered with other key variables, where under the same conditions in a separate regression the predictive value of hostility bias ambiguous was removed. Theoretically it is valuable that these two variables showed different relationships to paranoia. Hostility bias could be linked to attachment style as an expression of an individual's ability to mentalize/exhibit ToM skills. Indeed, it has been suggested that the ability to correctly attribute others' behaviour is dependent on the ability to construct the mental states of others (Kinderman, Dunbar & Bentall, 1998). Therefore hostility bias is associated with paranoia, but this relationship can be accounted for by attachment style. Perhaps hostility bias and attachment style are synonymous. When an individual feels under threat, working models of attachment are activated (Mikulincer et al., 2003), which appears to also increase a tendency for hostile attribution of others' intentions. Blame relates less to the interpretation of social interaction, measuring casual attribution rather than asking participants to consider and incorporate the intentions of others into their thinking. Blame remained a separate predictor of paranoia to attachment style because its role is qualitatively different. Blame might explain that an action was committed on purpose, but hostility bias implies that someone's actions were both on purpose and motivated by an enduring intention to harm or distress another.

Relationship to previous research. The results allowed us to expand on the original work of Collins (1996) by extending the relationship between working models and a sense of threat to general (non-romantic) relationships across different

degrees of implied intention. The results also clarified the role of ambiguity in these relationships. Attachment style was directly and uniquely predictive of actual paranoia levels. Huddy et al. (2012) found that people with psychosis struggled to construct coherent representations of others in combination with positive content, which may be a more complete account for paranoid social cognitive reasoning than a hostility bias alone. It may be that a combination of both difficulty constructing positive alternatives and a failure to mentalize can act in combination with an active hostility bias in response to ambiguity.

The current research contributes to an issue of contention in the literature which queries whether attachment style reflects general interpersonal dispositions or specific manifestations of close relationships (see Pietromonaco & Barrett, 2000). The AIHQ combined both close and impersonal relationship contexts into a task with varying degrees of implied intent from another. In this study attachment style appeared to predict a general style of interpersonal interaction across scenarios which were based on non-personal relationships to others.

Proposed model of paranoia. The results of this study provided evidence for a conceptual model of paranoia formation. Attachment style determines one's ability to acquire mentalization/ToM skills, with secure attachment providing a practice ground for healthy interpersonal connection (Fonagy & Target, 2008), and positive mentalization experiences reinforcing secure attachment. With these skills an individual is able to face negative ambiguous interpersonal outcomes with the ability to consider the other's behaviour alongside their own feelings. The individual who does not acquire such skills experiences an unclear negative outcome as both more threatening and personalising, and consequently blames the other more and holds them accountable for what has happened. A hostility bias emerges when

mentalization of the intentions of others is impoverished and/or when personalising and threatening explanations are activated too readily in the absence of evidence. The role of hostility bias is unclear at this stage, and appears to be explained by attachment style. Paranoia was significantly predicted by the extent to which individuals endorsed an insecure (anxious) attachment style.

Shared method variance. Although hostility bias was not predicted to remain a key predictor of paranoia, this observation challenges a growing literature on Hostility Bias and paranoia, so it should be considered that this effect might have been underpowered in the current study. After identifying key associations between the main variables it is important to reflect on their format and method of measurement. The GPTS and ASQ were shown to correlate with one another as predicted, though they were both self-rated questionnaires in contrast to Hostility Bias which was rated by the researcher. Shared method variance (Podsakoff, MacKenzie, Lee & Podsakoff, 2003) may account for the degree to which the key variables correlated, in particular because the Hostility Bias may have been underrated in comparison to previous studies (see below).

Sample commentary

Recruitment numbers. The dropout rate for participants after starting the survey was 16%. It was noted that the majority of these left during the AIHQ. This was possibly due to the length of the survey (observed in informal feedback), or the difficulty with working through an online server. There were also many more entries on the system that were either in error, people inspecting the survey but not continuing, and people attempting to input their details for the prize draw without continuing to complete the survey.

Recruitment method. Instructions passed via the snowballing recruitment incentive could not be controlled for, making it difficult to know exactly how the study was presented and to ensure that participants were not primed with information regarding the tasks or the focus of the study before taking part.

Sample Quality. The 221 participants in this study were predominantly female, working, and highly educated. This may be reflective of the principal researcher's initial network (through which the snowballing recruitment was started), though it was estimated that a high proportion of males invited to the study did not participate. The study was also promoted through social media and community groups who will have had varied potential for outreach. It was hypothesised that higher-educated females may show some bias for altruism or interest with regard to participation in mental health research. The sample was incredibly diverse with regards to occupation. Undergraduates were not sought for this study, with a broad age range (19-65 years) achieved. The sample as a whole was varied and inclusive, as hoped for this study.

Sensitivity of the GPTS. As expected, studying with a non-clinical sample generated a non-normal distribution where the majority of participants scored minimally on the paranoia measure. The GPTS was appropriate in this context as it provided continuous data rather than explicit clinical cut-offs. There was no need to generate specific paranoid thought content in this study. Participants endorsed GPTS items with less pressure than in a formal research context, at their own convenience (e.g. at home on their own computer). Virtual reality studies require priming of non-clinical participants to evoke paranoid content, with approximately only 40% of a n = 200 sample experiencing paranoid thoughts in response to intentional stimuli (Freeman et al., 2008).

Methodological issues with the AIHQ

Scenarios. The AIHQ scenarios cover a broad range of plausible day-to-day events which successfully inferred three levels of implied intention. The scenarios could be updated to incorporate modern technology into the content of the scale, as well as adapting Americanisms and outdated references. This is discussed under future research recommendations. As a task, the AIHQ benefits from its concise scenarios, which guide the reader in a way that allows us to draw conclusions from varying implied intent. However, it is also a limitation that the scenarios involve minimal engagement, requiring no narrative from the participant. In some cases the scenarios could be superficially engaged with or passed over (either not completed, or responded to briefly). The literature on Future Episodic Thought (FET) suggests that participants require time to construct a scenario and focus their attention to a specific situation (D'Argembeau & Mathy, 2011). Fortunately, in this section content was consistently generated to a desirable level.

Internal consistency for scenario context. While acceptable levels of internal consistency were found for Blame contexts, alpha levels were not reported for hostility bias contexts in this study, instead we provided the item total correlations. They were not presented in the original Combs et al. (2007) paper or in subsequent work from this team using the AIHQ. In the current study, alpha for hostility bias was lower than would be expected (Tavakol & Dennick, 2011), so it is likely that these items do not consistently correlate, but this does not deem the contexts as meaningless categories. One possible explanation for this finding is that hostility bias is not a consistently generated phenomenon, meaning certain scenarios might evoke more/less of a reaction depending on various individual differences in participants' interpersonal history. However, the significant between-group

differences for intentional, ambiguous and accidental items allows them to be ranked and demonstrate an overall effect of scenario context, indicating that context of intent is meaningful as an average score. We might consider reliable alpha levels difficult to reach with so few items per context in the AIHQ (five scenarios per context type). Calculating alpha with too few test items will violate the assumption of tau-equivalence and underestimate reliability (Graham, 2006).

Scoring. The AIHQ lacked guidance for rating part A (hostility bias). The AIHQ provides examples for one scenario, but the parameters changed significantly across all 15 scenarios. This was overcome by establishing rating guidelines between the principal rater and second-rater for each scenario individually, using a set of agreed principles. Some response styles were still difficult to score, for example where a very brief response was provided which gave limited material for rating. Raters agreed to search for the presence of intent and where little detail was given or a response was stated with minimal expansion on the event, this was taken to mean that there was no evidence of concern or perception of threat by the participant (indicating a lower score for hostility bias). Similarly, answers of "I don't know/not sure" were rated as low (1) because no intent was generated. Conversely, some participants gave significant detail in their responses and provided several pieces of information to rate. Commonly these responses were contradictory as they provided a contingency (e.g. "if it was X then I would think/act Y…otherwise I would think/act Z"). In this instance, the highest rated piece of content was scored, given that the person had engaged with the scenario and prepared for the possibility of someone intending them harm. When creating the Blame Score (the mean of responses B, C and D), item B was rated 1-6 in contrast to the other four ratings for the AIHQ which were scored 1-5. It is not clear why this had been decided in its

conception and presented a confusing inconsistency. Consequently, it may have been more difficult to hold in mind a six-point Likert scale whilst also completing two five-point scales. Also, when calculating a mean of three scores, a question that can score one point higher than the others will weight disproportionately.

Clinical implications: Indicated therapeutic targets for paranoia

In this study paranoia correlated only with ambiguous contexts for negative scenarios, adding to its self-confirmatory nature because it arises when individuals must generate others' intentions and complete the story for themselves, allowing limited opportunity to gather alternative information and challenge an appraisal. Paranoia possibly reduces the opportunity to discover alternative perspectives because it leads to social isolation (Freeman et al., 2007), though this relationship might also be reversed. This is perhaps because we expect paranoid individuals to exhibit anxious (or avoidant) attachment styles and thus be less likely to challenge others or enquire further into the true meaning of a negative outcome. Consequently, when studies have rated the behavioural response to scenarios (part E of the AIHQ), high paranoia non-clinical groups advocate a non-aggressive response; instead ruminating on the issue or internalising their anger (Combs et al., 2013). This has been supported in the psychiatric inpatient population, where delusions did not predict violence, however, specific delusions were linked to angry affect (Ullrich, Keers & Coid (2014). The literature proposes several opportunities for psychological work:

A classic cognitive approach to therapy with paranoia might take the evidence of this study as an indication of the need to target interpersonal and threat-related concepts, which could address difficulties with self-assurance and the ability to feel safe in relation to others (see Lincoln et al., 2010).

Introducing attachment representations in early psychosis may provide a rich source of information from which to formulate psychological problems such as paranoia. This could be useful in generating a secure base for individuals experiencing persecutory beliefs, as well as providing a point of exploration for the underlying insecurity that arises from a sense of threat. Insecure attachment styles were found to predict paranoia but not hallucinations (Wickham et al., 2015), indicating that this is a crucial relationship to consider in the specific development of persecutory delusions.

With attachment style emerging as the strongest predictor of paranoia in this study, it could be argued that people experiencing paranoia should be encouraged to acquire and practice ToM/mentalization skills in order to meet the unmet needs of an anxious (or avoidant) attachment style, as an indirect method of addressing paranoid thinking. Improving an individual's ability to accurately mentalize others' mental states regarding themselves could reduce the likelihood of a possible hostility bias.

Mindfulness-based cognitive therapy (MBCT) approaches might be helpful in strengthening the individual's ability to accept negative affect which is experienced in response to perceived threat. Recent evidence suggests that MBCT can facilitate an increase in social acceptance and reduction in paranoia with a history of depression (Collip et al., 2013).

Future research

Adapted scenarios. The scenarios in the AIHQ could be adapted to suit both a UK audience and a more modern setting of social interaction. Some of the terminology included Americanisms such as "grocery line", whilst the reference to an "answering machine" was noted by some participants to be outdated. Some of the scenarios did not succeed in their desired intention to create ambiguity due to the

possibility of solving said problem/ambiguity with modern devices. Some participants alluded to the availability of instant messaging applications, the ability to know if someone has received an electronic message and the general consensus of a fast-paced and multi-faceted style of electronic communication. Many people commonly use smartphones with several means of messaging, phone calls are free and wifi is widely accessible. Expectations have changed in terms of level/frequency of electronic contact, and people will cope with ambiguity in a different way as a result (perhaps with less tolerance for it and more means of resolving it). An interesting scenario for creating ambiguity might be, for example, "someone has read your message but not replied yet." We might argue that tolerating ambiguity and uncertainty is likely to take a specific form in a society where social media facilitates immediate validation.

Attachment, coherence and social cognitive biases. A future methodology might be to combine the evidenced mechanisms related to paranoia, for example by undertaking the AIHQ Hostility Bias item as a verbal response and rating coherence of narrative (as in Huddy et al., 2012). This would also help to engage participants with scenarios, compared with a written approach. With a simple measure of attachment such as the ASQ it might then be possible to provide a more complete assessment of the relationship between these key constructs thought to lead to paranoid thinking.

Summary

In summary, results suggest that attachment style is linked with paranoia in non-clinical populations, serving as a significant predictor. Hostile attribution of others' intentions is linked to paranoia when scenarios are ambiguous, although this relationship is no longer significant in the greater context of attachment style. A

secure attachment style (one that endorses attachment anxiety and attachment avoidance at lower levels) facilitates ToM skills and the ability to mentalize, both of which when impoverished are known to contribute to the formation of a hostility bias. The extent to which individuals blame others for negative events was supported as a separate style of attribution to hostility bias, maintaining its role as an independent predictor of paranoia within the context of attachment style. These results indicate that clinical work with paranoia could yield benefits through a focus on working models of attachment (Gumley & Schwannauer, 2006). Alternatively, hostility bias remains a thinking style that can be elicited, targeted and challenged in keeping with a cognitive approach, but which appears to exist as an expression of underlying attachment style.

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Part 3: Critical Appraisal

Introduction

This appraisal will reflect on the conceptual issues related predominantly to the empirical paper, and to some degree the literature review. I initially worked on a proposal for a different project related to visual hallucinations (not discussed here), which was deemed unrealistic in several respects. This experience taught me a lot about the process of building a feasible piece of research. From the beginning of the current study, the focus was to remain grounded in evidence and elaborate a clear theory-informed narrative for the relationships of interest. Of particular importance in this appraisal is the process of developing the methodology and conceptualising the key constructs. The literature on Future Episodic Thought (FET) (see Szpunar, 2010) was used to inform these processes. A Mental Simulation Task (MST) was originally developed to study attachment and paranoia, and is explained below. This was not the final methodology, but ultimately informed the thinking process behind and decision to move into an online survey approach. Overall the creation of the current study was a continually developing one, which has hopefully led to a clear and theoretically-informed contribution to the evidence base.

Developing the Methodology

Goals of the Methodology

The literature review discussed hostility bias and paranoia. Here, studies were sought for their ability to elicit implied intention from an imagined other in participants' minds. Hostile attribution of others' intentions was achieved in the literature most often through the use of imagined negative future events, framed within an ambiguous context. Eliciting and measuring a hostility bias in imagined future scenarios was the key challenge for the empirical paper, where other key constructs of attachment style and paranoia were quantified with self-report

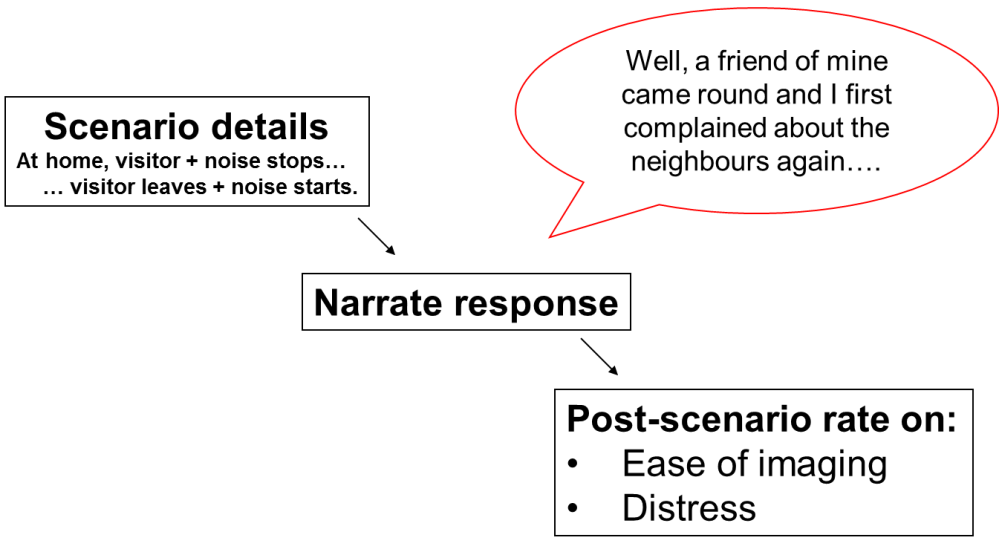
measures. The Ambiguous Intentions Hostility Questionnaire (AIHQ; Combs, Penn, Wicher & Waldheter, 2007) was eventually selected after developing and understanding a semi-structured mental simulation task format.

Mental Simulation Task

An exploration of the current literature for FET guided the development of scenario-based measures. From this came an understanding of how people engage in tasks, and what factors were influential in generating meaningful material: Future negative events are not generated as quickly or fluidly as positive future events (D'Argembeau & Van der Linden, 2004), perhaps because of a general bias/preference for positive experiences. This finding was used to predict that paranoid individuals might provide a narrative that was detached from their experiences and felt less vividly. When given an ambiguous starting point, people initially activate general personal knowledge, with only 16% of FET formed directly (D'Argembeau & Mathy, 2011), implying that participants may not present their ideas coherently without a clear starting point to a scenario. A mental simulation scenario is inclined to be based on vivid mental representations of familiar settings such as restaurants or cafés (Szpunar, 2010), emphasizing the need to orient participants to a virtual environment of their own making, reducing the cognitive effort dedicated to building a scenario. Specific events are thought to be more difficult to mentally construct for the future than for the past (D'Argembeau & Mathy, 2011), making it even more important that scenarios are constructed with ease. This theory was used to modify the MST as originally used by Huddy, Brown, Boyd and Wykes (2012), where adaptations were needed to ensure that intent was more consistently generated.

The MST from Huddy et al. (2012) was originally based on the Means-End Problem-Solving Approach (MEPS) (Platt & Spivak, 1977) as adapted by Brown and colleagues in 2002. Boyd and Gumley's (2007) interviews with paranoid individuals provided the basis of these adaptations. We further developed these simulation scenarios via a piloting process. These tied in with the initial work of Collins (1996) where romantic scenarios were used rather than general interpersonal situations. We proposed to work with 'close relationships' which are attachment specific but not limited to romantic relationships, for example family members, close friends or romantic partners. Generating social material in the context of close relationships was more likely to activate arousal of the attachment system and encourage participants to generate intent in imagined others. See Figure 1 for an example of how responses were elicited and recorded in the original task.

Figure 1
Example from Huddy et al.'s (2012) mental simulation task



Imaginal orientation was developed to improve scaffolding of the simulated scenario, as part of a wider protocol which would encourage participants to scaffold their environment and place themselves in a particular space and time e.g.

“I am going to ask you to think about a scenario. You are entering a café one day next week. Close your eyes and take a moment to imagine that. Think about where you are, what it looks like...what you notice as you walk in...what you can see...what you can hear...what you can smell...what you can taste...” The MST scenario content was adapted over time to meet the recommendations of the literature for reliably generating the intentions of others.

Departure from Mental Simulation

Although the task development was relatively successful, the project was deemed to be ambitious in its scale due to the increased time demands for such an approach. All participants would have been individually interviewed, audio recorded and transcribed. Each participant would then have been dual-rated on several dimensions. Also, the literature had suggested that high levels of sub-clinical paranoia could have a significant effect on the relationship between researcher and participant, with participants more inclined to perceive neutral experimenter behaviour as negative and exhibit more avoidant social behaviours (Combs & Penn, 2004; Gay & Combs, 2005). By this reasoning, participants with higher levels of paranoia are more likely to modify their responses in a face-to-face task.

With the Attachment Styles Questionnaire (ASQ; Feeney, Noller & Hanrahan, 1994) and Green et al. Paranoid Thought Scales (GPTS; 2008a) already selected as measures of attachment style and paranoia respectively, consideration was given to alternative scenario-based self-report measures which could be used reliably in the study of paranoid thinking. The AIHQ fulfilled this criteria, and would allow differentiation between levels of intentions rather than a focus on ambiguity alone. The combination of self-report measures then complemented an online format, which could reach large numbers easily. Online studies have been used to study

paranoia in both self-report and task-based methodologies with clinical samples (e.g. Westermann, Kesting & Lincoln, 2012).

Commentary on Methodology Changes

The change in methodology did not affect the overall research interest of attachment as a predictor of paranoid thinking, however it did mean abandoning a task which had been purposefully adapted and presented as the focus of the study. This was a difficult but justified loss, and might hopefully be of some use for future thinking with this task (as originally used by my supervisor/co-author of this research).

Conceptual Issues

Paranoia

The literature review presented difficulties with the definition of paranoia. When conducting systematic searches, the literature on psychosis was varied in its use of diagnostic terms and symptom-based terms. Whilst some papers referred to paranoia as a continuum experience, research commonly investigated psychosis under labels of 'schizophrenia.' It was not common for clinical groups to be chosen and divided by their level of specific symptoms. A particular challenge in the literature review was to ensure that any study which quantified paranoia (in relation to hostility bias) was not overlooked, where it was rarely clearly defined. In the empirical paper, paranoia was combined as GPTS total score because the two subscales were shown to be measuring a similar construct.

Attachment

Attachment was only studied in the empirical paper, hence the focus was to select an appropriate measure for this variable. There are a variety of measures of attachment for use with adults, including interview based techniques (Main &

Goldwyn, 1984) and self-report questionnaires (Berry et al., 2007). The latter often requires good insight into one's childhood experiences and the ability to reflect on early interactions with the primary caregiver. Interviewing measures such as the Adult Attachment Interview (AAI; Main, Kaplan & Cassidy, 1985) are intensive and require considerable training. The ASQ was chosen for its ability to measure attachment anxiety and attachment avoidance. These two dimensions are thought to best conceptualise attachment and can be measured reliably with self-report scales (Brennan, Clark & Shaver, 1998). It was theoretically important that attachment anxiety and attachment avoidance remained significantly independent in their relationships to other variables in the empirical study, as they did, because they were both indicated in the literature to have associations with paranoia.

Hostility Bias

Defining hostility bias was challenging in the literature review. During systematic searches the return rate was higher than perhaps expected, and many papers were screened in further detail than planned because of difficulty ascertaining how 'hostility' of some kind was being conceptualised and measured. Many of the returned papers were focused on actual levels of hostility (e.g. physical violence), or a desire to act with hostility, rather than perceived intention of hostility from others. Hostility has commonly been studied as an act towards others, with the reverse relationship (reception of hostility, or perceived reception of hostility) gaining much less attention in the literature. Several of the papers presented in the literature review did not use the term hostility bias, instead coining their own terms e.g. "intentionalising" (intentionalising hostility) (Peters et al., 2014) or "negative intent" (Huddy et al., 2012).

In the empirical paper, hostility bias was difficult to define when rating participant responses. There was a considerable range of variance in how participants responded to situations, but we agreed on a rating system which was justified and consistently implemented. This is discussed in relation to the value of the AIHQ as a measure.

The AIHQ

Although the AIHQ is a validated and useful measure, there also happen to be few options for eliciting and measuring a hostility bias. Ideas for further development of the AIHQ scenarios were presented in the discussion, but theoretical ideas could have been elaborated if the AIHQ were also analysed differently. It would have been interesting to explore grouping the variables based on different criteria than the intentional/ambiguous/accidental contexts. For example, the scenarios differ in their presentation of the identity of the other from which harm was potentially caused; one scenario might include a nameless driver who splashes you, whereas in another scenario it was a friend who knocked you down. Also, proximity from the person who harms you could be treated as a variable e.g. somebody bumping into you may be very different to somebody who has made you feel bad from a remote position (via the absence of a message or phone call). Further, some scenarios implied emotional rejection in contrast to those that implied public embarrassment or actual harm. Variance in this quality of interaction throughout the scenarios could be used to consider why the items grouped via context (intentional/ambiguous/accidental) did not elicit equal levels of response (the five items for each context were averaged as per the AIHQ protocol). It was acknowledged that people are likely to have varying reactions to different types of harm, with personal history likely to play a role. These observations were apparent

during the process of coding 221 participants' data for 15 items each. As a rater of this material it was extremely interesting to notice how individuals approached the scenarios, but unfortunately these possible trends and alternative analyses were not within the remit of the current study.

Although it was not presented for the current study's analyses, the third score for the AIHQ (a rated value for the aggression of the participant's imagined response to each scenario) was recorded and rated for this study. This was not a planned part of the original proposal or included in the hypotheses, so it was not excluded at a loss to the research, but it did consume a considerable period of rater time.

The rating guidelines for hostility bias and the unrecorded aggression variable were both found to be unclearly defined an insufficient in the original Combs et al. (2007) study. For the purposes of the current study I devised a scoring protocol for all 15 items to assess what would constitute each level of scoring (consistent with the standard set in the single example of the original paper guidelines). This was based on a meeting between myself and my supervisor, requiring attention to the subtle difference in emphasis between loaded language (which to some might be attributed as a 5/5 rating; extremely hostile) and actual intention to harm. The following example can elaborate: *You are walking outside in the rain, a car swerves to avoid hitting a cat, and drives into a puddle, splashing water onto you. What do you think was the real reason why the care splashed water onto you?* Response: "The driver swerved into the puddle for fun." Although this implies a high degree 5/5 score for blame (the other AIHQ measure recorded, which determines accountability and intentionality), it does not rate extremely highly in hostility bias (perhaps 3/5) because it implies that, although the other was aware of the reader's position, they took no individual, calculated and personalising attempt to harm them. This example,

instead, implied a general disregard for others or a sense of enjoyment from being careless at others' expense. The degree to which an event was perceived as personalising played a significant role in determining an increase in hostility bias. An alternative high hostility bias rating might have been as follows: "The driver swerved into the puddle and splashed me because he wanted me to fall over and look stupid" (5/5 because the intention was focused on inducing harm, and the reader has anticipated a further intended negative outcome for themselves that the other meant to induce).

In a relevant observation, a more recent use of the AIHQ by its original authors has taken a step further in explaining the lengths that they went to for inter-rater reliability: Raters in Combs, Finn, Wohlfahrt, Penn & Basso (2013) underwent extensive training on the AIHQ, including didactic training, sample responses and feedback. They were required to meet an ICC of .80 as assessed by a criterion-trained rater. However, there are still no accessible scoring guidelines readily available for the AIHQ where they would be extremely valuable for encouraging others to use the measure.

Online Survey

The creation of the online survey brought unexpected challenges. For example, learning to use the Opinio host software, setting up each individual variable and cross-referencing the items numerous times. Unfortunately, Opinio did not offer much room for customisation in this process. One major benefit did outweigh any costs, with the ability to distribute and recruit across a broad sample. Although the sample was disproportionately female and educated to degree level, the variance in other variables such as age (19-65 years) and previous mental health history was extremely diverse. Occupation was a particularly interesting variable to collect, with

a diversity that was not feasible to portray in the empirical paper. Overall, the sample was a significant strength of this research.

Reflections

The experience of undertaking this thesis has been extremely rewarding. Overcoming setbacks and learning to re-direct and adapt my thinking has been an invaluable experience. This is a project which has evolved over time, and become something more substantial than I had initially envisaged. Through this work I have consolidated the relationship between some key constructs which are of genuine importance to my clinical work (attachment style and attribution biases), within the field of psychosis which is an area of great personal interest. Paranoia in non-clinical samples is particularly intriguing and, like all areas of psychosis, it is increasingly valuable for me to reflect as a clinician on the existence of a continuum for these experiences. I hope that this literature review, empirical paper and critical appraisal can prove useful to other researchers and clinicians with similar interests in working models and paranoia.

Scope of the Thesis

The literature review coordinated the current evidence base for hostility bias as a predictor of paranoia. It was found that this association could be evidenced across a variety of sample types (clinical vs non-clinical, high risk for psychosis, clinical only, non-clinical only), each leading to further ideas regarding the nature of the hostility bias/paranoia association. There does appear to be an increase in this association from the early onset of psychosis into a first-episode, for reasons not fully understood. However, in clinical samples where different symptom groups were compared, it did appear that persecutory delusions (paranoia) might be accounting for this relationship to hostility bias, rather than broad diagnostic groups such as

‘schizophrenia’. Movements into studying paranoia within non-clinical samples have helped to broaden thinking around the relationship from being labeled as a psychosis-specific one. Having established the hostility bias/paranoia relationship in the literature review, the empirical paper continued in this trend, using a large non-clinical sample to look at associations between hostility bias and paranoia, but also introducing working models of attachment. It was evidenced that attachment style was overall a significant predictor of paranoia, causing the predictive significance of hostility bias to disappear. This has led to some exciting hypotheses around the importance of attachment style in paranoia and the possibility that attachment style and hostility bias represent the same construct.

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Appendices

Appendix A

Key findings for literature review selected studies

	Author(s) & Date	Key Findings
1	An et al. (2010)	• First episode schizophrenia patients had a perceived HAB associated with persecutory symptoms. • UHR for psychosis group also had a perceived HAB associated with paranoia (weaker association than that in first episode group). • Controls showed no significant association between HAB and paranoia, as well as a significantly lower HAB than that recorded for UHR and first episode groups. • No differences in recorded AIHQ scores between those UHR who went on to develop psychosis and those who did not. • A biased attribution system appears to play a role in the early prodromal period of psychosis, before explicit experiences of persecution are evidenced.
2	Combs et al. (2013)	• Persons with high levels of non-clinical paranoia perceived higher levels of hostility and blame in negative ambiguous social situations. • People with high levels of non-clinical paranoia were worse at recognising ambiguous negative emotional expressions.
3	Combs et al. (2009)	• Persecutory delusions group showed greater levels of perceived hostility, blame and aggression in ambiguous social situations than the psychiatric controls and healthy controls. • Therefore, there was no significant difference in HAB based on having schizophrenia or not. The relationship was dependent on paranoia. • AIHQ hostile attribution bias score was the only predictor of paranoid ideation (even when accounting for mood, self-esteem and self-consciousness).
4	Combs et al. (2007b)	• Hostile attribution bias score for ambiguous situations was a significant predictor of paranoia • Blame score for ambiguous situations was a significant predictor of paranoia. • AIHQ was positively correlated with paranoia and hostility, and was not correlated with measures of psychosis proneness (supporting convergent and discriminant validity of the scale).

5	Combs et al. (2006)	• Perceptions of blame, hostility and racism served as predictors of paranoia. • Paranoia among African Americans could be understood in terms of these constructs e.g. based on one's subjective perceptions of others' intentions and behaviours.
6	Combs & Penn (2004)	• Analysis of research assistant experimenter ratings was shown to be non-significant, evidencing the desired aim of a neutral and standardised assessment manner. Still, persons high in subclinical paranoia had a stronger belief that the research assistant was analysing their actions and influencing their study performance than did those in the low paranoia group. Consequently, they also rated the research assistant as less trustworthy. • There were no significant differences on ratings of perceived overt hostility, though the combination of perceptual differences observed between the two groups suggested that those higher in persecutory ideation were interpreting neutral and ambiguous behavior in a threatening manner, suggestive of a hostile attribution bias.
7	Huddy et al. (2012)	• Paranoid participants produced more responses that featured negative intent of others than healthy control participants. • Conversely, healthy controls produced more responses featuring positive intent than those in the paranoid group. • Greater frequency of negative intent was positively correlated with PSYRATS emotion factor, indicating that perceiving negative intentions of others in ambiguous situations is a key factor in the distress experienced during paranoia.
8	Morrison & Cohen (2014)	• Perceived intentionality of hostility higher for schizotypal group than control group. • Perceived intentionality of hostility moderated the relationship between ideas of reference (IOR) and paranoia e.g. perceiving others' actions in negative social scenarios as more intentional predicted higher levels of paranoia as IOR increased amongst schizotypal participants. • Perceived intentions of hostility and IOR together appear to provide an indirect way of assessing paranoia.
9	Peters et al. (2014)	• Intentionalising hostility was higher for the psychosis group than for the depressed and control groups. • Intentionalising hostility was the only bias for which there was no difference between the depressed and control group, indicating that this may be a thinking style specific to people with psychosis.

10	Turkat et al. (1990)	• When intentions were clear, both paranoid personalities and normal controls could correctly attribute intentions of others. • Paranoid personalities committed more social processing errors than normal controls when intentions were ambiguous. • Paranoid personalities were more often incorrect in identifying an intention as ambiguous than the normal controls. • Paranoid personalities were more likely than normal controls to identify hostile intentions when a scenario was ambiguous. • Responses from paranoid personalities were more likely to be hostile than responses from normal controls in response to a helpful or accidental intention.
11	Whaley (2004)	• Measure of paranoia was significantly correlated with perceived hostility of others. • Support for the distinction between pathological paranoia and variations cultural mistrust paranoia.
12	Whaley (2002)	• Pathological and confluent paranoia groups scored significantly higher on perceived hostility of others than cultural paranoia and non-paranoid groups.

Appendix B

AIHQ instruction page and example scenario

AIHQ

SUBJECT NAME/ID#_____ DATE_____

PLEASE READ EACH OF THE SITUATIONS LISTED BELOW AND IMAGINE THE SITUATION HAPPENING TO YOU. FOR EACH SITUATION, WRITE DOWN A BRIEF REASON FOR IT. THEN, RATE WHETHER YOU THINK THE PERSON ACTED THAT WAY TOWARD YOU ON PURPOSE. YOU WILL THEN BE ASKED TO RATE HOW ANGRY THAT SITUATION MAKES YOU FEEL AND HOW MUCH YOU BLAME THE OTHER PERSON. FINALLY, PLEASE WRITE DOWN WHAT YOU WOULD DO ABOUT THAT SITUATION. A RESPONSE OF "I DON'T KNOW" IS NOT ACCEPTABLE. YOU NEED TO DESCRIBE SOME TYPE OF BEHAVIORAL RESPONSE.

1. 1. Someone jumps in front of you on the grocery line and says, "I'm in a rush."

   A. What do you think was the real reason why someone jumped in line in front of you?

   _____

   B. Did that person jump in front of you on purpose?

1	2	3	4	5	6
Definitely No	Probably No	Maybe No	Maybe Yes	Probably Yes	Definitely Yes

   C. How angry would this make you feel?

1	2	3	4	5
Not at all Angry				Very Angry

   D. How much would you blame that person for jumping in front of you on line?

1	2	3	4	5
Not at All				Very Much

   E. What would you do about it?

   _____

2. A friend of yours slips on the ice, knocking you onto the ground.

   A. What do you think was the real reason why your friend knocked you to the ground?

   _____

   B. Do you think your friend knocked you onto the ground on purpose?

1	2	3	4	5	6
Definitely No	Probably No	Maybe No	Maybe Yes	Probably Yes	Definitely Yes

   C. How angry would this make you feel?

1	2	3	4	5
Not at all Angry				Very Angry

   D. How much would you blame your friend for knocking you onto the ground?

1	2	3	4	5
Not at All				Very Much

Appendix C

Study debriefing page

Thank you for taking the time to complete this study.

What was the purpose of this study? Around a third of people in the general population experience suspicious or paranoid thoughts at least once a week, such as thinking that other people may intend them harm or be watching them. We are interested in how paranoid thoughts are related to general patterns of how people relate to others, such as whether someone feels that they need others to be close when they are upset. We are also interested in how the frequency with which people experience suspicious thoughts influences how they interpret other peoples' intentions in everyday social scenarios.

Why is this useful? Exploring these constructs in the general population can help us to predict and understand why people seek help from mental health services when they are feeling very distressed by paranoid thoughts. The current study aimed to develop more sensitive measures of paranoid thinking that can be used in research to ultimately improve psychological treatments.

Will I be identifiable in this research? Once again, the results of this study will not/cannot include any identifiable information about you. There was no deception involved.

How can I find out more? Should you wish to find out more you may contact the principal investigator Gareth James, and on completion of the research you can receive a summary of the results and our findings of interest.
If you feel distressed by participation, require any additional support or participation has harmed you in any way, you can contact the principal investigator using the details below for further advice and information.
Principal Investigator: Gareth James, Department of Clinical, Educational and Health Psychology, University College London, London, WC1E 6HJ; Email: g.james.12@ucl.ac.uk. Tel: 020-7679-1897.

Once again, thank you for your participation in this research!

If you have submitted your contact details before starting, you will now be entered into the Prize Draw - you have a chance of winning £100 in vouchers of your choice. Your details will be separated from your responses to preserve confidentiality.

(Remember, you could win one of six £25 cash prizes if you recruit the highest number of participants into this study, so please share this link with as many people as possible).

https://opinio.ucl.ac.uk/s?s=33222

Appendix D

UCL ethical approval

Ethics Application Form for Non-Invasive Research on Healthy Adults

SECTION A	APPLICATION DETAILS

A1 Project details

Project title: **Looking into the Future: A Resource for Wellbeing?**

Date of submission:
10/4/14

Proposed start date:
10/5/14

Proposed end date:
10/5/19

A2 Principal researcher

(Note: A student – undergraduate, postgraduate or research postgraduate – cannot be the principal researcher for ethics purposes).

Full name: Vyv Huddy

Position held: Lecturer in Clinical Psychology

Research Department: Clinical, Educational and Health Psychology

The principal researcher must read and sign (electronic signature or scanned pdf with signature are acceptable) the following declaration. Please tick the box next to each of the statements below to acknowledge you have read them and provided all required information.

▪ I will ensure that changes in approved research protocols are reported promptly and are not initiated without approval by	x

the Departmental Ethics Committee, except when necessary to eliminate apparent immediate hazards to the participant.	
▪ I have completed a risk assessment for this programme of research and hereby confirm that the risk assessment document will be discussed with any researcher/student involved in this programme of research (currently or in the future). I will ensure that all researchers/students sign the risk assessment form following this discussion. **Risk assessment forms for projects can be downloaded from the Ethics section of the PaLS Intranet.**	x
▪ I have obtained approval from the UCL Data Protection Officer stating that this research project is compliant with the Data Protection Act 1998. My Data Protection Registration Number is: Z6364106/2014/04/23 You can find a data protection registration form here: http://www.ucl.ac.uk/efd/recordsoffice/data-protection/	x
▪ I have included examples of the Information Sheet and Consent Form for the proposed research. It will be made clear to the participants that they can withdraw from the study at any time, without giving a reason.	x
▪ I will ensure that all adverse or unforeseen problems arising from the research project are reported in a timely fashion to the UCL Research Ethics Committee.	x
▪ I will undertake to provide notification when the study is complete and if it fails to start or is abandoned.	x
▪ I have met with and advised students on the ethical aspects of this project/programme of research.	x
▪ I am satisfied that the proposed research complies with current professional, departmental and university guidelines.	x

Signature: 

Date: 10 / 04 / 2014

A3 Contact details

Principal Researcher

Full name: Vyv Huddy

Position held Lecturer in Clinical Psychology

Research Department: Clinical, Educational and Health Psychology

Email: v.huddy@ucl.ac.uk Telephone: 02076791675

Additional applicant 1

Full name: Gareth James

Position held: Doctorate in Clinical Psychology

Research Department: Clinical, Educational and Health Psychology

Email: g.james.12@ucl.ac.uk Telephone:

Additional applicant 2

Full name: Sasha Nagra

Position held: MSc in Research Methods

Research Department: Clinical, Educational and Health Psychology

Email: sasha.nagra.13@ucl.ac.uk Telephone:

(Add further details on a separate sheet if there are more applicants to be covered by this form)

A4 Approval from the Departmental Ethics Committee

(Approval cannot be given by the principal researcher of this project – if necessary the application must be sent to an Ethics Officer from a different Research Department, or to the College Ethics Committee, for approval)

Declaration by the Research Department Ethics Chair:

[redacted]

I have reviewed this project and I approve it. ☐ YES

The project is registered with the UCL Data Protection Officer and a formal signed risk assessment form has been completed.

Allocated Departmental Project ID Number for the approved application:

_CEHP_2014_519_____

Name of the Research Department Ethics Chair (type in):

Date: 9/5/14

Appendix E

Online consent form and cover pages

STUDY OF SOCIAL PERCEPTION

We would like to invite you to participate in this research project. You should only participate if you want to; choosing not to take part will not disadvantage you in any way. Before you decide whether you want to take part, please read the following information carefully.

Please note, if you are currently receiving help for a mental health problem or substance misuse you will unfortunately not be eligible to participate. This study is also only open to participants who are residents in the United Kingdom. For more information, please contact the Principal Investigator, Gareth James (g.james.12@ucl.ac.uk).

CLICK START TO CONTINUE

What is this research about? The purpose of this research is to investigate how the imagination helps people interpret and respond to events. We are interested in the processes at work during imagination and the impact of individual differences on these processes.

What will I have to do? We will ask for your responses to various prompts, such as everyday scenarios, according to varying instructions (e.g. telling a story or providing a description). You will also be asked to complete some questionnaires that ask about mood, personality or thinking style.

Are there any risks or possibility of discomfort? The risks involved in participating are minimal. If you find yourself becoming distressed during the study, you can choose to stop at any time or withdraw from the study altogether by closing your browser. Partially completed data will not be used for this research. You can also contact the principal investigator to discuss the study.

How will we maintain your privacy and confidentiality? You will be asked to give some demographic information, such as your age and ethnicity. All information will be stored anonymously and only the researchers involved in the study will have access to or process the data. All data will be collected and stored in accordance with the Data Protection Act 1998. If you choose to withdraw from the study you have the option of also requesting that all data be deleted.

When and where will the study take place? Participation will involve only a single episode of activity online. Most people will compete it in 40 minutes.

What if I have questions about the project? If you have any questions or require more information about this study, please contact the principal investigator using the contact details below.

If you feel you require any additional support or participation has harmed you in any way, you can contact the principal investigator using the details below for further advice and information.

To thank you for taking part, on completion you will be entered into an optional prize draw – you will have a chance of winning £100 in your choice of vouchers. If you would like to enter, please provide your details in the spaces below. These will be separated from your answers so that you will not be identifiable in the research.

£25 cash prizes will be offered to the six people who recruit the most participants into the study. We request that you forward details of the study to people that you know. Good luck!

Principal Investigator: Gareth James, Department of Clinical, Educational and Health Psychology, University College London, London, WC1E 6HJ; Email: g.james.12@ucl.ac.uk. Tel: 020-7679-1897.

1 Name:

2 Email address:

3 Please enter the name and/or email address of the person who told you about this study:

Please select before continuing:

- [ ] I am not currently receiving help for a mental health difficulty or substance abuse, and am eligible to participate in this research

Click “Next” to acknowledge that you understand your rights as a participant and would like to begin.