

Concomitants of paranoia in the general population

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Background. Paranoia is an unregarded but pervasive attribute of human populations. In this study we carried out the most comprehensive investigation so far of the demographic, economic, social and clinical correlates of self-reported paranoia in the general population.

Method. Data weighted to be nationally representative were analysed from the Adult Psychiatric Morbidity Survey in England (APMS 2007; $n=7281$).

Results. The prevalence of paranoid thinking in the previous year ranged from 18.6% reporting that people were against them, to 1.8% reporting potential plots to cause them serious harm. At all levels, paranoia was associated with youth, lower intellectual functioning, being single, poverty, poor physical health, poor social functioning, less perceived social support, stress at work, less social cohesion, less calmness, less happiness, suicidal ideation, a great range of other psychiatric symptoms (including anxiety, worry, phobias, post-traumatic stress and insomnia), cannabis use, problem drinking and increased use of treatment and services.

Conclusions. Overall, the results indicate that paranoia has the widest of implications for health, emotional well-being, social functioning and social inclusion. Some of these concomitants may contribute to the emergence of paranoid thinking, while others may result from it.

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Introduction

The paranoia spectrum is of special interest. Its severe end, persecutory delusion, is taken as a key sign of schizophrenia. Studying the milder variants, mistrust and suspicion, sheds light on societal issues, such as individual well-being and social cohesion. The few reported studies have identified correlates in common for mistrust, suspicion, persecutory ideation and delusions, suggesting that they are related experiences (e.g. Combs *et al.* 2006; Vermissen *et al.* 2008; Freeman *et al.* 2010b).

The pervasiveness of paranoia has been firmly established over recent years. Many people have a few paranoid thoughts, and a few people have many. Epidemiological and experimental studies indicate that paranoid thinking may be a regular experience in one out of three people from the general population, and at least one in twenty have a persecutory delusion

during their lifetime (e.g. Johns *et al.* 2004; Freeman *et al.* 2008b; Rutten *et al.* 2008). Even low-level, fleeting suspicious thoughts are distressing (Freeman *et al.* 2005). This high prevalence is unsurprising if paranoia arises from the normal everyday decision making about whether to trust or mistrust.

Few large epidemiological studies have examined the correlates of paranoia, but two are noteworthy. The assessment of trust in other people is considered as a central component of social cohesion or 'social capital' (Coleman, 1988; Putnam, 1995). Kawachi *et al.* (1997) in the USA used survey data from the late 1980s obtained from 7654 individuals across 39 states. The key items for assessing levels of trust were: 'Do you think most people would try to take advantage of you if they got a chance?', 'Generally speaking, [would you say that most people can be trusted] or that you can't be too careful in dealing with people?' Endorsement of each of these items was associated with greater wealth inequalities (the size of the gap between the rich and the poor) across the states and with higher mortality rates. Strikingly, a 10% increase in the level of trust across the states was associated with an 8% reduction in overall mortality. A path

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analysis indicated that the large effect of income inequality on death rates was mediated by social mistrust. Levels of trust in a society are thus clearly important.

The second key study is a report from the British National Psychiatric Morbidity Survey Programme (Jenkins *et al.* 2009). The population-based survey carried out in 2000 interviewed 8580 adults living in private households. After excluding individuals with probable diagnoses of psychosis, Johns *et al.* (2004) examined the paranoia item 'Have there been times when you felt that people were deliberately acting to harm you or your interests?'. This was endorsed by 9.1%, and endorsement was associated with youth, male gender, ethnicity, urban residence, average intelligence quotient (IQ), alcohol dependence, drug dependence, neurotic symptoms, life events in the past 6 months and victimization experiences. A further analysis of data from this survey tested a cognitive model that emphasizes the large affective contribution to paranoid experience. This showed strong associations of paranoid thinking with insomnia, anxiety, worry, depression and irritability (Freeman *et al.* 2010a).

Epidemiological surveys in the general population concerning psychosis have typically not distinguished individual positive symptoms, even though experiences such as delusions and hallucinations cluster into several separate factors (e.g. Vázquez-Barquero *et al.* 1996; Peralta & Cuesta, 1999). Nevertheless, from such reports of positive psychotic symptoms, it would seem likely that paranoia is associated with youth, single marital status, urban dwelling, migrant status, low socio-economic status and emotional disorders (e.g. Kendler *et al.* 1996; van Os *et al.* 2000, 2009; Scott *et al.* 2006). Association with illicit drugs such as cannabis is also highly probable (e.g. Moore *et al.* 2007; Henquet *et al.* 2008; Morrison *et al.* 2009). Reports linking gender and paranoia are more mixed; some find associations with male gender (e.g. Johns *et al.* 2004), some female gender (e.g. Forsell & Henderson, 1998), and some report no differences (e.g. Freeman *et al.* 2005).

In the current study, we use data from the latest British psychiatric morbidity survey, the Adult Psychiatric Morbidity Survey 2007 (APMS 2007; McManus *et al.* 2009), in the most thorough investigation so far of the concomitants of paranoid ideation. We wished to cover the full continuum from mild to severe instances and therefore did not exclude participants with putative diagnoses of psychosis. Our key questions were: What is the potential impact of paranoid thoughts on individual physical and psychological health and service use? Who is most affected by paranoid thoughts? What are the social and economic factors associated with paranoia? What other clinical

symptoms are associated with paranoia? We predicted that paranoia would be particularly associated with youth, urban residence, isolation, lower social cohesion, lower socio-economic status, poorer physical health, illicit drug use, poor sleep, and affective disturbance, especially anxiety and depression. Cutting across this analysis we wanted to examine the correlates of the different levels of paranoid thinking. Although these are related, the spectrum needs further investigation.

Method

Participants

The data used in these analyses were acquired from a third survey of psychiatric morbidity in the English national population, the APMS (<http://www.ic.nhs.uk/pubs/psychiatricmorbidity07>; McManus *et al.* 2009). This was based on a random sample of household residents aged 16 years and over. People who were homeless, in insecure housing, or in institutional settings (e.g. hospital) were not part of the sample. Fieldwork was carried out between October 2006 and December 2007. The survey adopted a multi-stage stratified probability sampling design. The sampling frame was the small user Postcode Address File. One adult aged ≥ 16 years was selected for interview in each household, using the Kish grid method (Kish, 1965). Of the sampled addresses, 9% were reckoned to be ineligible because they contained no private households, leaving an eligible sample of 13 171 addresses. Of those eligible, 57% agreed to take part in an interview. Interviews were successfully carried out with 7403 people. Complete paranoia data were available for 7281 of the participants.

Assessments

The APMS questionnaire items and full details of derived variables are available in the study report (McManus *et al.* 2009). The extensive interview included information on marital status, general health, service use and medication, common mental disorders, suicidal behaviour and self-harm, psychosis, work-related stress, drinking, drug use, social support, social capital and participation, and socio-demographic characteristics.

Paranoid thinking was assessed from endorsement of three items from the Psychosis Screening Questionnaire (PSQ; Bebbington & Nayani, 1995):

Paranoia level 1. 'Over the past year, have there been times when you felt that people were against you?'

Paranoia level 2. 'In the past year, have there been times when you felt that people were deliberately acting to harm you or your interests?'

Table 1. Levels of functioning and well-being by paranoia level (n = 7281)

Variable	Paranoia level ^a	OR (95% CI)	p
Social functioning (0–24, high–low)	1	1.26 (1.23–1.29)	<0.001
	2	1.34 (1.31–1.38)	<0.001
	3	1.41 (1.34–1.48)	<0.001
Emotional problems interfering with work or other activities in the past month	1	2.81 (2.27–3.47)	<0.001
	2	4.22 (3.35–5.32)	<0.001
	3	6.84 (4.54–10.31)	<0.001
Time feeling calm and peaceful in the past month (0–5, none–all of the time)	1	0.66 (0.62–0.71)	<0.001
	2	0.60 (0.55–0.65)	<0.001
	3	0.57 (0.49–0.66)	<0.001
How happy (0–2, not too happy–very happy)	1	0.47 (0.41–0.54)	<0.001
	2	0.36 (0.30–0.42)	<0.001
	3	0.20 (0.13–0.28)	<0.001
Suicidal thoughts in the past year	1	7.03 (4.99–9.91)	<0.001
	2	8.88 (6.20–12.72)	<0.001
	3	23.72 (14.57–38.60)	<0.001
Ever made a suicide attempt	1	4.49 (3.35–6.02)	<0.001
	2	6.80 (4.96–9.32)	<0.001
	3	17.08 (10.40–28.04)	<0.001
Currently taking antipsychotic medication	1	1.74 (0.77–3.94)	0.184
	2	3.93 (1.37–11.30)	0.011
	3	23.30 (10.48–51.83)	<0.001
Currently taking antidepressant medication	1	2.49 (1.84–3.37)	<0.001
	2	3.74 (2.68–5.22)	<0.001
	3	6.96 (4.08–11.87)	<0.001
Currently taking anxiolytic medication	1	2.05 (1.04–4.05)	0.039
	2	3.81 (2.05–7.09)	<0.001
	3	3.97 (1.42–11.08)	0.009
Spoken to GP in the past year about emotional problems	1	3.78 (2.51–5.69)	<0.001
	2	6.23 (4.04–9.61)	<0.001
	3	14.27 (7.81–26.06)	<0.001
Currently having therapy	1	3.66 (2.94–4.57)	<0.001
	2	5.70 (4.55–7.13)	<0.001
	3	8.33 (5.49–12.65)	<0.001
Any community care or day activity service in the past year	1	1.71 (1.27–2.31)	<0.001
	2	2.31 (1.72–3.11)	<0.001
	3	6.82 (4.37–10.64)	<0.001

OR, Odds ratio; CI, confidence interval; GP, general practitioner.

^a The reference category is always that on level 0 (i.e. endorse no paranoid thoughts).

Paranoia level 3. 'In the past year, have there been times you felt that a group of people was plotting to cause you serious harm or injury?'

Level 2 and level 3 questions were only asked if the preceding item had been endorsed.

Intellectual functioning was assessed with the National Adult Reading Test (Nelson, 1982), emotional well-being items were taken from the Short-Form 12-Item Health Survey (Ware *et al.* 1995), social functioning used a total score from the Social Functioning

Questionnaire (Tyrer *et al.* 2005), social support was assessed using the Interview Method of Social Relationships (Brugha *et al.* 1987), and the work stress items were derived from the effort–reward imbalance model (Siegrist, 1996). Non-psychotic psychiatric disorder was assessed using the Clinical Interview Schedule (revised) (CIS-R; Lewis *et al.* 1992), which can be administered by non-clinically trained interviewers. While this provides operationalized diagnoses for common mental disorders, we chose to use subscale scores as a measure of affective disturbances,

Table 2. Demographic and socio-economic information and paranoia

Variable	Paranoia level	Parameter coding	OR (95% CI)	<i>p</i>
Gender	1	Female	1.21 (1.00–1.47)	0.048
	2	Female	0.90 (0.74–1.11)	0.326
	3	Female	0.64 (0.43–0.96)	0.030
Age	1	Age	0.98 (0.97–0.98)	<0.001
	2	Age	0.97 (0.97–0.98)	<0.001
	3	Age	0.96 (0.95–0.97)	<0.001
Ethnicity	1	White		
		Black	0.73 (0.94–1.36)	0.323
		South Asian	0.97 (0.54–1.76)	0.926
		Mixed or other	1.08 (0.61–1.88)	0.798
	2	White		
		Black	1.06 (0.57–1.97)	0.960
		South Asian	1.01 (0.50–2.02)	0.988
		Mixed or other	1.70 (0.91–3.17)	0.094
	3	White		
		Black	6.65 (3.43–12.88)	<0.001
		South Asian	2.03 (0.81–5.09)	0.132
		Mixed or other	2.66 (1.05–6.76)	0.040
Education	1	None		
		GCSE (age 16 years)	1.46 (1.15–1.85)	0.002
		A-level (age 18 years)	1.67 (1.25–2.22)	<0.001
		Higher qualifications	1.26 (0.99–1.60)	0.062
	2	None		
		GCSE (age 16 years)	1.83 (1.32–2.54)	<0.001
		A-level (age 18 years)	2.56 (1.81–3.64)	<0.001
		Higher qualifications	1.59 (1.17–2.15)	0.062
	3	None		
		GCSE (age 16 years)	2.15 (1.20–3.86)	0.010
		A-level (age 18 years)	1.26 (0.58–2.71)	0.555
		Higher qualifications	1.05 (0.53–2.07)	0.893
Intellectual functioning	1	IQ score (range 70–127)	0.99 (0.99–1.00)	0.001
	2	IQ score	0.99 (0.99–1.00)	0.031
	3	IQ score	0.96 (0.95–0.98)	<0.001
Socio-economic status	1	Not worked in the last year		
		Routine occupations	1.84 (1.42–2.40)	<0.001
		Lower supervisory and technical operations	1.92 (1.29–2.85)	0.001
		Small employers and own account workers	1.69 (1.16–2.46)	0.007
		Intermediate occupations	1.63 (1.15–2.30)	0.006
		Managerial and professional occupations	1.45 (1.15–1.82)	0.002
		Not classified for other reasons (e.g. students)	2.06 (1.34–3.17)	0.001
	2	Not worked in the last year		
		Routine occupations	2.01 (1.43–2.80)	<0.001
		Lower supervisory and technical operations	2.07 (1.27–3.37)	0.004
		Small employers and own account workers	2.04 (1.30–3.20)	0.002
		Intermediate occupations	1.80 (1.16–2.78)	0.008
		Managerial and professional occupations	2.48 (1.88–3.27)	<0.001
		Not classified for other reasons (e.g. students)	2.44 (1.41–4.22)	0.002
	3	Not worked in the last year		
		Routine occupations	1.52 (0.83–2.78)	0.170
		Lower supervisory and technical operations	1.48 (0.65–3.39)	0.347
		Small employers and own account workers	1.81 (0.71–4.59)	0.210
		Intermediate occupations	1.44 (0.59–3.48)	0.420
		Managerial and professional occupations	1.04 (0.61–1.76)	0.898
		Not classified for other reasons (e.g. students)	2.38 (1.07–5.27)	0.033

Table 2 (cont.)

Variable	Paranoia level	Parameter coding	OR (95% CI)	p	
Equivalized annual household income quintiles	1	Lowest quintile (<£10575)			
		4th quintile (≥10575 to <£16195)	0.72 (0.51–1.01)	0.058	
		3rd quintile (≥£16195 to <£24700)	0.98 (0.74–1.28)	0.867	
		2nd quintile (≥£2700 to <£40384)	0.92 (0.70–1.22)	0.571	
		Highest quintile (≥£40384)	0.91 (0.68–1.21)	0.503	
	2	Lowest quintile (<£10575)			
		4th quintile (≥10575 to <£16195)	0.81 (0.56–1.17)	0.266	
		3rd quintile (≥£16195 to <£24700)	0.71 (0.49–1.03)	0.068	
		2nd quintile (≥£24700 to <£40384)	0.85 (0.58–1.24)	0.388	
	3	Highest quintile (≥£40384)	0.86 (0.59–1.26)	0.437	
		Lowest quintile (<£10575)			
		4th quintile (≥10575 to <£16195)	0.33 (0.17–0.67)	0.002	
3rd quintile (≥£16195 to <£24700)		0.50 (0.28–0.88)	0.017		
House ownership	1	Rent			
		Mortgage	1.01 (0.81–1.25)	0.952	
		Own outright	0.54 (0.43–0.69)	<0.001	
	2	Rent			
		Mortgage	0.81 (0.64–1.03)	0.080	
		Own outright	0.37 (0.26–0.51)	<0.001	
	3	Rent			
		Mortgage	0.28 (0.18–0.46)	<0.001	
		Own outright	0.10 (0.05–0.22)	<0.001	
	Able to keep house warm in winter	1	No	1.78 (1.24–2.58)	0.002
		2	No	2.59 (1.68–3.99)	<0.001
		3	No	5.90 (3.35–10.37)	<0.001
Any mould in home over the last 12 months	1	Yes	2.07 (1.67–2.58)	<0.001	
	2	Yes	2.41 (1.84–3.17)	<0.001	
	3	Yes	3.32 (2.03–5.42)	<0.001	

OR, Odds ratio; CI, confidence interval; GCSE, General Certificate of Secondary Education; A-level, Advanced level; IQ, intelligence quotient.

as this avoids the hierarchical assumptions built into the diagnostic facility. The subscales for anxiety, worry, phobias, panic, depression, and irritability ranged between 0 and 4. The subscale score for depressive ideas ranged between 0 and 5. These affective disturbances were considered present if the CIS-R score for each section was ≥ 2 . This therefore included more positive scorers in the analyses than only taking those who reached the criteria for a diagnosis of an emotional disorder, enabling more precise statistical estimates. Insomnia was defined as having problems getting or trying to stay asleep in the past week, that it took at least a quarter of an hour to get to sleep, and that the problems had been occurring for at least 6 months. Possible cases of current post-traumatic stress disorder (PTSD) were identified with the Trauma Screening Questionnaire, a short screening tool (Brewin *et al.* 2002). Respondents were first asked

whether they had experienced a traumatic event at some time in their life after the age of 16 years. If so, they rated 10 PTSD items in relation to the past week. Endorsement of six or more of these was taken to indicate a positive screen for PTSD. The questions in the survey on drug use are taken from the US Epidemiologic Catchment Area study (Eaton & Kessler, 1985) and self-completed on a computer. In the current study the only drug variable examined was cannabis use in the past year (no/yes). Problem drinking was considered probable with a score of ≥ 8 on the Alcohol Use Disorders Identification Test (Saunders *et al.* 1993).

A subsample of phase-one respondents was selected for a second-phase interview that included a full assessment of psychosis. A total of 630 respondents were interviewed by clinically trained research interviewers using the Schedule for Clinical Assessment in

Neuropsychiatry (SCAN; WHO, 1992). In the current paper, we use an overall category of 'probable psychosis', comprising those identified by the SCAN, together with those who did not have a phase-two interview, but had endorsed two or more psychosis screening criteria in the phase-one interview. The four criteria were the use of antipsychotic medication, psychiatric hospital admission, a self-reported diagnosis of psychotic disorder or symptoms suggestive of it, and a positive response to the question in the PSQ covering auditory hallucinations (Bebbington & Nayani, 1995).

Analysis

All analyses were carried out using the 'complex survey' commands in SPSS 15.0 (SPSS, 2006; SPSS, Inc., USA). The survey data were weighted to take account of survey design and non-response, in order to render the results representative of the household population aged ≥ 16 years. Weighting was necessarily complex, and is described in detail by McManus *et al.* (2009). There were three steps. First, sample weights were applied to take account of the different probabilities of selecting respondents in different-sized households. Second, to reduce household non-response bias, a household level weight was calculated from a logistic regression model using interviewer observation and area-level variables (collected from Census 2001 data) available for responding and non-responding households. Finally, weights were applied using the techniques of calibration weighting based on age, gender and region to weight the data to represent the structure of the national population, and to take account of differential non-response between regions and age \times gender groups. The population control totals used were the Office for National Statistics (2006) mid-year household population estimates. As a result of the calibration, the APMS 2007 weighted data matches exactly the estimated population across these three dimensions.

For the main analyses, logistic regressions were carried out with paranoia as the dependent variable. The three paranoia items were used to create four groups (0=no paranoia; 1=endorses item 1 only; 2=endorses items 1 and 2 only; 3=endorses all three items). This was intentionally treated as a multinomial (and not an ordinal) variable in order to treat the items as potentially qualitatively different. The reference category for each level of paranoia was always the group who endorsed no paranoid items. Odds ratios (ORs) and 95% confidence intervals (CIs) therefore refer to the likelihood of being in each group compared with those participants who reported no paranoid ideation. For the interpretation of the results it

should be remembered that for continuous scales the ORs refer to 1-point changes in the independent variables; if the OR for a unit change in the independent variable is, for example, 1.34 then the OR for a 10-point increase is 1.34 raised to the power of 10 (i.e. 18.7). We deliberately did not use covariates, except in the case of physical health variables, where there were strong grounds for their use. The aim was to establish the strength of association of single variables with paranoia, not to try to determine the unique contribution of each variable or establish which variable is 'primary'. (There are numerous cautions in the literature against inappropriate uses or interpretations of covariates, especially in non-randomized studies. Miller & Chapman (2001) provide a clear discussion. The basic issue is that variables may truly share variance or overlap and therefore it is artificial to correct statistically for one or the other and indeed it may remove so much variance as to make the results meaningless. It is of particular note that in this epidemiological study a wide range of factors at different levels of explanation are considered, many of which could be viewed as mediating variables, and therefore overlap between the independent variables is to be expected.)

Results

The frequency of paranoid thinking

The first paranoia item, 'Over the past year, have there been times when you felt that people were against you?', was endorsed by 1299 participants (weighted = 18.6%). Of these participants, 24 had a probable diagnosis of psychosis. The second paranoia item, 'Have there been times that you felt that people were deliberately acting to harm you or your interests?', was endorsed by 569 participants (weighted = 8.2%). Of these, 18 had a probable diagnosis of psychosis. The third paranoia item, 'Have there been times you felt that a group of people was plotting to cause you serious harm or injury?', was endorsed by 125 participants (weighted = 1.8%). Of these, 12 had a probable diagnosis of psychosis.

Social functioning, psychological well-being and paranoid thoughts

Paranoia was strongly associated with poorer social functioning, less calmness, less happiness, more suicidal ideation, psychiatric medication consumption, and greater current use of mental health services (see Table 1). The more severe the paranoia, the lower the indicators of well-being. Although the consumption of medication and services was highly associated with the presence of paranoid thoughts, only a

Table 3. Physical health and paranoia (controlling for age and gender)

	Paranoia level	OR (95% CI)	<i>p</i>
Diabetes in the past year	1	1.00 (0.62–1.62)	0.999
	2	1.92 (1.21–3.05)	0.006
	3	2.69 (1.11–6.54)	0.029
Cataracts/eyesight problems in the past year	1	1.33 (1.06–1.68)	0.016
	2	1.71 (1.28–2.28)	<0.001
	3	0.83 (0.43–1.57)	0.555
Ear/hearing problems in the past year	1	1.36 (1.00–1.86)	0.050
	2	1.29 (0.87–1.92)	0.207
	3	2.75 (1.38–5.50)	0.004
Heart attack/angina in the past year	1	0.90 (0.47–1.70)	0.736
	2	1.60 (0.79–3.27)	0.195
	3	3.23 (1.08–9.68)	0.036
High blood pressure	1	1.19 (0.91–1.55)	0.203
	2	1.49 (1.09–2.03)	0.013
	3	1.69 (0.95–3.02)	0.076
Obesity (BMI ≥30 kg/m ²)	1	1.14 (0.91–1.43)	0.879
	2	1.22 (0.93–1.61)	0.145
	3	1.53 (0.96–2.44)	0.074
Any of the above health problems	1	1.51 (1.24–1.85)	<0.001
	2	1.66 (1.30–2.12)	<0.001
	3	1.66 (1.03–2.66)	0.036

OR, Odds ratio; CI, confidence interval; BMI, body mass index.

Table 4. Prevalence of paranoia level within each type of area (descending frequency)

Paranoia level 0	Paranoia level 1	Paranoia level 2	Paranoia level 3
Accessible countryside (weighted = 87.1%)	Built-up areas (weighted = 14.0%)	Prospering metropolitan (weighted = 7.7%)	Built-up areas (weighted = 3.7%)
Suburbs and small towns (weighted = 83.0%)	Student communities (weighted = 11.7%)	Traditional manufacturing (weighted = 7.6%)	Prospering metropolitan (weighted = 3.2%)
Prospering metropolitan (weighted = 82.7%)	Coastal and countryside (weighted = 10.5%)	Student communities (weighted = 7.4%)	Multicultural metropolitan (weighted = 3.1%)
Multicultural metropolitan (weighted = 82.3%)	Traditional manufacturing (weighted = 10.3%)	Built-up areas (weighted = 6.8%)	Traditional manufacturing (weighted = 2.7%)
Industrial hinterlands (weighted = 81.5%)	Suburbs and small towns (weighted = 9.9%)	Industrial hinterlands (weighted = 6.8%)	Student communities (weighted = 2.7%)
Coastal and countryside (weighted = 81.4%)	Industrial hinterlands (weighted = 9.5%)	Multicultural metropolitan (weighted = 6.2%)	Industrial hinterlands (weighted = 2.2%)
Traditional manufacturing (weighted = 79.4%)	Multicultural metropolitan (weighted = 8.3%)	Coastal and countryside (weighted = 6.2%)	Coastal and countryside (weighted = 1.9%)
Student communities (weighted = 78.2%)	Accessible countryside (weighted = 7.8%)	Suburbs and small towns (weighted = 6.2%)	Accessible countryside (weighted = 1.1%)
Built-up areas (weighted = 75.5%)	Prospering metropolitan (weighted = 7.4%)	Accessible countryside (weighted = 4.0%)	Suburbs and small towns (weighted = 1.0%)

minority of the people at the first paranoia level (endorsed item 1) were prescribed antipsychotic (weighted = 1.7%) or antidepressant medication (weighted = 10.2%), few had spoken to their general

practitioner (GP) about emotional problems in the past year (weighted = 27.1%), few were having therapy (weighted = 7.5%) and few were attending daycare services (weighted = 13.4%). Even among people who

Table 5. Social support and paranoia

	Paranoia level	Parameter coding	OR (95% CI)	<i>p</i>
Living on own	1	Yes	0.99 (0.82–1.18)	0.889
	2	Yes	0.92 (0.73–1.17)	0.487
	3	Yes	1.65 (1.07–2.54)	0.025
Marital status	1	Married		
		Separated	1.88 (1.18–2.99)	0.008
		Divorced	1.49 (1.09–2.02)	0.013
		Widowed	0.62 (0.45–0.85)	0.004
		Single	1.80 (1.45–2.24)	<0.001
		Cohabiting	1.35 (1.00–1.81)	0.047
	2	Married		
		Separated	3.05 (1.99–4.67)	<0.001
		Divorced	2.29 (1.61–3.25)	<0.001
		Widowed	0.44 (0.27–0.71)	0.001
		Single	1.83 (1.40–2.39)	<0.001
	3	Cohabiting	1.55 (1.08–2.22)	0.018
		Married		
		Separated	1.27 (0.28–5.80)	0.758
		Divorced	3.05 (1.68–5.55)	<0.001
Number of family and friends that the respondent feels close to	1	Widowed	0.26 (0.06–1.21)	0.085
		Single	5.42 (3.33–8.83)	<0.001
		Cohabiting	2.10 (1.03–4.28)	0.041
		2	0.97 (0.96–0.98)	<0.001
		3	0.90 (0.87–0.94)	<0.001
		There are people I know who do things to make me happy	1	Certainly true
2	Not true or partly true	1.64 (1.32–2.05)	<0.001	
	Certainly true			
3	Not true or partly true	1.72 (1.35–2.19)	<0.001	
	Certainly true			
There are people I know who can be relied on no matter what happens	1	Not true or partly true	1.90 (1.21–2.97)	<0.001
		Certainly true		
	2	Not true or partly true	2.04 (1.59–2.62)	<0.001
		Certainly true		
	3	Not true or partly true	2.37 (1.78–3.16)	<0.001
		Certainly true		
There are people who I know who give me support and encouragement	1	Not true or partly true	3.39 (2.10–5.46)	<0.001
		Certainly true		
	2	Not true or partly true	2.13 (1.69–2.68)	<0.001
		Certainly true		
	3	Not true or partly true	2.45 (1.87–3.22)	<0.001
		Certainly true		
		Not true or partly true	3.63 (2.39–5.53)	<0.001

OR, Odds ratio; CI, confidence interval.

endorsed all three paranoia items, relatively few had been prescribed antipsychotic medication (weighted = 8.4%) or antidepressant medication (weighted = 19.4%), few had spoken to their GP about emotional problems (weighted = 39.6%), few were having therapy (weighted = 17.0%), and few were attending daycare services (weighted = 31.2%).

Demographic and socio-economic information and paranoia

The associations of paranoia with demographic factors varied to some extent with the level of paranoia assessed (see Table 2). The lowest level of paranoia was more common in women, the highest in men.

Table 6. Social cohesion and paranoia

	Paranoia level	Parameter coding	OR (95% CI)	<i>p</i>
I feel like I belong around here	1	Disagree	2.02 (1.54–2.66)	<0.001
	2	Disagree	2.28 (1.66–3.15)	<0.001
	3	Disagree	4.58 (2.83–7.40)	<0.001
I trust people around here	1	Disagree	1.78 (1.38–2.29)	<0.001
	2	Disagree	2.53 (1.90–3.37)	<0.001
	3	Disagree	4.37 (2.78–6.85)	<0.001
I feel safe around here in the day time	1	Disagree	1.72 (1.07–2.75)	0.026
	2	Disagree	3.10 (2.09–4.59)	<0.001
	3	Disagree	6.81 (3.54–13.13)	<0.001
The area around here is nicely kept by the residents	1	Disagree	1.34 (1.03–1.75)	0.030
	2	Disagree	1.64 (1.19–2.53)	0.003
	3	Disagree	1.94 (1.16–3.24)	0.012
Litter is a problem around here	1	Agree	1.26 (1.06–1.50)	0.010
	2	Agree	1.37 (1.09–1.71)	0.006
	3	Agree	1.00 (0.64–1.55)	0.996
Graffiti or vandalism is a problem around here	1	Agree	1.55 (1.26–1.91)	<0.001
	2	Agree	1.78 (1.40–2.25)	<0.001
	3	Agree	1.75 (1.14–2.71)	0.012
The properties around here are too close together	1	Agree	1.32 (1.08–1.63)	0.008
	2	Agree	1.72 (1.36–2.17)	<0.001
	3	Agree	2.60 (1.69–4.00)	<0.001
There are not enough green areas or trees around here	1	Agree	1.32 (1.06–1.64)	0.013
	2	Agree	1.41 (1.09–1.82)	0.010
	3	Agree	2.55 (1.59–4.08)	<0.001
Participation in voluntary or local community group in the past year	1	Yes	0.86 (0.69–1.07)	0.168
	2	Yes	0.85 (0.66–1.10)	0.220
	3	Yes	0.80 (0.47–1.38)	0.428
Participation in clubs or associations in the past year	1	Yes	0.82 (0.69–0.98)	0.026
	2	Yes	1.08 (0.89–1.32)	0.446
	3	Yes	0.73 (0.48–1.12)	0.152

OR, Odds ratio; CI, confidence interval.

An increased prevalence of paranoia in ethnic minority groups was restricted to the more severe item. Paranoia at all levels did, however, clearly decrease with age. Higher intellectual functioning was associated with less paranoia. Unexpectedly, those with no qualifications, together with those not working, acknowledged paranoia least frequently; somewhat at variance, financial indicators generally showed that paranoia was associated with poverty.

Physical health and paranoia

In analysing the associations of paranoia with physical health, we controlled for age and gender (Table 3). Physical ill health over the past year was associated with endorsement of paranoia items, although the ORs were not large.

Prevalence by area

Table 4 shows that paranoia was generally more frequent in the more urban areas. However, this association was often non-significant except for the highest level of paranoia. For instance, people endorsing the most severe paranoia item were more likely to be living in an area of high population density (OR 1.01, 95% CI 1.00–1.01, $p=0.012$), but this was not true for people who only endorsed the first paranoia item (OR 1.00, 95% CI 1.00–1.01, $p=0.832$), or items 1 and 2 (OR 1.00, 95% CI 1.00–1.01, $p=0.317$).

Social support and paranoia

There was a clear association between paranoia and measures of social support (Table 5). Married (or widowed) participants showed least paranoia, while

Table 7. *Insomnia, affective symptoms and paranoia*

	Paranoia level	OR (95% CI)	<i>p</i>
Insomnia diagnosis	1	1.78 (1.50–2.11)	<0.001
	2	3.13 (2.58–3.81)	<0.001
	3	2.54 (1.68–3.84)	<0.001
Irritability	1	4.51 (3.70–5.49)	<0.001
	2	4.98 (3.94–6.28)	<0.001
	3	5.79 (3.88–8.64)	<0.001
Depression	1	2.82 (2.21–3.60)	<0.001
	2	4.43 (3.47–5.65)	<0.001
	3	7.26 (4.70–11.20)	<0.001
Depressive ideas	1	6.23 (4.88–7.95)	<0.001
	2	9.91 (7.58–12.95)	<0.001
	3	14.81 (9.61–22.84)	<0.001
Worry	1	3.68 (3.01–4.50)	<0.001
	2	6.76 (5.37–8.51)	<0.001
	3	8.94 (5.91–13.53)	<0.001
Anxiety	1	3.64 (2.82–4.70)	<0.001
	2	6.19 (4.69–8.16)	<0.001
	3	9.74 (6.24–15.19)	<0.001
Phobias	1	4.96 (3.57–6.88)	<0.001
	2	7.70 (5.50–10.77)	<0.001
	3	13.63 (8.61–21.58)	<0.001
Panic	1	4.39 (2.79–6.91)	<0.001
	2	9.71 (6.42–14.68)	<0.001
	3	20.26 (11.63–35.30)	<0.001
Probable PTSD	1	3.47 (2.34–5.14)	<0.001
	2	6.88 (4.63–10.21)	<0.001
	3	27.12 (16.04–45.88)	<0.001

OR, Odds ratio; CI, confidence interval; PTSD, post-traumatic stress disorder.

people who reported less access to social support were clearly more paranoid.

Social capital

Paranoia was clearly associated with the social capital indicator of trusting other people (Table 6). It was also strongly linked to negative perceptions of the local environment, but there was much less evidence of an association with civic engagement.

Mental health symptoms

Paranoia was strongly associated with other common mental health problems (Table 7). The ORs for the associations of paranoia with anxiety, phobias, worry, panic, post-traumatic stress, depression and insomnia were all substantial. For example, the presence of anxiety symptoms was associated with an almost 10 times greater likelihood of the severest paranoid thinking.

Drugs and alcohol

A total of 414 participants (weighted = 7.4%) reported using cannabis in the past year. Paranoia was strongly and progressively associated with cannabis use: paranoia level 1 (OR 1.91, 95% CI 1.38–2.65, $p < 0.001$); paranoia level 2 (OR 2.86, 95% CI 1.94–4.21, $p < 0.001$); paranoia level 3 (OR 4.90, 95% CI 2.91–8.25, $p < 0.001$). There were significant but weaker associations with problem drinking: paranoia level 1 (OR 1.53, 95% CI 1.27–1.85, $p < 0.001$); paranoia level 2 (OR 1.82, 95% CI 1.41–2.35, $p < 0.001$); paranoia level 3 (OR 2.84, 95% CI 1.88–4.28, $p < 0.001$).

The working environment

Approximately one half of the sample (weighted count 56.3%) were in paid employment in the previous week. Perceptions of work stresses and poor rewards were associated with the endorsement of paranoid items (Table 8).

Discussion

It is important to begin this discussion with some caveats. The survey was cross-sectional. Thus, while the strong associations in many of our analyses indicate the presence of some kind of mechanism, the direction of effect cannot be substantiated, even though in some instances one particular direction may be more plausible. The associations could also be the consequence of other unmeasured variables. Moreover, although paranoia was the focus of the analysis, similar patterns might have been found if, for example, we had chosen to analyse anxiety or depression instead. Other methods are needed to understand the nature of these associations, for example, longitudinal, experimental and interventionist (e.g. Kendler & Campbell, 2009). These are now being employed in the study of paranoia (e.g. Startup *et al.* 2007; Freeman *et al.* 2008*b*; Harrow *et al.* 2008; Lincoln *et al.* 2008; Foster *et al.* 2010), and form part of a process of triangulation that will permit more substantial inferences of causality.

It is also quite possible that some of the ideation reported was an accurate and not unfounded assessment of the participant's situation. All mental experiences like paranoia are elicited from self-report. However, the validity of the self-report is likely to increase where initial endorsements of self-statements like the PSQ paranoia questions are augmented through a process of clarificatory cross-questioning, the essence of clinical interview. Although interviewer and self-report methods of assessment show correlations (e.g. Iancu *et al.* 2005; Lindström *et al.*

Table 8. Work stress and paranoia

	Paranoia level	Parameter coding	OR (95% CI)	<i>p</i>
I have constant time pressure due to heavy work load	1	Yes	1.32 (1.03–1.69)	0.027
	2	Yes	1.67 (1.22–2.30)	0.002
	3	Yes	0.86 (0.49–1.49)	0.586
Over the past year, my job has become more and more demanding	1	Yes	1.31 (1.04–1.66)	0.023
	2	Yes	1.94 (1.38–2.73)	<0.001
	3	Yes	1.46 (0.73–2.94)	0.285
My job promotion prospects are poor	1	Yes	1.47 (1.18–1.83)	0.001
	2	Yes	1.35 (1.01–1.79)	0.043
	3	Yes	1.25 (0.70–2.24)	0.452
My job security is poor	1	Yes	1.64 (1.26–2.15)	<0.001
	2	Yes	2.04 (1.51–2.75)	<0.001
	3	Yes	2.64 (1.39–5.00)	<0.001
I receive the respect I deserve from my line manager	1	No	2.28 (1.73–3.01)	<0.001
	2	No	2.49 (1.77–3.50)	<0.001
	3	No	2.11 (1.05–4.26)	0.037
Considering all my efforts and achievements, I receive the respect I deserve at work from my colleagues	1	No	2.55 (1.86–3.50)	<0.001
	2	No	3.91 (2.74–5.57)	<0.001
	3	No	3.66 (1.77–7.56)	0.001

OR, Odds ratio; CI, confidence interval.

2009), our assessment of paranoia is therefore vulnerable to appreciable inaccuracy. In the three questions there is also a limited capture of the variety of paranoid ideation and no assessment of the strength with which the statements are endorsed. Participants were also only asked the second and third paranoia questions contingent upon endorsing the previous question, assuming a simple progression in the three paranoia items. Nonetheless, the current study has the distinct advantage of a large dataset and a uniquely comprehensive report of the correlates of paranoid ideation capable of stimulating further work on the topic.

The data from this study do give a very clear indication of the potential impact of paranoid thinking. It is associated with marked reductions in happiness and social functioning. The risk of suicidal thoughts is greatly increased, as is the tendency to seek the aid of medication. However, only a minority of those reporting paranoid thoughts are in contact with primary care and mental health services and receive interventions. This may come about because people are reticent about divulging paranoid thoughts, and clinicians do not routinely assess them. Added to this, people with paranoid thinking have more physical health concerns, such as diabetes and high blood pressure. This is consistent with the earlier report of Kawachi *et al.* (1997).

From a theoretical perspective, the links between paranoia, emotional disorders and sleep problems are of particular interest. One cognitive model emphasizes the direct emotional contribution to paranoid experiences (see Freeman, 2007): anxiety, via the anticipation of threat, provides the content of paranoid fears; worry makes the cause more implausible and distressing; and depressive and social phobic concerns make a person feel vulnerable to harm. The associations of anxiety, worry, panic, phobias and depression with paranoia in this survey are very substantial. These results are broadly consistent with a number of recent studies by other research groups (e.g. Myin-Germeys & van Os, 2007; Bentall *et al.* 2009; Varghese *et al.* 2009; Ben-Zeev *et al.* 2010). The postulated affective component in paranoid experience is reflected in new developments in psychological interventions (Freeman *et al.* 2008a; Foster *et al.* 2010). It has also been argued that it is plausible that insomnia exacerbates paranoid fears (Freeman *et al.* 2009); the insomnia results from this survey closely replicate two other recent reports (Freeman *et al.* 2009, 2010a). Further substantiation is also provided for the idea that perceptual difficulties such as hearing impairments, in the context of negative affect, will make perceptions of hostility more likely (e.g. Zimbardo *et al.* 1981; Thewissen *et al.* 2005).

The analysis also highlights a neglected issue: the importance of considering the level of paranoid thought. Many variables showed a simple dose-response relationship with severity of paranoia, but, intriguingly, a number of the demographic and social-economic variables showed different relationships with different levels of paranoid thought. For instance, there was a reverse in gender ratios: females endorsed the mildest paranoid item more frequently, males the most severe item. This may account for the conflicting results previously reported in the literature. Differences by ethnicity were only apparent for the most severe paranoid thinking. Likewise, densely populated (i.e. urban) environments, paralleling findings for psychosis (Pedersen & Mortensen, 2001; Krabbendam & van Os, 2005), were associated only with the most severe paranoia. Previous research indicates that the severer paranoid thinking typically builds upon the commoner variants (Freeman et al. 2005), but this does not mean that the continuum of paranoid thoughts is smooth. There may be qualitative shifts in paranoid thinking at the top end of the spectrum.

Our results also extend the significance of paranoid thinking beyond the psychiatric domain. Perceived isolation, lack of social cohesion and work stresses were all strongly associated with the occurrence of paranoia. Levels of trust are a likely indicator of the health of a society. An often implicit judgement whether to trust other people underpins many of our daily interactions, and when this judgement becomes distorted there may be far-reaching consequences. We contend that greater consideration should be given to understanding the causes of trust and mistrust and the consequences that levels of trust have for a society. For instance, research is needed into the way crime rates, the built environment, community services, security countermeasures, media reporting, technological and societal changes, and income inequality affect levels of trust (Freeman & Freeman, 2008). Once persecutory ideation is conceived as a spectrum, its importance at both an individual and a societal level becomes increasingly apparent.

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Declaration of Interest

None.

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