Paranoid Ideation and Assessments of Trust

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Abstract

The ability to make accurate social judgements is crucial to effective functioning in society. Individuals suffering from paranoia are suspicious and mistrustful of others and consequently may have difficulties accurately assessing information about others within their environment. We investigated the effects of paranoid ideation on evaluations of trustworthiness from unfamiliar faces in a non-clinical sample. Measures of paranoid beliefs about others were used to assess 122 typically developing young adults. Individuals categorised with high paranoid ideation (n=25) and low paranoid ideation (n=23) subsequently rated unfamiliar faces that had previously been manipulated to look untrustworthy, of average trust, and trustworthy. Individuals high in paranoid ideation rated faces as significantly less trustworthy than those low in paranoid ideation. Both groups altered their ratings according to the trustworthiness of the face, but those high in paranoia rated all faces as less trustworthy. The findings suggest a bias in social judgements in individuals with high levels of paranoid ideation. They are able to judge faces for trustworthiness but have a bias towards a lower estimation of trust.

Keywords: Paranoia, trust, face perception

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Some 10 - 15% of the general population regularly experience paranoid thoughts (Freeman, Garety, Bebbington, Smith, Rollinson, Fowler et al., 2005), with the most immediate trigger being misinterpretation of an everyday experience, such as a person's facial expression (Freeman et al., 2005; Freeman, Pugh & Garety, 2008; Freeman, Pugh, Vorontsova, Antley & Slater, 2010). The prevalence in the non clinical population as revealed by surveys (Freeman, 2007; Freeman et al., 2005) and tests of the psychological processes in paranoia in experimental studies (Freeman et al., 2010; Lincoln, Ziegler, Mehl & Rief, 2010; Warman Lysaker, Martin, Davis & Haudenschield, 2007) suggests that paranoia may be best understood as being on a continuum, rather than as an all or nothing phenomenon (see Freeman, 2007; van Os, Hanseen & Bijl 2000). Of course the consequences of high levels of paranoia, in both clinical and non-clinical populations, are emphasised by significant associations with depressed mood, social anxiety & avoidance, and lowered self-esteem (Martin & Penn, 2001).

People with clinical paranoia have an unfounded suspicion that others have the intention to cause harm. Hence, paranoia involves a concern about the trustworthiness of other people. Trust can be defined as, "Confidence in or reliance on some quality or attribute of a person or thing, or the truth of a statement." (Trust as defined in the Oxford English Dictionary, 1989). Surprisingly little research has been focussed on this important social judgement. Determining whether we should or should not trust an unfamiliar person allows us to adapt our own behaviour accordingly; for example, deciding whether to approach or avoid that person.

Whether or not an individual is deemed trustworthy is based on numerous factors and one important source of information is their face. The face is such a powerful source of information that a mere 100 milliseconds exposure is sufficient for adults to make various trait judgements, including trustworthiness (Willis & Todorov, 2006).

Of course we differ in our ability to make such judgements and some individuals may find it difficult to accurately judge the trustworthiness of other people, particularly those they do not know. This may be especially the case of people who experience lots of paranoid thoughts such as some people with severe mental illnesses (e.g. schizophrenia). Studies of trustworthiness judgments in people with schizophrenia have produced mixed findings about trust judgements. It has been found that they tend to rate unfamiliar faces as similar or more trustworthy than controls but to also have more variability in their ratings (Baas, van't Wout, & Kahn, 2008a; Pinkham, Hopfinger, Pelphrey, Piven & Penn, 2008).

However, among people with schizophrenia, there are differences between paranoid and non-paranoid participants in the way that social judgments are made. Paranoid patients show differing behavioural and neural responses from non-paranoid patients when making social judgments and judgments of facial emotion (Hooker, Tully, Verosky, Fisher, Holland & Vinogradov, 2010). In addition, it was found that paranoid people rated faces as more untrustworthy than non-paranoid people and controls and that the paranoid patients demonstrated reduced activation in the network underlying social judgments including the amygdala, fusiform face area, and ventrolateral prefrontal cortex (Pinkham et al., 2008).

On balance it can be seen that individuals suffering with paranoid schizophrenia may judge others faces as less trustworthy (Hooker et al., 2010) and a number of theories have been postulated to explain what leads such individuals to make such evaluation of others. Frith (1992) proposed that difficulties such as paranoia arise from an inability or deficit in the ability to interpret the motives of others; with individuals experiencing deficits in meta-representation or theory of mind (see also Corcoran, Mercer & Frith, 1995; Frith & Corcoran, 1996). Recent studies have supported the idea of a deficit in emotional processing as individuals suffering from paranoid schizophrenia show disconnection in the amygdala, medial prefrontal cortex and autonomic arousal systems, areas responsible for processing fearful stimuli (Williams et al., 2007). Additionally, individuals suffering with paranoid schizophrenia display an inability to assign the appropriate emotional significance to face stimuli (Pinkham et al., 2008). Despite this evidence there has been limited support for a theory of mind deficit in the formation and maintenance of paranoia and such impairments seem to be more related to the negative symptoms of severe mental illness (Freeman, 2007).

An alternative interpretation of the link between paranoia and evaluations of trust proposes that people with paranoia are not unable to gauge others motives, but have a bias in their processing whereby they consistently rate others as less trustworthy. Multi-factorial models of paranoia and persecutory beliefs (i.e. Freeman, 2007) emphasise that people with paranoia have a number of cognitive biases including a reasoning bias in which many people with delusions 'jump to conclusions' (Dudley & Over, 2003; Dudley et al., 2011). In addition, people with persecutory delusions exhibit increased attention to threat-related words (Bentall & Kaney, 1989), preferentially recall threat-related information (Bentall, 1994) and characteristically blame others

for negative events (Bentall, Kaney & Dewey, 1991). In summary, this theory proposes that individuals with paranoia have a bias towards a more negative interpretation of the world and hence of other people.

The aim of the current study is to explore the impact of paranoid ideation on evaluations of trustworthiness from unfamiliar faces in a non-clinical sample. The study will help clarify whether paranoid ideation within a non-clinical sample results from a deficit (Frith, 1992) or bias (Garety et al., 2005) in the judgements of others. Based on the existing research from clinical samples with paranoia, it is hypothesized that individuals with higher levels of paranoid ideation will rate faces as less trustworthy than those with lower levels of paranoid ideation. To help determine whether there is a bias or a generalised deficit in the assessment of trust in individuals with high levels of paranoid ideation, we also explore differences in the rating of faces that vary along a dimension of trustworthiness (trustworthy, neutral and untrustworthy).

A deficit would be revealed by reduced ratings of trust on all faces with no change in ratings across the different trust face types. In other words a deficit would be revealed if people high in paranoia rated all faces the same regardless of face type and thus showed an inability to account for face differences. A bias in emotion recognition would be revealed by reduced ratings of trust across all dimensions in comparison to people low in paranoid ideation. Importantly though there would be a difference across the types of faces indicating that changes in face type were accounted for. Therefore, a biased style would take account of the change of dimension even in the context of an overall lower rating of trustworthiness. A third possibility is that people high in paranoia would be particularly affected by the least trustworthy faces and there would be an

interaction revealed between the group (those high in paranoia) and the specific content of the task (very untrustworthy faces). This research aims to reveal whether there is a deficit, bias or highly specific difficulty in the judgment of others.

Method

Participants

One hundred and twenty nine individuals were recruited in a lecture theatre from the undergraduate population and were asked to complete a questionnaire designed to assess levels of paranoia. Seven participants were removed from the sample owing to considerable missing data (e.g. missing 2 or more questions). Therefore, 122 individuals (97 female, mean age=18.93years, SD=1.31) were included in a screening phase.

From this initial phase, 48 participants (42 female, mean=18.94 years; SD=1.08) were selected for the experimental phase. From the sample as a whole those classed as high paranoid ideation (22 female, 3 male, mean age=19.2years, SD=1.22) had scores above the 70th percentile and those classed as low paranoid ideation (20 females, 1 male, mean age=18.65years, SD=0.83). were below the 30th percentile. These cut offs were selected based on previous research which specifically explored the structure of paranoia in a non-clinical population (Freeman et al., 2005) who similarly used the 25th and 75th percentiles as a grouping variable.

Design

A mixed between and within subjects design was utilised. Two groups (high or low in paranoid ideation) completed a task that varied faces presented according to trustworthiness (three levels; trustworthy, neutral, and untrustworthy).

An apriori power calculation for a predicted medium effect size (based on initial pilot data) of f=0.2 indicated a sample size of 42 would be required to detect an effect using a repeated-measures, between factors design (α=.05, Power =.80; G Power version 3.0.8).

Measures

The 20-item, ParanoiaScale (PS) (Fenigstein & Vanable, 1992) is designed to measure subclinical levels of paranoia. The scale includes items such as 'Someone has it in for me' and 'I believe that I have often been punished without cause.' Each item is rated on a five-point scale (1-not at all applicable to me, to 5-extremely applicable to me). Scores can range from 20 to 100, with higher scores indicating greater paranoid ideation. Scores ranged from 20 - 73 with a mean for the screening phase sample of 41.14 (sd = 10.96) which is a little lower than that reported by Freeman et al., (2005) but was very similar to the finding of Mills, Gilbert, Bellew, McEwan & Gale, (2007) who similarly recruited an undergraduate sample and was comparable to the mean scores previously found in subclinical groups, (Combs, Penn & Fenigstein, 2002; Fenigstein & Venable, 1992). Scale reliability (Chronbach's α) for the Fenigstein scale indicated excellent internal consistency, α=0.88.

Materials and Procedure

The experimental phase assessed ratings of trust for unfamiliar faces and was completed approximately 2 weeks after the screening phase. Thirty faces were selected from the Karolinska dataset (see Lundqvist, Flykt, & Ohman, 1998; Oosterhof & Todorov, 2008). The face stimuli were computer generated using Facegen and based on a database of human faces that were laser-scanned in 3D. Seventy- five undergraduate students from Princeton University were asked to judge 300 computer generated faces specifically on the trait of trustworthiness. The response scale ranged from 1 (not at all) to 9 (extremely) (see Oosterhof & Todorov, 2008). The mean judgements for all participants (mean = 4.75, SD=0.66) were used to find dimensions of trustworthiness. Faces representing +2, 0 and −2 standard deviations from the average trustworthy face were selected. Ten identities were included and each identity was presented three times displaying varying stages of trust (untrustworthy, neutral and trustworthy).

Faces were displayed in Microsoft PowerPoint 2007 in a randomised order determined by the randomisation function in Excel. Participants were given verbal instructions that they would see a face and were required to rate the face for trustworthiness using the scale on screen. A practice task was given to allow participants to ask any necessary questions. Within each trial a fixation cross appeared for 1000ms followed by a face in the centre of the screen along with a Likert scale, the face remained on the screen for 3000ms and then disappeared. Previous studies investigating judgements made from facial stimuli vary in the duration of presentation time (100ms (Willis & Todorov), 2500ms (Eisenbarth & Alpers, 2011) and 5000ms (Turk & Cornish, 1998). As we were assessing a relatively complex trait, trust, a greater presentation period was deemed necessary. Our pilot data supported that 3000ms was an adequate amount of time to

form accurate judgements of trust from faces. This presentation time has subsequently been

supported by recent work investigating facial processing using computer generated images

(Carlson, Gronlund, Weatherford & Carlson, 2012.)   The Likert scale remained on the screen

until the participant had stated their rating of trust, with -3 being very untrustworthy and +3

being very trustworthy (0 being average). Participants completed 30 trials. A researcher was

present in the room and noted down the responses to each face presented.

Anonymity of the participants was protected at all times and the research had been approved by

the Ethics Committee of Newcastle University.

Results

Participants in the high paranoid ideation group scored higher in paranoid ideation (mean =

54.44 sd = 7.28, range from 52 to 73) than the low paranoid ideation group (mean = 29.17, sd

=2.98, range from 20 to 30). This was a significant difference (t(1,46) =15.49 , p<0.001, CI

21.98-28.55).

With regards the experimental task as can be seen in figure 1 the groups differed in their

assessments of the trustworthiness of faces. People high in paranoia were lower on their ratings

for each face type than the low paranoia group. It can also be seen that both groups accounted

for the change in face type and gave lower ratings for untrustworthy and higher for trustworthy

faces.

[Figure 1]

A 2 x 3 analysis of variance (ANOVA) was conducted with factors Paranoid Ideation (high, low) and Stimuli (untrustworthy, neutral, trustworthy) and rating of trustworthiness as the outcome variable. There was a significant main effect of Paranoid Ideation $F(1,46)=7.45$, $p<.01$ with participants higher in paranoid ideation giving lower ratings of trust overall (mean high=2.83, sd=0.55; mean low=3.16, sd=0.49). There was a significant main effect of Stimuli $F(2, 92)=386.92$, $p<.001$ as untrustworthy faces were rated significantly lower than neutral faces $t(47)=18.07$, $p<.001$ (mean untrustworthy=1.86, sd=0.54; neutral=3.12, sd=0.45), and neutral faces were rated significantly lower than trustworthy faces $t(47)=13.24$, $p<.001$ (trustworthy faces=4.00, sd=0.56. The interaction between factors was not significant $F(2,92) =0.15$, p=.86). This would seem to support the biased processing account in that the high paranoid group were systematically reporting lower levels of trust than the low paranoid group but they did account for the changes in face type.

Discussion

The current study explored the relationship between paranoid ideation and ratings of trustworthiness for unfamiliar faces within a non-clinical sample. Participants with high levels of paranoid ideation rated unfamiliar faces as less trustworthy than those with low paranoid ideation. Individuals with high paranoid ideation were able to distinguish between different trust stimuli as they could identify whether a face was more or less trustworthy (Figure

1). The pattern of results suggests a bias (Bentall & Kaney, 1989) rather than a deficit in social judgement (Frith, 1992).

The fact that there was a difference in the trust evaluations of participants in these groups is valuable when taking into consideration that the participants are not at an extreme or clinically-significant level of paranoia. The results would seem to be consistent with the concept of a continuum of paranoia present throughout the general population and which may impact upon the way that individuals evaluate unfamiliar people.

Of course there are a number of limitations of this work that need to be held in mind. Potential criticism may come from the selective stimuli used, as only computer generated male faces were used in a setting that lacked ecological validity. One specific limitation of the stimuli set was that the images were static and therefore neglected the movements and subtle cues that are conveyed in real life environments, thus the current study would benefit from the inclusion of dynamic stimuli to allow a more realistic portrayal of facial cues. This stimulus did however have a number of benefits, perhaps the most crucial being the ability to control for confounding variables. Factors including external features such as hair and gender have been shown to have the potential to influence individual's judgments about others (Bronlow & Zebrowitz, 1990). Second, our sample was recruited via advertisement, and therefore respondents may only represent a small part of the population. Individuals with the most pronounced paranoid ideations are likely to be less willing to participate voluntarily in research studies. It is noticeable that our overall sample reported quite low levels of paranoid ideation and hence the groups selected from this sample were likely to be relatively low on the overall continuum of

paranoia. Despite this issue alongside the relatively small sample size a significant result was still found. Third, individuals were only asked to rate faces on trust, with no other dimensions being tested. It is possible that factors such as attractiveness or intelligence of the faces may have influenced ratings of trust. Inclusion of these factors would have allowed assessment of whether individuals suffering from paranoia had a specific negative bias to trust others, or whether they generally rated all traits lower. Finally, we did not control for other potential confounds such as depression. It may be that a factor like low mood could account for lower ratings of trustworthiness of others, and these judgements are not solely to do with levels of paranoia.

Despite the fact that the majority of previous research investigating trust evaluations has focused on clinical samples (Baas et al., 2008a, Baas, Aleman, Vink, Ramsey, de Haan & Kahn, 2008b, Baas, van't Wout, Aleman & Kahn, 2008c; Combs & Penn, 2004), using a non-clinical sample was effective in showing the presence of paranoid thoughts and their effect on social judgements (at least on a laboratory based experiment). The findings are particularly noteworthy when considering the impact of this type of judgement style on individuals and their everyday lives; for example resulting in social withdrawal, depressed mood, and lowered self-esteem (Martin & Penn, 2001). Of course further experimental work is needed to establish whether individuals with clinical levels of paranoia may rate all faces with even greater untrustworthiness. Such work may also include other trait judgements from unfamiliar faces to detect whether this negative attribution bias extends to other domains or whether it is specific to evaluating trust.

In conclusion, the current study highlights that paranoid ideation has an influence on the judgements that we make about other people. Paranoia has often been viewed as a symptom of psychosis that is restricted to the clinical population. However, this study provides support that paranoid ideation may impact upon evaluations of trustworthiness for unfamiliar people. Helping people judge others in a more trusting manner may be potentially included in methods to help people overcome their suspicion and mistrust of others (Cromarty & Dudley, 2009).

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Figure 1:

Mean ratings for each category of face for participants high and low in paranoid ideation.

Error bar represent standard error of the mean.