Paranoid thinking, cognitive bias and dangerous neighbourhoods: Implications for perception of threat and expectations of victimisation

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Abstract
Background: Paranoid thinking is prevalent in the non-clinical population and cognitive mechanisms of heuristic reasoning and jumping to conclusions bias contributes to its formation and maintenance.
Aims: This study investigated the degree to which paranoia, perceived environmental risk, heuristic reasoning and jumping to conclusions bias (measured with the beads task) contribute to misinterpretation of neutral stimuli, and whether this informed judgments regarding vulnerability to threat and crime. It is also investigated whether impulsiveness is a confounding factor on the beads task.
Methods: Two hundred participants were recruited using a snowball-sampling method for a quantitative cross-sectional study. Participants reported demographic information, three psychometric questionnaires and two experimental tasks via an online paradigm hosted by the Bristol Online Survey tool.
Results: Participants with high paranoia scores perceived their environment to be more dangerous than those with low scores. Participants with high paranoia scores also overestimated threat in neutral stimuli and had high expectations of future victimisation. Jumping to conclusions on the beads task did not predict fear of crime outcomes, but was predicted by impulsivity.
Conclusion: Participants who demonstrated paranoid thinking were more likely to reside in perceived dangerous neighbourhoods and overestimate threat. While this could indicate a paranoid heuristic, it is a potentially rational response to prior experiences of crime and victimisation. Implications and suggestions for future research are discussed.

Keywords
Paranoia, jumping to conclusions, threat, victimisation, heuristic reasoning

Introduction
Delusional thinking (beliefs held to be true despite clear contradictory evidence; Freeman & Garety, 2004) has attracted considerable investigation since the paradigmatic shift from categorical to continuum-based models of mental disorder (Garety & Freeman, 2013).

Thinking of a delusional nature has been shown to be prevalent in the non-clinical population (Johns & Van Os, 2001). For example, a study conducted by Verdoux et al. (1998) reported that one in 10 non-clinical respondents believed that they were the victim of a conspiracy. A more recent study by Cella, Sisti, Rocchi, and Preti (2011) used latent class analysis to examine data in 800 young adults, finding 41% experienced paranoid thinking and a further 31% held beliefs with delusional content. Another study (Freeman et al., 2005) found that approximately a third of non-clinical participants experienced paranoid thinking. A limitation of current research on this topic is the restricted age range of participants in studies investigating the phenomena, with studies showing a bias towards samples comprising young adults (Bora & Baysan Arabaci, 2009). An exception to this is seen in an experimental study by Freeman, Pugh, Antley, et al. (2008) which subjected 200 participants, aged 18–77, to a virtual reality train ride, populated by neutral characters. They found that
a ‘substantial minority’ interpreted the neutral characters as threatening, with over 40% experiencing some paranoid thinking. There was also a positive association between self-reported paranoia and constructs derived from the virtual reality measure. Bora and Baysan Arabaci (2009) controlled for age in a sample of 1,024 participants aged between 16 and 90, finding that younger participants reported more delusional beliefs than older participants. Though Van Os, Linscott, Myin-Germeys, Delespaul, and Krabbendam (2009) report a dose-response relationship between traumatic stressors and increasing persistence of psychotic symptoms, it is important to note that transient paranoid experiences are not necessarily indicative of frank psychosis.

While a number of cognitive mechanisms are associated with the formation and maintenance of paranoid thinking, ‘jumping to conclusions’ (JTC) reasoning bias has been repeatedly implicated in experimental research looking at the phenomenon (Garety & Freeman, 2013). JTC is the tendency to use fewer data to reach a conclusion before a reasoned decision can really be made. JTC bias is associated with the rapid appraisal of anomalous or ambiguous stimuli to form a delusional conclusion without due consideration of alternative explanations (Garety & Freeman, 2013).

A JTC bias has consistently been reported in individuals with delusional thinking, indicating that individuals with delusional thinking patterns accept hypotheses as correct on the basis of less evidence than controls (Fine, Gardner, Craigie, & Gold, 2007). Lincoln, Lange, Burau, Exner, and Moritz (2010) found that individuals with active delusions required fewer beads before making a decision, and those with remisive delusions also required fewer beads than controls. So et al. (2012) corroborated these findings in a 1-year longitudinal study, finding JTC bias prevalent in delusional clinical participants, and that this was stable across the period of study.

An association between paranoid thinking and JTC bias has also been seen in non-clinical populations. Freeman, Pugh, and Garety (2008) demonstrated that approximately 20% of participants displayed a JTC bias, and that this was highly associated with being more convinced by personally held paranoid beliefs. Persons can also JTC for a more prosaic reason than cognitive bias: impulsivity. Impulsivity crosses a variety of mental disorders (Moeller, Barratt, Dougherty, Schmitz, & Swann, 2001) and may also affect performance as commission errors (i.e. the failure to withhold a response), as has been seen for both human and animal studies (Bizot & Thiébot, 1996; Wright, Lipszyc, Dupuis, Thayaparanajah, & Schachar, 2014). While there is considerable literature highlighting the utility of the beads task, only one (Moritz & Woodward, 2005), to the author’s knowledge, has controlled for impulsiveness. As psychotic individuals are reported to be more impulsive than controls (Lee et al., 2013), it is of value to exclude impulsivity as an explanation for JTC effects.

Misinterpretation of anomalous experiences is a valid contributing factor in the development and maintenance of paranoid delusional beliefs (Freeman & Freeman, 2008, p. 105), and a JTC bias may indicate inaccurate appraisals of neutral stimuli (Garety & Freeman, 2013). In research, paranoid individuals overestimate threat in neutral stimuli (Green & Phillips, 2004), display attentional bias towards threatening stimuli (Salvatore et al., 2011); react quicker to ‘paranoid words’ than controls on an emotional Stroop test (Bentall & Kaney, 1989), and perceive neutral faces as angry (Pinkham, Brensinger, Kohler, Gur, & Gur, 2011). The Freeman, Pugh, Antley, et al. (2008) virtual reality study revealed that paranoid participants even perceived threat in neutral characters within a virtual reality environment.

Evidence suggests that prior victimisation leads to the development of paranoid thinking for some people (Mawby, 2001; Scott, Chant, Andrews, Martin, & McGrath, 2007). For example, Mawby (2001) reported that there was a significant association between repeat victimisation and increased negative feeling towards neighbours and neighbourhoods, as well as a consequent increased fear of crime. Furthermore, traumatic victimisation is reported to be causally associated with an increase in paranoid delusions (Scott et al., 2007). Increased exposure to crime can lead to heightened anxiety (Breslau, Davis, Andreski, & Peterson, 1991) and in turn anxiety has been shown to contribute to the formation of paranoid thoughts (Bentall et al., 2009), with Freeman and Garety (2003) stating: ‘... in many cases delusions are a direct representation of emotional concerns, and that emotion contributes to delusion formation and maintenance’ (p. 923). Freeman, Gittins, et al. (2008) describe paranoid thinking as ‘anxious fear’ (p. 1130).

There is an increased risk of being a victim of crime in urban areas (Brennan, Moore, & Shepherd, 2010), and epidemiological studies report that urbanisation increases the risk of psychoses (Sundquist, Frank, & Sundquist, 2004; Van Os, 2004). Ellett, Freeman, and Garety (2008) demonstrated how exposure to an urban environment exacerbated pre-existing paranoid thinking, heightened anxiety, negative beliefs about others and raised JTC reasoning bias. This conjunction of associations makes causality for victimhood, paranoia and fear of crime difficult to determine.

Heuristic reasoning (Tversky & Kahneman, 1974) may explain how prior victimisation leads to paranoid thinking. Corcoran et al. (2006) found participants used the availability heuristic to predict future negative events based on experience of past negative events. Bentall et al. (2008) found negative self-esteem and expectation of future negative events correlated with paranoid thinking, indicating that prior experiences contribute to future expectations. Bennett and Corcoran (2010) reported corroborating findings in paranoid participants. Lastly, Preti and Cella (2010) posit that a ‘paranoid heuristic’ may be employed by individuals to anticipate potential threat. While experiences of
paranoid thinking might be transient, non-pathological and even potentially adaptive (Preti & Cell, 2010), Van Os et al. (2009) report that increased exposure to traumatic stressors can lead to the development of persistent and potentially impairing psychosis. While in the majority of cases this would not reach clinical thresholds, a paranoid individual’s ability to process social information may be impaired to an extent whereby a detrimental effect on his or her social functioning is observed.

This study sought to investigate whether non-clinical paranoid individuals use heuristic reasoning and JTC to interpret neutral stimuli and if so, how this informs the judgements they form regarding their vulnerability to threat and crime. It also examined if the JTC task is affected by simple impulsivity. It was hypothesised that (1) there will be a positive association between living in a perceived dangerous neighbourhood and greater paranoid thinking; (2) participants who experience more paranoid thinking will overestimate threat / criminal intent, with perceived dangerous neighbourhoods and JTC bias acting as contributing factors; (3) greater paranoid thinking, more perceived dangerous neighbourhoods and higher JTC bias will predict high likelihood of crime expectations; and (4) that there will be a positive association between greater impulsiveness and JTC bias. This study will allow for greater understanding of the interaction between paranoid thinking, perceptions of danger and expectations of crime, contributing to an understanding of how judgements grounded in paranoid thinking influence our experiences of everyday anxiety as the potential victim of a crime. Insight will also be achieved into the mechanisms and factors that contribute to JTC such as affect, age and cognition.

Method

Design

A quantitative cross-sectional design was employed, utilising an opportunistic snowball-sampling method. All data were collected online using the Bristol Online Survey (BOS; http://www.survey.bris.ac.uk/); the survey was initially promoted on ‘Facebook’, ‘Twitter’ and the ‘Psychological research on the net’ websites. Participants were required to provide demographic information, respond to three standardised measures and complete two experimental tasks, all of which gathered information within the BOS architecture. The University ethics committee approved the study.

Participants

Two hundred participants (M:F = 85:115) were recruited for the study; their age ranged from 17 to 67 (M=31.29 years, SD=12.58 years). Eighty-one participants (40.5%) reported themselves to be from an urban neighbourhood; 72 (36%) reported to be from a suburban neighbourhood and 47 (23.5%) from a rural neighbourhood. Fifty-two (26%) participants reported that they had received a diagnosis of mental illness at some point in their life, with 24 (12%) reporting depression, 10 (5%) reporting anxiety and seven (3.5%), a dual diagnosis of depression and anxiety. A further 12 (6%) reported other mental illness diagnoses.

Measures

Barratt Impulsiveness Scale (Short Form). The Barratt Impulsiveness Scale (BIS-15) is an adapted short form of the BIS-II (Barratt & Stanford, 1995; Spinella, 2007). It measures impulsivity across 15 items, and is rated on a four-point scale (one equates to ‘rarely/never’ and four to ‘almost always’). The BIS-15 was utilised in this study so as to ascertain whether JTC bias can be accounted for by impulsiveness. The BIS-15 has a reliability of .79, and a high correlation with the full BIS-II (r=.94) (Spinella, 2007).

Beads task. The beads task (Garety et al., 2005; Phillips & Edwards, 1966) is a measure of cognitive reasoning to assess JTC bias. For this study, a computerised version of the beads task (Garety et al., 2005) was adapted for use within the BOS. The task was as per standard instructions. The participant is presented with two jars: one had a ratio of 60:40 red to blue beads and the other had inverted proportions of the two colours (Figure 1). The participant was informed that one of the jars has been chosen, and that beads can be drawn from it until a decision is made regarding which of the two jars was chosen (Figure 2). The ‘number of draws to decision’ was used to score the task.

Fear of crime and prior victimisation scale. This assessment consists of two subscales, measuring fear of crime and likelihood of crime respectively (Ferraro & LaGrange, 1992) (adapted). For this study, only an adapted likelihood of crime subscale was utilised. The likelihood of crime subscale consists of 10 items, with participants required to rate the likelihood of being a victim of each item within the next year. A five-point rating scale is used, ranging from one (‘absolutely won’t happen to me’) to five (‘will happen to me’). The ‘likelihood of being a victim in the next year’ subscale is reported to have a strong alpha internal consistency, with reliability of .87 (Ferraro & LaGrange, 1992).

Paranoia scale. The paranoia scale is a 20-item, self-report measure for the assessment of paranoia within a non-clinical population (Fenigstein & Vanable, 1992). Each item is rated on a five-point scale, ranging from one (‘strongly disagree’) to five (‘strongly agree’). Total scores range from 20 to 100, with higher scores indicating greater paranoid thinking (Freeman et al., 2005).
The paranoia scale is reported to have strong alpha internal consistency, with a reliability of .84 (Fenigstein & Vanable, 1992).

Perception of criminal intent vignettes. This measure consisted of 10 neutral situational vignettes. Each vignette is designed to be realistic, mundane and internally consistent, in line with the recommendations of Wason, Polonsky, and Hyman (2002). Each individual measure consisted of a neutral situational statement such as: ‘There has been a violent incident. A man is leaning over the victim and has blood on his shirt’; a neutral instruction: ‘Based only on the above statement, use the scale to rate how much you agree with following statement’; and a possible conclusion: ‘The man has harmed the victim’. Participants are asked to rate how strongly they agreed with the conclusion on a five-point scale, ranging from one (strongly disagree) to five (strongly agree). There were five subjective and five objective vignettes.

Procedure

The measures were input into a research website using the BOS survey building tool. In order to host the images required for the beads task, a separate picture hosting website was developed (http://www.frpresearch.co.uk). The images were taken with permission from the computerised beads task (Garety et al., 2005) and sequenced appropriately.

Participants were recruited through a snowball-sampling method, utilising online social media websites. A standardised
message was created, with a link to the survey, and shared among the author’s contacts. A request to forward the message to others was also included. While this meant that the survey could potentially reach an exponentially vast and heterogeneous audience, the BOS allowed for 250 responses, over the sample size estimate of 150, and sufficient to accommodate any attrition in data and reduce the size of the confidence limits around the results of the study.

The full survey took approximately 20 minutes to complete. Upon completion, participants were advised to follow a link to the participant debrief. This was hosted on the same webpage as the beads task images. Results were automatically logged by the BOS system.

Statistical analysis

Results were extracted from the BOS system and imported into Statistical Package for Social Sciences (SPSS) 21.0 for analysis. All measures were found to be reliable, with Cronbach’s alpha at minimum ‘acceptable’ for all tasks (Table 1). Skewness and kurtosis were satisfactory for all measures, falling within desired parameters following the removal of one outlier.

In order to investigate the degree to which age, gender and previous diagnosis of mental illness predict scores on the paranoia scale, a multiple linear regression was conducted. Results indicated that gender did not predict scores on the measure, \( \beta = -2.22, 95\% \text{ CI} [-5.96, 1.52], t(197) = -1.17, p = .24 \); however, age did predict scores on the measure, \( \beta = -26, 95\% \text{ CI} [-402, -11], t(197) = -3.45, p = .001 \), as did previous diagnosis of a mental disorder, \( \beta = -5.43, 95\% \text{ CI} [-9.63, -1.23], t(197) = -3.45, p = .012 \). A model constructed of age and previous diagnosis of mental illness predicted 7.6% of the variation in paranoia scale scores (adjusted \( R^2 = .076 \)) (see Table 2).

Results

Hypothesis 1

To test the hypothesis that perceived dangerous neighbourhoods would be associated with paranoid thinking, an analysis of covariance (ANCOVA) was run in order to ascertain which neighbourhoods were perceived to be most dangerous and to control for an age-effect. The ANCOVA revealed that urban areas were perceived to be the most dangerous (Table 3). There was no effect of age, \( F(1, 199) = 86, p = .36, \eta^2_p = .14 \). A one-way analysis of variance (ANOVA) was then run and Post hoc Bonferroni tests indicated that there were significant differences between urban and rural neighbourhoods (\( p < .001 \)) and suburban and rural neighbourhoods (\( p = .001 \)). There was a non-significant difference between urban and suburban neighbourhoods (\( p = .13 \)). Results indicate that perceived dangerousness increases as the neighbourhood becomes more urbanised (Table 3).

To test for an association between perceived dangerousness and paranoid thinking, a bivariate correlation analysis was conducted. Results indicated that perceived dangerousness of neighbourhood was modestly, but significantly,

| Table 1. Cronbach’s alpha, mean and standard deviations for measures utilised in this study. |
|---------------------------------|--------|--------|
| Cronbach’s alpha | Mean | SD |
| Paranoia scale | .913 | 48.24 | 13.60 |
| Likelihood of crime scale | .854 | 25.81 | 5.91 |
| BIS–15 | Total | .818 | 39.61 | 6.80 |
| | Motor | .784 | 11.50 | 3.03 |
| | Attention | .753 | 12.11 | 2.90 |
| | Non-planning | .704 | 16.03 | 3.12 |
| Beads task | .959 | 10.10 | 2.96 |
| Social perception vignettes | .781 | 28.71 | 4.92 |

| Table 2. Variables that predict scores on the paranoia scale. |
|-----------------|--------|--------|--------|
| B (95% CI) | SE | \( \beta \) | \( p \) |
| Constant | 69.267 [12.132, 19.700] | 1.875 | .005* |
| Age | \( -256 [-402, -110] \) | .074 | -237 | .001* |
| Gender | \( -2220 [-5.960, 1.521] \) | 1.897 | -.081 | .243 |
| Mental illness | \( -5.433 [-9.634, -1.233] \) | 2.130 | -.176 | .012* |

Table legend: Linear model of predictors of paranoia scale scores, with 95% confidence intervals reported in parenthesis. Confidence intervals and standard errors based on 200 bootstrapped samples.

*Significant \( p < .005 \).
related to paranoid thinking, \( r = .145 \), 95% CI \([- .023, .322]\), \( p = .04 \).

**Hypothesis 2**

In order to investigate whether paranoid participants overestimated threat/risk of criminal victimisation, and whether JTC bias, perceived dangerous neighbourhoods and mental illness contributed to the phenomenon, a bivariate correlation analysis was conducted. Findings indicated that paranoid thinking was significantly associated with overestimation of threat/risk of criminal victimisation (\( r = .321 \), 95% CI \([- .167, .235]\), \( p < .001 \)); however, there were no significant associations between the other variables and overestimation of threat/risk of criminal victimisation (Table 4).

To investigate the degree to which paranoid thinking predicted the overestimation of threat/risk of criminal victimisation, a simple linear regression analysis was conducted. Findings indicated that paranoia significantly predicted the overestimation of threat/risk of criminal victimisation, \( \beta = .84 \), 95% CI \([.33, .139]\), \( t(197) = 3.35, p = .001 \). Paranoia predicted 5.4% of the variation in outcome scores (adjusted \( R^2 = .054 \)).

**Hypothesis 3**

In order to investigate whether paranoid thinking, perceived dangerous neighbourhoods, heuristic reasoning and JTC bias predict high likelihood of victimisation expectations, bivariate correlations initially tested for associations. Gender and mental health diagnoses were included in the analysis as potential contributing factors. Results indicated that gender, paranoid thinking and perception of one’s neighbourhood as dangerous were all independently associated with high likelihood of crime expectations. To untangle the degree to which paranoid thinking, perception of neighbourhoods as dangerous and gender could predict high likelihood of crime expectations, a multiple linear regression was conducted. Results indicated that a model constructed from paranoid thinking, perception of neighbourhoods as dangerous and gender predicted a significant proportion of variance in outcome scores, \( R^2 = .14, F(3, 196) = 10.664, p < .001 \). Adjusted \( R^2 \) indicated that the model accounted for 12.7% of the variance. Females were more likely than males to have high likelihood of victimisation expectations (Table 5).

**Hypothesis 4**

To investigate whether impulsiveness is a confounding factor for JTC effect on the beads task, a two-tailed bivariate correlation analysis was conducted. Results indicated significant negative correlations between total impulsiveness (and two of the three impulsiveness subscales) and scores on the beads task (Table 6). This demonstrates that a JTC bias is modestly but significantly associated with

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**Table 3.** Descriptive statistics for perceived dangerousness ratings by neighbourhood.

| Neighbourhood | N   | Mean | SD  | SE  | 95% confidence interval for mean lower | higher |
|---------------|-----|------|-----|-----|--------------------------------------|--------|
| Urban         | 81  | 1.91 | .81 | .090| 1.73                                 | 2.09   |
| Suburban      | 72  | 1.68 | .73 | .086| 1.51                                 | 1.85   |
| Rural         | 47  | 1.19 | .45 | .066| 1.06                                 | 1.32   |

**Table 4.** Correlation matrix describing associations between overestimation of threat/risk of criminal victimisation and variables; and high likelihood of victimisation expectations and variables.

|                         | Overestimation of threat/risk of criminal victimization | High likelihood of victimisation expectations |
|-------------------------|--------------------------------------------------------|-----------------------------------------------|
|                         | \( R \) | \( p \) | \( SE \) | \( R \) | \( p \) | \( SE \) |
| Paranoia                | .321   | <.001** | .084 | .178  | .044*  | .084 |
| Beads task              | -.032  | .715   | .077 | -.015 | .865   | .094 |
| Dangerous neighbourhood | .033   | .711   | .098 | .303  | <.001** | .071 |
| Mental illness          | -.020  | .820   | .088 | -.118 | .184   | .078 |
| Gender                  | .203   | .021*  | .080 | .006  | .945   | .102 |

Table Legend: 95% confidence intervals for \( r \) reported in parenthesis. Confidence intervals and standard errors based on 140 bootstrapped samples. *\( p = .005 \) **\( p = .001 \).
impulsiveness, specifically motor ($r = −.215$, $p = .002$) and non-planning impulsivity ($r = −.227$, $p = .007$).

## Discussion

The results from this study support findings by Johns and Van Os (2001), Cella et al. (2011), Freeman, Pugh, Antley, et al. (2008) and others who find a non-trivial prevalence of paranoid thinking in the general population. This is particularly apparent in urban environments, corroborating the findings of Sundquist et al. (2004) and Ellett, Freeman, and Garety (2008). Paranoid thinking was also associated with greater perceptions of danger in increasingly urbanised neighbourhoods, which possibly supports the hypothesis that paranoid thinking becomes increasingly persistent with greater exposure to stressors (Van Os et al., 2009) and that younger participants are more likely to experience paranoid thoughts than older participants. Of particular significance in this study were the findings that paranoid participants interpreted neutral social vignettes as containing threat, thus indicating their vigilance for potential harm. This vigilance for threat, identified in this study and previous research (for review see Green & Phillips, 2004), can potentially be interpreted as an evolutionary and adaptive rational trait when the ecological niche suggests it is required (Preti & Cella, 2010). The findings of this study, that paranoid thinking and dangerous neighbourhoods predict high expectations of crime, appear to be rational and corroborate the explanation.

### Table 5. Variables that predict high likelihood of crime expectations.

|                          | B (95% CI) | SE β  | β    | p    |
|--------------------------|------------|-------|------|------|
| Constant                 | 15.544 [12.132, 19.700] | 1.875 | .005* |
| Paranoia                 | .071 [0.16, 1.14] | .025 | .163 | .005* |
| Dangerous neighbourhoods | 1.832 [0.914, 2.724] | .477 | .236 | .005* |
| Gender                   | 2.411 [3.38, 4.062] | .867 | .202 | .015* |

Table legend: Linear model of predictors of high likelihood of victimisation expectations, with 95% confidence intervals reported in parenthesis. Confidence intervals and standard errors based on 200 bootstrapped samples.

*Significant $p \leq .005$.

### Table 6. Associations between impulsiveness and the beads task.

|                          | Beads task | p   | SE  |
|--------------------------|------------|-----|-----|
| Impulsiveness (total)    | −.265 [−.413, −.109] | .002* | .076 |
| Impulsiveness (motor)    | −.215 [−.306, −.065] | .011* | .074 |
| Impulsiveness (attention)| −.156 [−.306, .000] | .065  | .078 |
| Impulsiveness (non-planning) | −.227 [−.367, −.054] | .007* | .077 |

Table legend: Correlation matrix describing associations between beads task and impulsiveness. 95% confidence intervals for $r$ reported in parenthesis. Confidence intervals and standard errors based on 140 bootstrapped samples.

*Significant $p \leq .05$. Our study indicates that neighbourhoods perceived as dangerous may contribute to the development of an individual’s paranoid thinking. Previous research has indicated that the risk of victimisation was increased in urban environments (Brennan et al., 2010); that persons with mental vulnerability are more likely to be victims of crime (Hart, de Vet, Moran, Hatch, & Dean, 2012) and that general paranoid thinking is greater within such neighbourhoods (Ellett et al., 2011). The availability heuristic (Tversky & Kahneman, 1974) can be utilised to explain this association, as it is plausible that greater exposure to another’s criminal victimisation can lead to greater vicarious fear (Mawby, 2001) and expectations of future victimisation (Bentall et al., 2008; Corcoran et al., 2006). Preti and Cella (2010) posit that ‘paranoid ideation is not per se pathological but may, under certain circumstances, be [even] adaptive’ (p. 264). The authors argue that paranoia is itself a heuristic that informs decision-making that maintains an individual’s sense of security. The findings of this study tentatively support this hypothesis.
Beads task

Findings relating to JTC bias in this study were contrary to the existing published literature (see Garety & Freeman, 2013) and no association was found between paranoid thinking and JTC bias; however, an association was found between impulsiveness and the beads task. The failure to replicate an association between JTC bias and paranoid thinking in this study is interesting; however, most significant research in support of the JTC phenomenon has been conducted with clinical samples (Garety et al., 2009) using the 85:15 ratio. Non-clinical research using the 60:40 proportions is less conclusive, perhaps because the ratio is more ambiguous so provides a weaker stimulus.

Perhaps more salient were the small associations discovered between impulsiveness and the beads task. Motor and non-planning impulsiveness were significantly associated with the beads task, indicating that those who make decisions early on the beads task ‘act on the spur of the moment’ and ‘do not think carefully about their actions’ (Barratt & Stanford, 1995). This would indicate that unless carefully administered by the researcher, the JTC effect is potentially confounded, especially in participants with psychosis (Lee et al., 2013). Future studies using the beads task to measure JTC bias should consider controlling for impulsiveness.

These findings suggest the beads task results should be perhaps viewed with caution when applied to the vulnerable populations. While this study’s adapted beads task made use of standardised instructions (Garety et al., 2005), it was apparent that a significant proportion of participants had difficulties following the procedure correctly. Scores of ‘1’ and ‘2’ were necessarily excluded from results due to the potential for comprehension errors as confounders. In future research, using the beads task outside of the laboratory, it is recommended that a practice run be conducted to maximise participant understanding, and the task further engineered to minimise such problems.

Limitations of study

The use of a snowball-sampling method allowed for considerable variance in the sample; however, the use of social media websites does create a potential selection bias; potentially excluding those populations most prone to paranoid thinking. A second limitation is the reliance on self-report information; for example, the researchers were unable to identify if participants were under the influence of substances at the point of response, or the degree to which they were experiencing difficulties with their mental health diagnoses: it is possible that some participants may have been experiencing remission, and others relapse. Despite this, the nature of a community sample is such that a multitude of factors such as these might impact upon the mental state of participants and crucially, how they function in society at large, and practitioners have to work with referrals in a variety of states, which the study’s sample perhaps reflects. It is therefore unwise to exclude participants on the basis of confounders, as this present study sought to investigate the individuals’ perception of the social environment. Any replication of this study could, however, ensures a more detailed analysis of experiential and mental health issues.

Further limitations relate to the absence of certain measures from this study: if practicable, it would have been advantageous to control for intelligence as a confounding factor on the beads task. Furthermore, as research indicates that worry and anxiety are factors in delusion formation (Freeman & Garety, 2003), it would also have been beneficial to incorporate a reliable and valid anxiety measure into this study, particularly as anxiety is a reported consequence of victimisation (Freeman & Freeman, 2008) and an antecedent of paranoia (Bentall et al., 2009).

Conclusion

The findings from this study add to existing literature on fear of crime, and provide further evidence that within the non-clinical population, individuals with a paranoid thinking style interpret threat in neutral stimuli and have high expectations of future victimisation; it is posited that dangerous neighbourhoods and use of availability heuristics contribute to this phenomenon. This study also found an association between the beads task and impulsiveness; consequently, it is recommended that future studies utilise the measure control for impulsivity and explore methods to increase ease of comprehension by participants.

Future research should further investigate the role of worry in expectations of victimisation, and the role that this plays in the formation of paranoid thinking. It is also important to further research how the use of paranoid heuristics (Preti & Cella, 2010) informs judgements of criminal responsibility/intent and the degree to which this is pathological. This will allow for greater understanding of biases that inform everyday social decision-making.

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Note

1. Scores of ‘1’, ‘2’ and ‘15’ on the beads task were excluded from analysis due to the potential for participants to incorrectly complete the task. This resulted in 60 participants being excluded from all analyses that included the beads task.

Supplementary Materials

Supplementary materials can be accessed via direct communication with the corresponding author.

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