*DOI:*
10.1002/wps.20301

*Document Version*
Peer reviewed version

# Clinical, socio-demographic and psychological characteristics in individuals with persistent psychotic experiences with and without a "need for care"

**Emmanuelle Peters[1,2], Thomas Ward[1], Mike Jackson[3,4], Craig Morgan[5], Monica Charalambides[1], Philip McGuire[2,6], Peter Woodruff[7], Pamela Jacobsen[1], Paul Chadwick[1], Philippa A. Garety[1,2]**

[1]King's College London, Institute of Psychiatry, Psychology and Neuroscience, Department of Psychology, London, UK; [2]NIHR Biomedical Research Centre for Mental Health, South London and Maudsley NHS Foundation Trust, London, UK; [3]Bangor University, School of Psychology, Bangor, North Wales, UK; [4]Betsi Cadwaladr University Health Board, Bangor, North Wales, UK; [5]King's College London, Institute of Psychiatry, Psychology and Neuroscience, Health Service & Population Research, London, UK ; [6]King's College London, Institute of Psychiatry, Psychology and Neuroscience, Psychosis Studies Department, London, UK ; [7]University of Sheffield, Cognition and Neuroimaging Laboratory, Academic Psychiatry, Sheffield, UK

PUBLISHED IN WORLD PSYCHIATRY

Individuals reporting persistent psychotic experiences (PEs) in the general population, but without a "need for care", are a unique group of particular importance in identifying risk and protective factors for psychosis. We compared people with persistent PEs and no "need for care" (non-clinical, N=92) with patients diagnosed with a psychotic disorder (clinical, N=84) and controls without PEs (N=83), in terms of their phenomenological, socio-demographic and psychological features. The 259 participants were recruited from one urban and one rural area in the UK, as part of the UNIQUE (Unusual Experiences Enquiry) study. Results showed that the non-clinical group experienced hallucinations in all modalities as well as first-rank symptoms, with an earlier age of onset than in the clinical group. Somatic/tactile hallucinations were more frequent than in the clinical group, while commenting and conversing voices were rare. Participants in the non-clinical group were differentiated from their clinical counterparts by being less paranoid and deluded, apart from ideas of reference, and having fewer cognitive difficulties and negative symptoms. Unlike the clinical group, they were characterized neither by low psychosocial functioning nor by social adversity. However, childhood trauma featured in both groups. They were similar to the controls in psychological characteristics: they did not report current emotional problems, had intact self-esteem, displayed healthy schemas about the self and others, showed high life satisfaction and well-being, and high mindfulness. These findings support biopsychosocial models postulating that environmental and psychological factors interact with biological processes in the aetiology of psychosis. While some PEs may be more malign than others, lower levels of social and environmental adversity, combined with protective factors such as intact IQ, spirituality, and psychological and emotional well-being, may reduce the likelihood of persistent PEs leading to pathological outcomes. Future research should focus on protective factors and determinants of well-being in the context of PEs, rather than exclusively on risk factors and biomarkers of disease states.

**Key words:** Persistent psychotic experiences, need for care, psychosis, hallucinations, first-rank symptoms, psychosocial functioning, social adversity, childhood trauma, protective factors

The continuum view of psychosis (1) proposes that psychotic symptoms are the severe expression of "schizotypal" traits that are normally distributed in the general population. Large-scale surveys have confirmed that psychotic experiences (PEs) in the general population are relatively common, with a recent meta-analysis yielding a prevalence of 7.2% (2). Qualitative similarities between high "schizotypes" and psychosis patients have been shown on psychopathological (3), epidemiological (4,5), and neurobiological (6,7) measures. Approximately 20% of people with PEs report persistent, rather than transient, experiences. Although a minority of this subgroup may eventually develop a psychotic disorder (8), in most cases these experiences are not associated with distress, and do not lead to a malign outcome (4).

However, some authors (9) have argued that subclinical or psychosis-like experiences in the general population are distinct from true symptoms of psychosis, as they are often too mild and transient to be clinically meaningful (10), and are not specific to schizophrenia (11). This issue can be addressed by targeting individuals whose PEs are persistent and relatively severe, but who are not distressed by them, have never been diagnosed with a psychotic disorder, or sought help from mental health services (i.e., they do not have a "need for care") (4).

A number of studies have compared persistent PEs in individuals with and without a need for care. Auditory verbal hallucinations in non-clinical and clinical samples are broadly phenomenologically similar, but differ in content, emotional valence, and appraisals about their omnipotence (12). Jackson et al (13,14) found that intense spiritual experiences reported by some individuals could not be distinguished phenomenologically from psychotic symptoms; the differences lay in the interpretation and meaning given to these experiences, and in their emotional and behavioural correlates. Similarly, Brett et al (15) found that the positive symptoms present in psychosis patients and individuals at ultra-high-risk for psychosis were similar to the PEs reported by a non-clinical group, with only "cognitive" anomalies (inability to concentrate, loss of automaticity of thinking skills) being more common in both help-seeking groups. However, the groups differed in the way they appraised and responded emotionally to their PEs (16), which predicted the extent to which PEs were associated with distress (17). Specifically, several studies suggest that PEs occur in the absence of paranoid appraisals in people with no need for care (16,18,19), while odd beliefs tend to lead to worse outcome than anomalous experiences (20).

Stress-vulnerability and integrated cognitive models (21,22) posit a role for social, environmental and psychological factors in the aetiology of psychosis, in addition to genetic and neurodevelopmental features such as a family history of psychosis and low intelligence quotient (IQ). For instance, negative schemas about self and others are common in psychotic populations (23), as are dysfunctional attachment styles (24). Childhood adversity (25,26), and interpersonal trauma

specifically (27), have been linked to the development of PEs, and there is evidence linking current adverse environments – characterized by racial discrimination (28), migrant status (29) and low social capital (30) – with psychosis. There seems to be a synergistic interplay between different risk factors, such as between childhood abuse and adult life events, as well as cannabis use (31,32), suggesting that exposure to childhood and adult disadvantage may combine in complex ways to push some individuals along the pathway to psychotic disorder. Sommer et al (33) compared non-clinical voice-hearers with controls and showed that higher schizotypy scores, lower education, and higher family loading for psychiatric disorders, but not presence of voices, were associated with lower global functioning, illustrating the importance of disentangling the contribution of biopsychosocial factors to psychotic experiences from poor functioning and potential "need for care". On the other hand, childhood and interpersonal trauma have been consistently associated with the presence of voices (34-36) and other anomalous experiences (18), irrespective of need for care.

Studies with people reporting persistent but benign PEs provide a means of examining both risk and protective factors for the development of psychosis. On the one hand, the persistence of psychotic phenomena implies the sharing of risk factors for psychotic disorders. On the other, such individuals lead unperturbed lives without needing clinical care, suggesting they possess or have been exposed to protective factors absent in psychotic populations.

The aim of the present study was to characterize people with persistent, non-distressing PEs by comparing them with psychosis patients and controls without PEs, recruited as part of the UNIQUE (Unusual Experiences Enquiry) study. We tested three specific hypotheses, based on cognitive models of psychosis (21,37) and previous studies on differences in clinical, environmental, and psychological characteristics. We postulated that people with persistent PEs would not differ socio-demographically or psychologically from controls and, compared to patients diagnosed with psychotic disorders, would have: a) similar types of positive symptoms, but fewer subjective cognitive deficits, paranoid delusions, and negative symptoms; b) lower levels of social and environmental adversity, with the exception of childhood trauma (18,34); c) greater emotional and psychological well-being, and healthier parental relationships.

## Methods

### *Participants*

Three groups of adults were recruited from one urban (South London and environs) and one rural (Bangor and environs, North Wales) area over a period of 23 months: a) individuals with PEs

without a "need for care" (non-clinical group); b) patients diagnosed with a psychotic disorder (clinical group); c) controls with no PEs. Exclusion criteria for all groups were: age<18; insufficient command of English; history of neurological problems, head injury or epilepsy; primary substance dependence. Participants were screened over the phone by research workers, or face-to-face in the case of inpatients.

*Non-clinical group (N=92)*

This group comprised healthy individuals with enduring PEs who had never been diagnosed with, or treated for, a psychotic disorder (London site: N=51, 55.4%; Bangor site: N=41, 44.6%).

The majority (N=82, 89.1%) were recruited using our previous sampling strategy (16,19,38-40) targeting specialist sources in London, North Wales and their respective environs. Advertisements were placed in psychic and spiritualist fora (including: College of Psychic Studies, The British Astrological and Psychic Society, The International Academy of Unconsciousness, Spiritualist Association of Great Britain, Society of Psychical Research, London College of Spirituality, Unitarian Church, Two Worlds, Open Arms Spiritualist group, and Bangor Spiritualist Church), usually through the relevant organization leaders (or via Facebook pages). Interested individuals would then contact the team and proceed with screening of eligibility. A number of individuals were also recruited from a research register held by the first author, who had consented to being contacted about research following participation in previous studies. Lastly, an advert was circulated using the King's College London circular email list. In all cases a snowballing method was adopted in which participants were encouraged to pass on information about the study to contacts whom they considered appropriate.

A further 10 participants (10.9%) were recruited from an epidemiologically representative community sample (South East London Community Health Study (41)) and general practitioner (GP) registers selected from the same geographical area as our South London clinical sample.

Individuals were invited to participate if they: a) reported one or more PE (secondary item) on the Psychosis Screening Questionnaire (PSQ, 42), and "occasional" (at least monthly) experiences of any positive and Schneiderian first-rank symptom on the Unusual Experiences Screening Questionnaire (UESQ, 16), within the last month, in the absence of drug use and in clear consciousness; b) had experiences occurring for more than 5 years (to avoid including individuals who may be prodromal); c) had never been in contact with mental health services/GPs in relation to their PEs (nor had someone else on their behalf); d) had never been in contact with secondary mental health care; e) did not score 2 ("unmet need") on items covering basic self-care and the psychological distress dimension (in relation to their PEs) of the Camberwell Assessment of Need

Short Appraisal Schedule (CANSAS, 43); f) were judged by the research worker, in consultation with the study coordinator, to not be in need of care.

Only individuals with current positive PEs (score of 2 or above on at least one item of the Scale for the Assessment of Positive Symptoms (SAPS, 44) at the time of recruitment) were included. People who had received diagnoses of, and/or treatment for, common mental health problems (such as anxiety and depression) or had been in contact with primary care services for issues unrelated to their PEs (N=16, 17.4%) were not excluded from the study.

There were 25 men (27.2%) and 67 women (72.8%), with a mean age of 46 years (range of 18-80).

*Clinical group (N=84)*

This group was recruited from routine inpatient (N=29, 34.5%) and community (N=55, 65.5%) services of the South London and Maudsley NHS Foundation Trust (N=43, 51.2%) and Betsi Cadwaladr University Health Board (N=41, 48.8%) concurrently.

Consultant psychiatrists, care coordinators or primary nurses were asked to identify patients under their care eligible for the study, who were then approached by the research workers to ascertain their willingness to participate. Only patients with current positive symptoms (score of 2 or above on at least one item of the SAPS at the time of recruitment) and a psychotic disorder diagnosis (ICD-10 categories F20-39) were included.

The diagnosis was schizophrenia in 53 patients (63.1%), schizoaffective disorder in 13 (15.5%), and psychosis not otherwise specified in 6 (7.1%), while 11 patients (13.1%) had a diagnosis belonging to F30-39 categories. Seventy-six patients (90.5%) were on an antipsychotic medication. Patients had a mean of 4.4 (median=4; SD=3.6) prior hospital admissions.

There were 55 men (65.5%) and 29 women (34.5%), with a mean age of 42 years (range of 20-78).

*Control group (N=83)*

The control participants were volunteered directly by non-clinical participants (N=18, 21.7%), or recruited using research registers held by members of the team (including a local GP register) or advertisements placed in various community settings (e.g., newsagents and community centres) in the South London area, the King's College London circular email list, the Bangor University "research

participation panels" and the Bangor Network News Magazine (N=65, 78.3%). Interested individuals would then contact the team and proceed with screening of eligibility.

Only individuals with no PEs (endorsed no items on UESQ and PSQ), and scoring no higher than one standard deviation above the Unusual Experiences subscale mean of the Oxford-Liverpool Inventory of Feelings and Experiences (O-LIFE, 45), were invited to participate. Controls were broadly matched to the non-clinical group in age, gender, ethnicity, and education level, and also included people who had received diagnoses of, and/or treatment for, common mental health problems (N=5, 6.0%), but not those who had been in contact with secondary mental health care.

There were 26 men (31.3%) and 57 women (68.7%), with a mean age of 46 years (range 21-76).

***Assessments***

*Screening tools*

Screening tools were not routinely administered to the clinical group, who were screened through clinicians and/or case-note review. The CANSAS was administered to the non-clinical group only, and the O-LIFE to the control group only.

The PSQ (42) assesses PEs in the preceding year and comprises five sections covering hypomania, thought disorder, paranoia, strange experiences and hallucinations. Each section has an initial probe, followed by secondary questions that are designed to establish the psychotic quality of experiences. The PSQ has been validated in two national surveys in the UK (46,47). As we were specifically interested in PEs, items on hypomania were discarded.

The UESQ consists of nine items derived from the Appraisals of Anomalous Experiences Interview (AANEX, 16), assessing the presence of a range of positive and Schneiderian first-rank symptoms (such as hallucinations, thought interference, delusional perception), within the last month, in the absence of drug use and in clear consciousness.

The CANSAS (43) is a comprehensive assessment of clinical and social needs. Only items 1-4 (relating to accommodation, food, home, and self-care), and item 9 (psychological distress in relation to unusual experiences) were used. Scores range from 0 to 2 (0=no problem; 1=met need; 2=unmet need).

Of the O-LIFE (45), a standardized schizotypy questionnaire, we used only the Unusual Experiences subscale. This includes 30 items describing perceptual aberrations, magical thinking, and hallucinations, and is phenomenologically related to positive symptoms of psychosis. Items are

scored “yes” or “no”, with a potential range of scores from 0 to 30. O-LIFE norms (45) indicate a mean of 8.8 and SD of 6.2. The cut-off score for this study was 15.

*PE assessments*

Clinical assessments were performed in the clinical and non-clinical groups only.

The AANEX semi-structured interview (16) was used to elicit participants’ current PEs and their associated emotional and cognitive correlates. The first part of the interview (AANEX-Inventory, short form (18)) consists of 17 anomalous experiences that are rated for both presence and severity in the person’s lifetime and currently (within the last month). Each item is rated on a 3-point scale (1=not present; 2=unclear; 3=present). Possible total scores range from 17 to 51 for both lifetime and current experiences.

Five factor scores are also generated via summation of individual item scores (15): a) meaning-reference (which reflects manic or hypomanic states and experiences, ideas of reference, insight, and prominent “revelatory” experiences; b) paranormal-hallucinatory (which reflects alterations in sense of agency and passivity, somatic hallucinations, and paranormal experiences such as mediumship, clairvoyance and magic, and perception of other entities/energies); c) cognitive-attention (which reflects non-specific subjective changes or deficits in thinking and attention, such as thought blockages and loss of automatic skills); d) dissociative-perceptual (which reflects dissociative experiences such as depersonalization and derealisation, along with other global perceptual changes); and e) first-rank symptoms (which includes auditory hallucinations, experiences of weakened boundaries between self and other such as thought transmission, receptivity, and “made” emotions).

The anomalous experiences elicited by the first part are then used to anchor the second part of the interview (AANEX-CAR (Context, Appraisals & Response)), which covers emotional and cognitive factors associated with the anomalous experiences, and the context in which they occurred. Additional items were added to assess “belief flexibility”, derived from the Maudsley Assessment of Delusions Scale (MADS, 48). Only AANEX-Inventory data are reported here.

The SAPS (44) and the Scale for the Assessment of Negative Symptoms (SANS, 49) were used to assess positive and negative psychosis symptoms. The SAPS consists of 35 items subdivided into four sections: hallucinations, delusions, bizarre behaviour, and positive formal thought disorder. The SANS consists of 25 items subdivided into five sections: affective flattening or blunting, alogia, avolition-apathy, anhedonia-asociality, and attention. Scores for each item reflect level of severity

and frequency, and range from 0 (none) to 5 (severe). Each subscale produces a global rating (also 0-5). The total range of scores is 0-175 for SAPS, and 0-125 for SANS.

*Socio-demographic and environmental factors measures*

A demographic form was used to record the following information from all participants: age, gender, ethnicity, current socio-economic status (SES), years in education, current employment status, migrant status, first language, current and past relationship status, number of children, religious/spiritual affiliation, current and past drug use. Age at onset and length of time of PEs were obtained from the clinical and non-clinical groups. Current medications, diagnosis, and number of admissions were checked through case-note review for the clinical group.

The Social-Environmental Assessment Tool (SEAT, 50) was adopted to assess social capital. It consists of four subdomains: civic disorder (i.e., thefts, vandalism, truancy); impact of civic disorder (i.e., how concerned respondents feel about crime and disorder); informal social control (i.e., how likely people are to take action about civic disorder); and social cohesion and trust (i.e., whether people can be trusted, are willing to help, will cooperate to campaign for local issues, feeling part of the community). The first three domains consist of four items, and the fourth of 11 items (all items are scored 1-5). Sum-scores for each subdomain are z-standardized, and an overall social capital score is created using a weighted sum of the z-scores for each subdomain.

A short form of the Wechsler Adult Intelligence Scale, 3rd edition (WAIS-III, 51) was used, consisting of one subtest of each cognitive index: information (verbal comprehension), block design (perceptual organization), arithmetic (working memory), and digit symbol (processing speed). The four subtest scaled scores were summed and divided by the total number of subtests (11) to generate a WAIS estimation total score, which was then converted into an estimated IQ score.

The Victimization Experiences Schedule (VES, 52) was developed for this study. It is a semi-structured interview incorporating the two categories of interpersonal trauma and perceived discrimination. Relevant items from a number of existing scales – Childhood Experience of Care and Abuse (53), Trauma History Questionnaire (54), Discrimination Interview (55) – were selected to cover the range of victimization experiences relevant to psychosis. The first category consists of nine items: sexual abuse (divided into sexual intercourse, and unwanted sexual contact); physical abuse; physical attack (with, and without, a weapon); threat of assault; bullying; psychological abuse; parental neglect. The second category consists of five items assessing everyday perceived discrimination (unfairly treated: at work, by the police, by the court system, by neighbours and/or family, when receiving medical care). Three scores can be obtained for each category: total number

of interpersonal trauma/discrimination experiences in childhood, in adulthood, and across the lifespan. Scores across categories can also be summed to provide total victimization scores. Only the childhood interpersonal trauma and lifespan discrimination scores are reported here.

*Psychological characteristics*

The Beck Depression and Anxiety Inventories (BDI-II, 56 and BAI, 57) were used to assess depression and anxiety symptoms, respectively. They both consist of 21 items, and respondents are asked to rate the severity of each item in the last week on a 4-point scale (potential range of scores 0-63; higher scores represent higher pathology).

The Perceived Stress Scale (PSS, 58) was adopted to explore perceived levels of stress in the last month. This includes 10 items, each rated on a 5-point scale from “never” to “very often”, with a potential range of score of 0-40 (higher scores represent higher levels of perceived stress).

The Brief Core Schema Scale (BCSS, 23) was used to assess long-term held beliefs (i.e., “schema”) about the self and others. This includes 24 items, rated on a 5-point scale from “don't believe it” to “believe it totally”. Four scores are obtained relating to “positive self”, “negative self”, “positive others”, and “negative others”, each with six items (potential range of scores 0-24; higher scores represent stronger schemas for each subscale).

The Questionnaire for Evaluation of Self (QES, 59) was used to assess self-esteem. This is a 21-item questionnaire based on the modified Self-Evaluation and Social Support Interview (60), assessing positive, negative, and self-acceptance attributes. Each subscale has seven items rated on a 4-point scale from “disagree” to “agree very much” (range of scores 7-28; higher scores represent stronger attributes for each subscale).

The Southampton Mindfulness Questionnaires (SMQ, 61,62) were adopted to assess participants' habitual responses to distressing thoughts and images (all groups), and to voices (clinical and non-clinical groups only). Each of these questionnaires consists of 16 items rated on a 7-point scale, from “agree totally” to “disagree totally”, with a potential range of scores of 0-96 for each questionnaire (higher scores represent better ability to respond to thoughts/images and voices mindfully).

The Satisfaction with Life Scale (SWLS, 63) was used to assess satisfaction with life. This is a 5-item self-report measure. Each statement is rated on a 7-point scale, ranging from “strongly disagree” to “strongly agree”, with a potential range of scores of 5-35 (high scores represent higher life satisfaction).

The Psychological Well-Being-Post-Traumatic Changes Questionnaire (PWB-PTCQ, 64) explores any positive sequelae to traumatic experiences, and was adapted in this study to identify positive changes occurring as a result of PEs. It is an 18-item self-report measure, with six subscales (self-acceptance, autonomy, purpose in life, relationships, sense of mastery, personal growth). Each item is rated on a 5-point scale, from "much more so now" to "much less so now", with a range of scores of 18-90 (higher scores represent higher psychological well-being). This scale was not administered to the controls.

The Parental Bonding Questionnaire (PBQ, 65) was used to evaluate the participants' retrospective perceptions of parental attitudes and behaviours towards them in the first 16 years of life. This scale consists of two 25-item forms (one for mother and one for father), each comprising a subscale on protection (13 items) and one on care (12 items). Each item was rated on a 4-point scale ("very like" to "very unlike"). Potential range of scores for the protection scale is 0-39, and for care 0-36. Low scores on the protection scale relate to perceived acceptance of autonomy, whereas high scores reflect perceived intrusion and excessive control. Low scores on the care scale relate to indifference and rejection; high scores relate to perceived warmth and affection.

***Procedures***

Ethical approval for the UNIQUE study was obtained from the London-Westminster National Research Ethics Service Committee (12/LO/0766); the South London and Maudsley NHS Foundation Trust/King's College London Institute of Psychiatry, Psychology and Neuroscience Research and Development (R&D2012/047); and the Betsi Cadwaladr University Health Board Research and Development (Jackson/LO/0766). Following written informed consent, eligible participants completed all assessments with the research workers. At the end of the study participants were debriefed, and given £30 honorarium.

Interviews were audio-recorded for scoring, with the participant's consent. Interrater reliabilities (ascertained using 35 interviews across sites and groups, rated by the study coordinator and the individual research workers) for the three AANEX-Inventory totals indicated almost perfect agreement (intra-class correlation, ICC=.995-.998). Interrater reliability for the combined SAPS and SANS (ICC=.904) and for the VES (ICC=.99) also showed almost perfect agreement.

***Analytic strategy***

The distribution of continuous variables was checked to ensure basic assumptions of parametric testing were met. Where deviations from a normal distribution were found, variables were either dichotomized or non-parametric testing was carried out. One-way ANOVAs or t-tests (socio-demographic and environmental factors; psychological characteristics), MANOVAs (AANEX, SEAT) or Kruskal-Wallis (VES) were used to test for significant differences between the groups, followed by post-hoc least significant difference comparisons or Mann-Whitney tests (SAPS and SANS) between specific groups where appropriate. Categorical variables were tested using $\chi^2$ tests. Significance level was set at $p<0.01$ for analyses of PEs due to multiple testing on related constructs.

**Results**

The groups did not differ in age ($F_{2,256}=2.5$, $p=0.09$), but there were more men in the clinical than in the other two groups ($\chi^2=31.3$, $df=2$, $p<0.001$). Results are presented in Tables 1-3.

***Types of PE (see Table 1)***

The non-clinical group had a younger age of onset of their PEs than the clinical group, and had lived with their experiences for longer. Over 75% in both groups reported having heard voices during their lifetime. Both groups reported hallucinations in all modalities, although commenting and conversing voices were rare in the non-clinical individuals, while somatic/tactile and (at trend level) olfactory hallucinations were more frequent in the non-clinical sample. The latter also scored significantly higher on both the AANEX lifetime and current paranormal-hallucinatory factor than the clinical group, reflecting a greater frequency of magical and precognitive experiences, somatic hallucinations and passivity experiences.

First-rank symptoms, especially thought insertion, mind reading, and feelings of being controlled, were also commonly reported in the non-clinical group, although they had a higher lifetime (but not current) frequency in the clinical group. The non-clinical individuals showed few signs of being paranoid or deluded, apart from ideas of reference, which were commonly reported, but still less frequently than in the clinical group.

Compared with the clinical group, the non-clinical sample reported fewer negative symptoms and cognitive difficulties, both currently and over their lifetime. In particular, their average score was <0.5 for all individual SANS items. They also scored lower on bizarre behaviour and thought disorder

(although these were not common in the clinical group either). On SAPS and SANS total and global scores, the non-clinical individuals had lower ratings than their clinical counterparts, although there were no significant differences on the AANEX-Inventory totals, either current or lifetime.

***Socio-demographic and environmental factors (Table 2)***

The non-clinical sample differed in the predicted direction from the clinical group on 16 (+1 trends) of the 25 socio-demographic and environmental factors measured. They were less likely than the clinical group to: belong to British minority ethnic groups and be a migrant (at trend level); come from a working class background and live in areas with civic disorder (although there was no difference in terms of overall social capital); have a family history of psychosis (although not of general mental health problems). They had a higher IQ, were more educated, and more likely to be employed or in training, with higher professional grades; they were more likely to be in/have had a long-term relationship and to have children; they were less likely to use drugs.

The non-clinical participants were selected to be matched to the controls on age, gender, ethnicity and education, and therefore did not differ on those variables. In addition, they did not differ from the controls on most of the other variables examined (19 out of 23), apart from the non-clinical group having a slightly lower IQ, a greater proportion reporting being spiritual and following non-traditional religions, and to tend to take fewer drugs, than the controls.

In relation to victimization, there were no differences between the clinical and non-clinical groups in number of childhood interpersonal traumatic events, with the latter group scoring higher than the controls (although the overall group difference was at trend level only). However, the clinical individuals reported significantly more lifetime discrimination than the other two groups.

***Psychological characteristics (Table 3)***

The non-clinical sample differed in the predicted direction from the clinical group on 15 of the 18 characteristics examined. Compared with the non-clinical sample, the clinical group was more anxious, depressed and stressed, reported lower self-esteem, and scored higher in negative schema about the self and others. Furthermore, non-clinical participants showed more self-acceptance and were more likely to perceive themselves as having positive attributes, scored higher on positive schema about the self and others, were more satisfied with life, and scored higher on mindfulness than even the control group. They reported high psychological well-being as a result of their PEs, and

non-clinical voice-hearers were more able to accept their voices and have a mindful response style than their clinical counterparts.

Although non-clinical participants were slightly more anxious than the controls, their mean score on the BAI was still within the minimal anxiety range (0-7). The only psychological domain where differences between the clinical and other groups were either absent or equivocal ($p>0.01$) was perception of parental relationships, although the clinical group had notably more individuals who did not have any kind of paternal relationship (18%) than the other two groups (non-clinical = 3%; controls = 6%).

## Discussion

In the largest study of its kind, and broadly in line with our hypotheses, we found: a) a distinctive pattern of similarities and differences on individual PEs between the clinical and non-clinical groups, suggesting that some types of PEs are more benign than others; b) that specific socio-demographic and environmental factors may protect against the development of "need for care"; c) that it is possible to be psychologically and emotionally healthy while experiencing persistent PEs. These results support biopsychosocial models of psychosis (21,22,37) that emphasize the importance of environmental and psychological factors in the aetiology of psychosis and need for care.

The main limitation of the study was that recruitment of the majority of the persistent PEs group was not implemented in an epidemiological way; rather we targeted a selective sample from specialist interest organizations, who tend to be high functioning and immersed in sub-cultural groups that are likely to provide validation and acceptance of their PEs. Therefore, our sample may not be representative of the broader group of individuals with PEs in the general population, who may be distressed by their experiences (67,68) and have unmet mental health needs (69). While an epidemiological sample would have been preferable, this is logistically difficult as individuals with persistent, as opposed to transient, PEs are rare. Nevertheless, the aim of the present study was not to characterize a representative, general population sample with PEs, but to compare individuals with poor and good outcomes of persistent PEs, hence our results are still informative within this context.

### *Types of PEs*

The majority of the non-clinical group reported hearing voices in their lifetime, and hallucinations in all modalities were common, with some types being more frequent than in the

clinical group. First-rank symptoms were also reported, such as passivity experiences, thought insertion and mind reading, and there were marked ideas of reference. The experiences were far from transitory (average duration was 31 years), with an earlier age of onset than in the clinical group, replicating other studies that typically show a childhood or adolescent onset of PEs in these individuals (18,19,33). There were, however, some individual positive symptoms that may be more pathological than others: voices commenting and conversing, for instance, and experiences suggesting a loss of control over one's own thoughts (such as withdrawal and broadcast), were rarely present in the non-clinical group. Furthermore, an important difference between the groups was severity: even when clear-cut positive symptoms were present, they were not as severe/frequent in the non-clinical group, suggesting that the relentlessness of such experiences may be an important factor in leading to distress and need for care (70).

The non-clinical group were almost completely devoid of negative symptoms, bizarre behaviour and thought disorder, consistent with data from healthy voice-hearers (33). They were also less likely to report cognitive and attentional difficulties than the clinical group, which is now a well-replicated finding (17,18,39,71). These results are in line with recent evidence that positive symptoms in individuals at ultra-high-risk for psychosis are weaker predictors of transition to psychosis and a poor functional outcome than negative and disorganized symptoms (72), and subjective cognitive difficulties (73,74).

Finally, as predicted, non-clinical participants were much less paranoid than their clinical counterparts, and displayed relatively few delusions overall, apart from ideas of reference. The presence of PEs in the absence of delusions may be a crucial distinction between the phenomenology of non-clinical and clinical groups: other studies have also shown that a paranoid world view and threatening/maladaptive appraisals of anomalous experiences differentiate the two groups (16,18,19,39), and may therefore determine whether an individual will develop a full-blown psychosis.

***Socio-demographic and environmental factors***

As expected, the two PE groups were highly distinct demographically, with the non-clinical sample resembling the controls on most variables examined. Overall, non-clinical individuals were less socially disadvantaged than the psychosis patients, and had more socially-valued roles. They had greater cognitive resources than the clinical group, and reported less drug-taking than even the controls. Although it is not possible to determine direction of causality, taken together these findings

suggest tentatively that a lack of social and environmental adversity may be protective against malign outcomes of PEs.

One notable exception was the prevalence of childhood trauma, which did not differ between the clinical and the non-clinical group, with the latter scoring higher than the controls. An association between childhood trauma and the presence of PEs replicates previous findings (18,34,35), although the link was weaker in this study (the overall group difference did not reach significance). Nevertheless, these results demonstrate the importance of identifying which particular types of adversity may be related to the presence of PEs (36), and differentiating from those that are associated with a need for care. Our results are in line with Morgan et al's report (31,32) of a complex interplay between different environmental risk factors, suggesting that it is the synergy of social adversity and other factors such as drug abuse and familial risk, which, in combination with exposure to childhood trauma, may push individuals beyond the threshold for psychotic disorder.

A greater proportion of the non-clinical participants (>90%) described themselves as spiritual (in a non-mainstream religious way) than both the control and clinical samples. Spirituality may be a key factor in the development of positive appraisals of PEs and in facilitating their social validation. The combination of enhanced spirituality with the above socio-demographic findings may represent a specific psychosocial buffer against the potential noxious impact of persistent PEs; or, put another way, it is likely that persistent PEs only become problematic in the context of pre-existent vulnerabilities, as suggested by contemporary aetiological models of psychosis (21,22,37).

***Psychological characteristics***

Participants in the non-clinical group did not report current emotional problems, had intact self-esteem, displayed self-acceptance and healthy schemas about self and others, and showed high life satisfaction. They were indistinguishable from the controls on any measure, apart from being slightly more anxious, although their BAI score was still within the minimal anxiety range. Findings about parental relationships were more equivocal, with a tendency for the non-clinical group to report being more likely to have a paternal relationship, and to perceive their parents as less overprotective, than the clinical group. These results require replication, potentially with a more robust measure of attachment (75).

The non-clinical group reported relating more mindfully to voices than the clinical group, and to potentially distressing internal events than even the control group. Similarly to spirituality, a mindful response style may therefore represent a protective factor against problematic outcomes of PEs. Overall, these findings provide robust evidence that even persistent PEs are not necessarily

associated with mental ill-health, at least in individuals who present with a range of protective environmental and psychological factors.

***Clinical implications***

Our findings have potential implications for the clinical management of people with PEs, including individuals at ultra-high-risk for psychosis. Psychological therapies (including cognitive behaviour therapy for psychosis and third-wave therapies such as acceptance and commitment therapy and mindfulness) all have a normalizing and accepting approach to PEs as a central tenet (76,77). Since PEs can occur without pathological outcomes, the aim of therapy may not necessarily be to eliminate such experiences, but to appraise them in a less threatening and paranoid way, or to deal with them differently (78). These results also have clear implications for ultra-high-risk services. Whilst traditionally the diagnosis of the high risk state has been heavily weighted towards the presence of positive PEs, the lack of negative symptoms and subjective cognitive deficits in the non-clinical sample is consistent with recent evidence that these features are particularly associated with an increased risk of transition to psychosis (79). Importantly, psychological and emotional problems were shown to be key factors in differentiating the groups, confirming they merit intervention in their own right (80), whether they are the consequences of, or contributors to, PEs (81-83).

We hope these findings will pave the way for a paradigm shift in psychosis research, which has traditionally been overly focused on illness models and identifying risk factors/biomarkers for disease states, to looking at protective factors and determinants of well-being in the context of PEs (84).

**Acknowledgements**

The authors would like to acknowledge E. Bristow, J. Walker, P. Green, E. Saddleton and L. Brookwell, who collected the data as research workers employed on the study, and thank S. Hatch, S. Frissa and M. Hotopf for access to the database of the South East London Community Health Study. This study was supported by the Medical Research Council (grant G1100568).

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**Table 1 Types of persistent psychotic experiences (PEs) in the non-clinical and clinical groups**

| | **Non-clinical (N=92)** | **Clinical (N=84)** | **Statistics** |
|---|---|---|---|
| Age at onset of PEs (years, mean±SD) | 15.0±12.3 | 22.0±10.4 | **$t_{174}$=3.9, p<0.001** |
| Length of time with PEs (years, mean±SD) | 31.2±15.3 | 20.2±12.9 | **$t_{174}$=5.1, p<0.001** |
| Lifetime auditory hallucinations (%) | 77.2 | 88.1 | $X^2$=3.6, df=1, p<0.06 |
| SAPS total (mean±SD) | 12.3±7.2 | 27.5±15.5 | **$U_{173}$=1433, p<0.001** |
| SAPS hallucinations global rating (mean±SD) | 2.5±1.3 | 3.2±1.9 | **$U_{173}$=2494, p<0.001** |
| SAPS delusions global rating (mean±SD) | 2.3±1.4 | 3.7±1.2 | **$U_{173}$=1618, p<0.001** |
| SAPS bizarre behaviour global rating (mean±SD) | 0.1±0.4 | 0.7±1.1 | **$U_{173}$=2718, p<0.001** |
| SAPS thought disorder global rating (mean±SD) | 0.1±0.3 | 1.0±1.3 | **$U_{173}$=2227, p<0.001** |
| SANS total (mean±SD) | 3.0±3.3 | 22.7±13.4 | **$U_{173}$=250, p<0.001** |
| SANS global ratings total (sum of 5 global ratings) (mean±SD) | 1.5±1.7 | 9.3±4.3 | **$U_{173}$=216, p<0.001** |
| SAPS somatic/tactile hallucinations (mean±SD) | 2.1±1.7 | 1.4±1.7 | **$U_{173}$=2845, p=0.002** |
| SAPS delusions of reference (mean±SD) | 1.7±1.7 | 2.9±1.7 | **$U_{173}$=2436, p<0.001** |
| SAPS visual hallucinations (mean±SD) | 1.6±1.7 | 1.3±1.8 | $U_{173}$=3392, p=0.17 |
| SAPS thought insertion (mean±SD) | 1.6±1.7 | 1.9±1.9 | $U_{173}$=3483, p=0.29 |
| SAPS auditory hallucinations (mean±SD) | 1.4±1.4 | 2.8±2.2 | **$U_{173}$=2407, p<0.001** |
| SAPS mind reading (mean±SD) | 1.1±1.4 | 1.7±1.9 | $U_{173}$=3152, p=0.03 |
| SAPS olfactory hallucinations (mean±SD) | 0.7±1.2 | 0.4±1.1 | $U_{173}$=3273, p=0.03 |
| SAPS feelings of being controlled (mean±SD) | 0.5±1.1 | 1.1±1.8 | $U_{173}$=3265, p=0.03 |
| SAPS voices commenting (mean±SD) | 0.3±1.0 | 1.6±2.1 | **$U_{173}$=2505, p<0.001** |
| SAPS thought broadcast (mean±SD) | 0.2±0.6 | 1.5±2.0 | **$U_{173}$=2412, p<0.001** |
| SAPS voices conversing (mean±SD) | 0.2±0.6 | 1.1±1.8 | **$U_{173}$=2751, p<0.001** |
| SAPS grandiose delusions (mean±SD) | 0.2±0.7 | 0.8±1.5 | **$U_{173}$=3132, p=0.003** |
| SAPS thought withdrawal (mean±SD) | 0.1±0.5 | 0.8±1.5 | **$U_{173}$=2962, p<0.001** |
| SAPS religious delusions (mean±SD) | 0.1±0.4 | 0.8±1.5 | **$U_{173}$=2884, p<0.001** |
| SAPS persecutory delusions (mean±SD) | 0.1±0.4 | 1.9±1.6 | **$U_{173}$=1438, p<0.001** |

| | | | |
|---|---|---|---|
| SAPS inappropriate affect (mean±SD) | 0.03±0.3 | 0.3±0.9 | **$U_{172}$=3410, p=0.006** |
| SAPS delusions of jealousy (mean±SD) | 0.01±0.1 | 0.3±0.7 | **$U_{173}$=3258, p<0.001** |
| SAPS delusions of sin/guilt (mean±SD) | 0.01±0.1 | 0.7±1.3 | **$U_{173}$=2932, p<0.001** |
| SAPS somatic delusions (mean±SD) | 0.01±0.1 | 0.3±0.9 | **$U_{173}$=3349, p=0.001** |
| AANEX total current (mean±SD) | 28.6±5.1 | 30.1±6.2 | $F_{1,172}$=2.9, p=0.088 |
| AANEX total lifetime (mean±SD) | 34.8±4.9 | 36.3±6.4 | $F_{1,172}$=2.8, p=0.098 |
| AANEX meaning-reference, current (mean±SD) | 7.7±2.1 | 7.5±2.2 | $F_{1,172}$=0.7, p=0.41 |
| AANEX meaning-reference, lifetime (mean±SD) | 9.1±2.1 | 8.7±2.3 | $F_{1,172}$=1.5, p=0.23 |
| AANEX first-rank symptoms, current (mean±SD) | 7.5±1.9 | 8.1±2.5 | $F_{1,172}$=2.8, p=0.096 |
| AANEX first-rank symptoms, lifetime (mean±SD) | 8.9±1.6 | 9.7±2.0 | **$F_{1,172}$=9.5, p=0.002** |
| AANEX paranormal- hallucinatory, current (mean±SD) | 5.9±1.7 | 5.1±1.9 | **$F_{1,172}$=9.3, p=0.003** |
| AANEX paranormal-hallucinatory, lifetime (mean±SD) | 7.5±1.4 | 6.5±2.1 | **$F_{1,172}$=17.7, p<0.001** |
| AANEX dissociative-perceptual, current (mean±SD) | 3.8±1.4 | 4.5±1.8 | **$F_{1,172}$=7.5, p=0.007** |
| AANEX dissociative-perceptual, lifetime (mean±SD) | 5.3±1.9 | 5.8±2.0 | $F_{1,172}$=2.9, p=0.093 |
| AANEX cognitive-attentional, current (mean±SD) | 3.8±1.6 | 5.1±1.7 | **$F_{1,172}$=28.4, p<0.001** |
| AANEX cognitive-attentional, lifetime (mean±SD) | 4.1±1.6 | 5.7±1.8 | **$F_{1,172}$=38.3, p<0.001** |

SAPS – Scale for the Assessment of Positive Symptoms, SANS – Scale for the Assessment of Negative Symptoms, AANEX – Appraisals of Anomalous Experiences Interview - Inventory

Significant differences are highlighted in bold prints; SAPS items are listed in order of severity rating in the non-clinical group

**Table 2 Socio-demographic and environmental factors in the three groups**

| | **Controls (N=83)** | **Non-Clinical (N=92)** | **Clinical (N=84)** | **Statistics** |
|---|---|---|---|---|
| Ethnicity (%) | | | | White vs. others: **$\chi^2$=20.1, df=2, p<0.001** (clinical < non-clinical = controls) |
| White | 90.4 | 87.0 | 65.5 | |
| Mixed | 2.4 | 3.3 | 4.8 | |
| Asian | 2.4 | 2.2 | 2.4 | |
| Black | 3.6 | 6.5 | 26.2 | |
| Other | 1.2 | 1.1 | 1.2 | |
| Migrant (%) | 12.1 | 15.2 | 26.2 | **$\chi^2$=6.4, df=2, p=0.04** (clinical > non-clinical at trend level; non-clinical = controls) |
| English first language (%) | 89.0 | 91.2 | 88.1 | $\chi^2$=0.5, df=2, p=0.79 |
| Education (years, mean±SD) | 17.1±4.0 | 16.8±4.2 | 14.7±5.8 | **$F_{2,254}$=6.3, p=0.002** (clinical < non-clinical = controls) |
| Employed/in training (%) | 78.3 | 69.6 | 16.7 | **$\chi^2$=76.1, df=2, p<0.001** (clinical < non-clinical = controls) |
| Current employment* (%) | | | | **$\chi^2$=100.8, df=8, p<0.001** (clinical < non-clinical = controls) |
| Salariat | 28.9 | 18.9 | 0 | |
| Intermediate | 21.7 | 21.1 | 0 | |
| Working class | 6.0 | 13.3 | 6.0 | |
| Never worked/long-term unemployed | 22.9 | 32.2 | 90.5 | |
| Unclassifiable | 20.5 | 14.4 | 3.6 | |
| Married/partner (%) | 47.0 | 50.0 | 21.4 | **$\chi^2$=17.6, df=2, p<0.001** (clinical < non-clinical = controls) |
| Ever had relationship (%) | 92.8 | 96.7 | 75.0 | **$\chi^2$=22.5, df=2, p<0.001** (clinical < non-clinical = controls) |
| Children (one or more, %) | 59.0 | 57.6 | 35.7 | **$\chi^2$=11.6, df=2, p=0.003** (clinical < non- |

| | | | | |
|---|---|---|---|---|
| | | | | clinical = controls) |
| Family history of psychosis (%) | 5.0 | 10.2 | 24.7 | **$\chi^2$=14.0, df=2, p=0.001** (clinical > non-clinical = controls) |
| Family history of mental health problems (%) | 28.0 | 31.5 | 43.0 | $\chi^2$=4.4, df=2, p=0.11 |
| Religion (%)<br>None<br>Mainstream<br>Non-traditional | <br>57.8<br>33.7<br>8.4 | <br>34.8<br>20.7<br>44.6 | <br>19.0<br>65.5<br>15.5 | **$\chi^2$=68.2, df=4, p<0.001** (clinical ≠ non-clinical ≠ controls) |
| Spiritual (%) | 41.0 | 91.1 | 76.5 | **$\chi^2$=54.2, df=2, p<0.001** (non-clinical > clinical > controls) |
| Cannabis use, past (%) | 41.0 | 33.7 | 53.6 | **$\chi^2$=7.2, df=2, p=0.027** (clinical > non-clinical; clinical = controls; non-clinical = controls) |
| Cannabis use, present (%) | 4.8 | 2.2 | 10.7 | **$\chi^2$=6.1, df=2, p=0.048** (clinical > non-clinical; clinical = controls; non-clinical = controls) |
| Other drugs, past (%) | 25.3 | 12.0 | 36.9 | **$\chi^2$=14.9, df=2, p=0.001** (non-clinical < clinical = controls) |
| Other drugs, present (%) | 2.4 | 0 | 2.4 | $\chi^2$=2.3, df=2, p=0.32 |
| SEAT total (mean±SD) | 0.20± 2.6 | 0.04±2.9 | -0.13±2.6 | $F_{2,250}$=0.3, p=0.73 |
| SEAT civic disorder (mean±SD) | 0.05±0.9 | 0.21±0.9 | -0.27±1.1 | **$F_{2,250}$=5.2, p=0.006** (clinical < non-clinical = controls) |
| SEAT impact of civic disorder (mean±SD) | 0.08±1.0 | 0.02±1.0 | -0.10±1.1 | $F_{2,250}$=0.7, p=0.49 |
| SEAT informal social control (mean±SD) | -0.04±1.0 | -0.12± 1.0 | 0.18±0.9 | $F_{2,250}$=2.0, p=0.14 |
| SEAT social cohesion and trust (mean±SD) | 0.16± 0.9 | -0.05±1.1 | -0.10±1.0 | $F_{2,250}$=1.7, p=0.19 |
| IQ (mean±SD) | 112.0±16.5 | 105.0±14.0 | 85.0±14.2 | **$F_{2,247}$=71.1, p<0.001** (clinical < non-clinical < controls) |

| | | | | |
|---|---|---|---|---|
| VES childhood interpersonal trauma (mean±SD) | 2.4±2.2 | 3.0±2.4 | 2.6±2.5 | K=4.8, df=2, p=0.09 (controls < non-clinical; non-clinical = clinical; clinical = controls) |
| VES lifetime discrimination (mean±SD) | 1.0±1.2 | 1.2± 1.4 | 1.9±1.7 | **K=16.2, df=2, p<0.001** (clinical > non-clinical = controls) |

*Classified according to the European Socio-economic Classification (ESeC, 66)

SEAT – Social Environment Assessment Tool, VES – Victimization Experiences Schedule

Significant differences are highlighted in bold prints

**Table 3 Psychological characteristics in the three groups**

| | **Controls (N=82)** | **Non-Clinical (N=91)** | **Clinical (N=83)** | **Statistics** |
|---|---|---|---|---|
| Beck Depression Inventory-II (mean±SD) | 5.9±8.2 | 6.7±7.1 | 20.9±14.0 | **$F_{2,251}$=57.3, p<0.001** (clinical > non-clinical = controls) |
| Beck Anxiety Inventory (mean±SD) | 3.7±5.0 | 6.8±7.2 | 17.4±12.8 | **$F_{2,251}$=52.8, p<0.001** (clinical > non-clinical > controls) |
| Perceived Stress Scale (mean±SD) | 13.5±7.0 | 13.7±7.2 | 20.1±7.4 | **$F_{2,246}$=22.0, p<0.001** (clinical > non-clinical = controls) |
| QES positive attributes (mean±SD) | 21.3±3.5 | 21.8±3.7 | 19.0±4.9 | **$F_{2,251}$=11.2, p<0.001** (clinical < non-clinical = controls) |
| QES negative attributes (mean±SD) | 8.9±2.2 | 8.7±2.4 | 11.7±4.2 | **$F_{2,251}$=25.4, p<0.001** (clinical > non-clinical = controls) |
| QES self-acceptance, lack of (mean±SD) | 12.0±3.5 | 11.7±2.9 | 16.5±5.6 | **$F_{2,252}$=34.4, p<0.001** (clinical > non-clinical = controls) |
| BCSS positive self (mean±SD) | 14.2±5.5 | 14.9±7.0 | 10.2±6.9 | **$F_{2,252}$=13.0, p<0.001** (clinical < non-clinical = controls) |
| BCSS negative self (mean±SD) | 1.8±3.2 | 2.0±3.2 | 6.0±6.2 | **$F_{2,253}$=24.0, p<0.001** (clinical > non-clinical = controls) |
| BCSS positive others (mean±SD) | 13.6±5.4 | 12.9±4.9 | 11.0±6.0 | **$F_{2,250}$=5.3, p=0.006**(clinical < non-clinical = controls) |

| | | | | |
|---|---|---|---|---|
| BCSS negative others (mean±SD) | 3.8±5.4 | 4.8±5.3 | 9.1±6.8 | **$F_{2,251}$=19.6, p<0.001** (clinical > non-clinical = controls) |
| Satisfaction With Life Scale (mean±SD) | 23.3±7.1 | 23.6±6.7 | 17.2±7.9 | **$F_{2,251}$=21.1, p<0.001** (clinical < non-clinical = controls) |
| Psychological Well-Being−Post PEs Questionnaire (mean±SD) | | 72.9±11.9 | 61.5±14.3 | **$F_{1,169}$=32.7, p<0.001** |
| SMQ thoughts/images (mean±SD) | 58.9±15.6 | 63.4±15 | 47.0±12.7 | **$F_{2,228}$=24.6, p<0.001** (non-clinical > controls > clinical) |
| SMQ voices* (mean±SD) | | 69.2±14.5 | 48.0±13.3 | **$F_{1,88}$=51.8, p<0.001** |
| PBQ protection, mother (mean±SD) | 12.6±8.0 | 14.5±9.3 | 15.6±7.9 | $F_{2,247}$=2.6, p=0.076 (clinical > controls; controls = non-clinical; clinical = non-clinical) |
| PBQ protection, father (mean±SD) | 11.4±8.0 | 11.4±7.6 | 14.8±8.6 | **$F_{2,225}$=4.0, p=0.02** (clinical > non-clinical = controls) |
| PBQ care, mother (mean±SD) | 23.2±9.4 | 22.7± 10.3 | 24.3±9.9 | $F_{2,247}$=0.6, p=0.55 |
| PBQ care, father (mean±SD) | 21.8±9.6 | 21.4±11.3 | 23.7±9.2 | $F_{2,225}$=1.1, p=0.35 |

*Only voice-hearers were administered this questionnaire (non-clinical: N=41; clinical: N=49)

QES – Questionnaire for Evaluation of Self, BCSS – Brief Core Schema Scales, PE – persistent psychotic experiences, SMQ – Southampton Mindfulness Questionnaires, PBQ – Parental Bonding Questionnaire

Significant differences are highlighted in bold prints