Pandemic paranoia, general paranoia, and their relationships with worry and beliefs about self/others – a multi-site latent class analysis

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Abstract

Background
During the COVID-19 pandemic, an increase in paranoid thinking has been reported internationally. The development of the Pandemic Paranoia Scale (PPS) has provided a reliable assessment of various facets of pandemic paranoia. This study aimed to (i) identify classes of individuals with varying levels of general paranoia and pandemic paranoia, and (ii) examine associations between classification and worry, core beliefs, and pro-health behaviours.

Methods
An international sample of adults (N = 2510) across five sites completed the Revised-Green Paranoid Thoughts Scale and the PPS. Latent class analysis (LCA) was conducted using these two paranoia variables. Classes were compared on trait worry (Penn State Worry Questionnaire), beliefs about self/others (Brief Core Schema Scales), and pro-health behaviour.

Results
Three latent classes emerged: Class 1 with low R-GPTS and PPS scores, Class 2 with a high R-GPTS score and a moderate PPS score, and Class 3 with high R-GPTS and PPS scores. Compared to Class 1, Classes 2-3 were associated with more worry and negative self- and other-beliefs. Class 3 was further characterised by greater positive-self beliefs and less engagement in pro-health behaviours. Engagement in pro-health behaviours was positively correlated with interpersonal mistrust and negatively correlated with paranoid conspiracy and persecutory threat.

Conclusions
Individuals with a general paranoia tendency were more likely to respond to the global health threats in a suspicious and distrusting way. Our findings suggested that worry and negative self/other beliefs may contribute to not just general paranoia but also pandemic paranoia. The preliminary finding of a link between pro-health behaviours and interpersonal mistrust warrants further examination.

1. Introduction

In an uncertain and rapidly evolving threat situation like the COVID-19 pandemic, an increase in stress and anxiety symptoms has been reported across countries, and COVID-related worries have been associated with clinical levels of depression and anxiety (Amundson & Taylor, 2020; Liu et al., 2020; Qiu et al., 2020; Shevlin et al., 2020; Wang et al., 2020; Zavlis et al., 2021; Zhao et al., 2020; see review by Torales et al., 2020). Apart from these fears, a sense of interpersonal mistrust also prevails. Mertens et al. (2020) surveyed 439 participants, among whom 6.9% were afraid that others will not follow rules for infection control, 5.7% did not trust the government or believe that the government was doing enough to protect the public, and 2.5% worried about the role of media or fake news. Interpersonal mistrust may manifest in a form of xenophobia (Shaller & Park, 2011) – an increase in negative attitudes towards nationals from countries most heavily affected by COVID-19 (Sorokowski et al., 2020) – which has been shown to predict COVID-related stress and anxiety symptoms (Mertens et al., 2021; Taylor, 2019; Taylor et al., 2020b).

Paranoia is the erroneous idea that others are targeting you for harm (Freeman & Garety, 2014). While paranoia may manifest in an extreme form among patients with schizophrenia and other psychotic disorders (as persecutory delusions), paranoid experiences and appraisals (albeit of a milder magnitude) are common among individuals without a psychiatric diagnosis (Bebbington et al., 2013; Freeman, 2007; Freeman et al., 2005, 2019). Paranoia is characterised by anticipation of danger and threat, which is often precipitated by anomalous experiences and stress (Ellett et al., 2008; Freeman et al., 2011, 2002; Lincoln et al., 2009; Lopes & Pinto-Gouveia, 2013). There have been clinical reports of new onsets of paranoia and other psychotic symptoms in individuals without a mental health service history following exposure to COVID-19 and SARS (Brown et al., 2020; Chacko et al., 2020; Chandra et al., 2020; Cheng et al., 2004; Fischer et al., 2020; Haddad et al., 2020; Sheng et al., 2005), with the impact of COVID-19 on paranoia being more marked among younger people and minority groups (Lopes et al., 2020).

With preliminary reports of an increase in paranoia in the community during the COVID-19 pandemic, it is of interest to further understand this phenomenon. How does this COVID-related paranoia phenomenon relate to general paranoia, which is a psychopathological phenomenon that is typically assessed using scales such as Green et al. Paranoid Thoughts Scale (Green et al., 2008) and the Paranoia Checklist (Freeman et al., 2005)? Is pandemic paranoia experienced exclusively by individuals who report general paranoia, or is it commonly experienced by individuals regardless of their general paranoid tendency?

To capture paranoid ideas in relation to the COVID-19 pandemic, an international consortium of five study sites (US, UK, Germany, Australia and Hong Kong) has been formed. We developed a new Pandemic Paranoia Scale (PPS; Kingston et al., 2021) and validated it in

an international sample. The PPS consists of 25 items, which load on three separable factors (persecutory threat, paranoid conspiracy, and interpersonal mistrust) that converge into a higher-order pandemic paranoia construct. There was a moderate correlation between the PPS and R-GPTS scores (r = 0.68), indicating a level of overlap between the two scales (Kingston et al., 2021). The PPS offers a valid assessment tool of paranoid thinking that focuses particularly on the threat posed by others to oneself in the context of the pandemic. Using a data-driven approach of latent class analysis (LCA), the present study aimed to classify a large international sample into groups of individuals with varying levels of general paranoid tendency (as measured by the R-GPTS) and pandemic paranoia (as measured by the PPS).

Not only would the LCA allow us to examine the extent to which the phenomenon of pandemic paranoia co-occurs with general paranoia, the classification would also make possible group comparisons on putative psychological processes that have been shown to contribute to general paranoia, namely excessive worry and negative self-beliefs (see reviews by Garety & Freeman, 2013; Freeman, 2016). Longitudinal and experimental studies have found that worry predicted subsequent development and maintenance of paranoia among clinical and non-clinical participants (Freeman et al., 2008, 2012, 2015; Sun et al., 2019). Network analyses reveal worry as central to the structure of paranoia (Bell & O'Driscoll, 2018) and COVID-related fears (Taylor et al., 2020a) respectively. Mertens et al. (2020) also reported that worry-proneness predicted increased COVID-related fear.

There is a wealth of research supporting the association between negative self-beliefs and paranoia across clinical and non-clinical samples (see reviews by Bentall et al., 1994, 2001; Bentall & Taylor, 2006; Freeman et al., 2019; Kesting & Lincoln, 2013; Tiernan et al., 2014). Longitudinal and experimental studies have found that negative-self beliefs predicted subsequent development and maintenance of paranoia (Fowler et al., 2012; Freeman et al., 2014a), whereas positive-self beliefs were associated with clinical recovery (Chung et al., 2013). While most studies in this area focused mainly on self-beliefs, Addington and Tran (2009) reported that both negative-self and negative-other beliefs were associated with suspiciousness in a clinical high-risk group. Only two studies examined core beliefs about self/others in the COVID-19 pandemic. While Ritchie et al. (2021) reported an overall drop in self-efficacy beliefs from before to during the pandemic, Leibovitz et al. (2021) reported that negative-self beliefs and negative-other beliefs interact to contribute to conspiracy beliefs. In summary, while negative self-beliefs appear to be robustly associated with general paranoia, how beliefs about others relate to general paranoia was less clear. With the PPS capturing elements of conspiracy thinking and interpersonal mistrust, it would be of interest to examine whether pandemic paranoia would be associated with both negative-self and negative-other beliefs.

Lastly, the present study also explores class comparison on pro-health behaviours during COVID-19, including social distancing, hand hygiene, and mask wearing, etc. Recent studies have shown that general paranoia is associated with poor adherence to COVID safety guidelines, perhaps via conspiracy beliefs (Allington et al., 2020; Freeman et al., 2020; Georgiou et al., 2020; Kowalski et al., 2020; Marinthe et al., 2020). After controlling for conspiracy beliefs, Kowalski and Gaweda (2020) reported that general paranoia at baseline predicted an increase in adherence to safety guidelines in a small sample (N = 110).

In summary, the aim of the present study was twofold: (i) to identify classes of individuals who present with varying levels of general paranoia and pandemic paranoia at a time when the COVID-19 pandemic was ongoing and vaccines were not fully available (i.e. a naturally-occurring threat situation), and (ii) to estimate prediction between classification and levels of worry, negative self-beliefs, and pro-health behaviours. For (i), we sought to identify classes of individuals based on their R-GPTS and PPS scores using latent class analysis (LCA). For (ii), we would expect worry to be more marked in classes scoring higher on either general paranoia or pandemic paranoia, and negative self-beliefs to be associated with general paranoia while both negative self- and other-beliefs to be associated with pandemic paranoia. Pro-health behaviours were compared across classes as an exploratory analysis.

2. Method

2.1 Sample

A representative adult sample was collected via the Qualtrics Panel Service in February-April 2021. Inclusion criteria were age 18 or above and living in the country represented by the respective study site. No exclusion criteria were applied. For each site, sampling stratification (by age, sex, and education level) was referenced against the local census data. According to Jaki et al. (2019), a sample size of at least 1000 would be needed for reliable classifications. As we included separate sites and some of the analyses were exploratory, we went for a larger sample size (N = 2510).

2.2 Measures

Participants completed a Qualtrics survey in their native language (i.e. English for the UK, USA, and Australia, German for Germany and Chinese for Hong Kong). The survey consisted of the following self-reported questionnaires:

2.2.1 Key measures for latent class analysis

The Revised Green Paranoid Thoughts Scale (R-GPTS; Freeman et al., 2021) is an 18-item 5-point (0 to 4) rating scale assessing ideas of reference (eight items) and ideas of persecution (ten items) in the general population. The R-GPTS had good internal consistency in the current sample (Cronbach's alpha = 0.96).

The Pandemic Paranoia Scale (PPS; Kingston et al., 2021) is a newly developed 25-item 5-point (0 to 4) scale assessing paranoid thinking specifically related to the COVID-19 pandemic. Kingston et al. (2021) reported that the 25-item PPS yields a total score (score range 0-100) and three subscores: persecutory threat (15 items, score range 0-60; e.g. 'People are deliberately trying to pass COVID-19 to me'), paranoid conspiracy (six items, score range 0-24; e.g. 'COVID-19 is a conspiracy by powerful people'), and interpersonal mistrust (four items, score range 0-16; e.g. 'I can't trust others to stick to the social distancing rules'). The PPS has good internal consistency in the current sample (Cronbach's alpha = 0.90).

2.2.2 Psychological correlates for class comparisons

The 3-item Penn State Worry Questionnaire (PSWQ-3; Berle et al., 2011) is an ultra-brief version of the 18-item PSWQ (Meyer et al., 1990), the most established measure of trait worry style. The PSWQ-3 assesses the most central features of pathological worry (i.e. high frequency, perceived uncontrollability and multiple domains of worry). Despite its brevity, the PSWQ-3 has been shown to have comparable internal consistency, convergent and discriminant validity with the full PSWQ (Berle et al., 2011; Kertz et al., 2014). The PSWQ-3 has good internal consistency in the current sample (Cronbach's alpha = 0.82).

The Brief Core Schema Scales (BCSS; Fowler et al., 2006) is a 24-item 5-point (0 to 4) self-report rating scale assessing evaluative beliefs about the self and others. The BCSS yields four sub-scores (six items each): negative self, positive self, negative others, and positive others. The BCSS has good internal consistency in the current sample (Cronbach's alphas > 0.85).

2.2.3 Other measures

The Depression Anxiety and Stress Scale-21 (DASS-21; Antony et al., 1998) is a 21-item version of the 42-item DASS (Lovibond & Lovibond, 1995), both assessing the perceived severity of symptoms related to depression, anxiety and stress (seven items per subscale). Symptoms are assessed using a four-point scale (0 to 3). In this sample, the subscales had good internal consistency (Cronbach's alphas > 0.88).

Participants provided the following demographic information: gender, education level, household income, employment status, current psychiatric diagnosis and current psychiatric medication.

2.3 Procedure

Ethical approval was obtained from the respective research ethics committees of the five study sites. Reference numbers are as follows: Australia: HEC21012; Germany:

2020_346_Lincoln_Schlussvotum; Hong Kong: SBRE-20-233; UK: RHUL#2368; USA: 202012-002.

Upon written consent, participants were asked to fill out an online survey on the Qualtrics platform. Completers of the survey were remunerated either in cash or through a lucky draw.

2.4 Statistical analysis

Responses were excluded based on the following criteria: (i) responses that were completed too quickly (less than half of the median completion time); (ii) suspected duplicates; (iii) machine responses; (iv) inattentiveness (failing the attention check items). Only validated responses were entered into data analysis.

Descriptives and correlations were calculated in jamovi (version 1.8.1.0; The jamovi project, 2021). The LCA was conducted on Mplus (version 8.3; Muthén & Muthén, 2019), where the total scores of the R-GPTS and the PPS were analysed in finite normal mixture modelling using the robust maximum likelihood estimation. Given the large sample size, we chose 1000 and 200 as the numbers of initial stage starts and final stage optimizations respectively. Initial analysis based on an unrestricted model did not converge beyond two classes. Since means of and covariances between the R-GPTS total score and the PPS total score within each class were targets of interest, we restricted variances across classes to enable specification. Models of two to seven classes were compared on a variety of criteria to determine the number of classes for the optimal fit of the data. These criteria included AIC, BIC, CAIC, sample size adjusted BIC, CLC, NEC, Entropy, and ICL-BIC (see Table 1). A better goodness-of-fit was indicated by a smaller value of all of these criteria except for Entropy, where values approaching 1 would suggest a clear separation of class (Celeux & Soromenho, 1996). Bootstrapping was conducted with 500 draws, 1000 initial random starts and 100 final stage optimisations.

To examine question 2, comparisons of worry and core schemas across classes were conducted using Vermunt's (2010) three-step approach. This approach fully accounts for the classification error and can avoid errors and complexity caused by simultaneously estimating classes and the effect of hypothesised predictors (Bolck et al., 2004). To test the association between classes and counts of pro-health behaviours, BCH three-step approach was adopted to account for the violation of normal distribution (Bolck et al., 2004; Vermunt, 2010).

3. Results

3.1 Sample characteristics

A total of 2510 responses passed the validity check and entered into analysis (Australia: 502; Germany: 516; Hong Kong: 445; UK: 512; USA: 535). This sample had an average age of 43.32 (± 15.73), and 1323 participants (52.7%) were female. Demographic variables of the sample were reported in full in Kingston et al. (2021). Key variables and their correlations are reported in Supplemental Table.

[Insert Supplemental Table here]

3.2 Latent class analysis

As shown in Table 1, CLC and ICL-BIC indicated three, six or seven classes, whereas NEC and Entropy indicated two or three classes respectively. Therefore, a three-class model was selected as the final solution.

[Insert Table 1 here]

The final estimated three classes composed 1860, 384, and 266 individuals respectively (see Table 2 and Figure 1). Class 1 was low on both R-GPTS and PPS ('low-low'), Class 2 was high on the R-GPTS and moderate on the PPS ('high-moderate'), and Class 3 was high on both scales ('high-high'). R-GPTS and PPS were correlated with each other strongly for Classes 1 and 3 (r = 0.528 and 0.628, respectively, ps < .001) and mildly for Class 2 (r = 0.130, p = .006). Class 1 was significantly older than Classes 2 and 3 (W = 15.52, p < .001 and W = 13.58, p < .001, respectively), with the latter two classes not differing from each other. Class 3 was significantly higher on education level and average income than Classes 1 and 2 (education: W = 7.93, p < .001 and W = 8.54, p < .001, respectively; income: W = 15.81, p < .001 and W = 12.89, p < .001, respectively).

[Insert Table 2 here]

Kruskal-Wallis test reported an overall significant class effect on R-GPTS and PPS ($\chi^2(2)$ = 1459.21, p < .001, ε^2 = 0.58, and $\chi^2(2)$ = 817.22, p < .001, ε^2 = 0.33, respectively). Dwass-Steel-Critchlow-Fligner pairwise comparisons showed that Class 1 reported lower R-GPTS and PPS scores than Class 2 (W = 43.99, Cohen's d = -3.63 and W = 16.33, Cohen's d = -0.69, respectively, ps < .001), which in turn reported lower scores than Class 3 (W = 7.87, Cohen's d = -0.41 and W = 30.62, Cohen's d = 3.43, respectively, ps < .001).

[Insert Figure 1 here]

Kruskal-Wallis test also reported an overall significant class effect on DASS stress, anxiety, and depression ($\chi^2(2)$ = 623.10, p < .001, ε^2 = 0.25, $\chi^2(2)$ = 742.71, p < .001, ε^2 = 0.30, and $\chi^2(2)$ = 537.13, p < .001, ε^2 = 0.21, respectively). Pairwise comparisons further showed that for stress and depression, Class 1 was significantly lower than Classes 2 and 3 (ps < .001),

which did not differ from each other (p > .05). For DASS anxiety, Class 1 was significantly lower than Class 2 (W = 29.16, Cohen's d = -1.35, p < .001), which was in turn lower than Class 3 (W = 6.30, Cohen's d = -0.36, p < .001).

3.3 Class prediction using worry and core schemas

Regression of latent classes on worry and core schemas are shown in Table 3. A higher PSWQ score increased the likelihood of being categorised as Classes 2-3 as opposed to Class 1 (odds ratios = 1.35 and 1.35, ps < .001).

[Insert Table 3 here]

Higher negative-self and negative-other schema scores increased the likelihood of being categorised as Classes 2-3 as opposed to Class 1 (odds ratio for negative-self schema = 1.11, 1.13, ps < .001; odds ratio for negative-other schema = 1.10, 1.06, ps < .001). A higher positive-other schema score decreased the likelihood of being categorised as Classes 2-3 as opposed to Class 1 (odds ratios = 0.95 and 0.97, ps < .050). A higher negative-other schema score decreased the likelihood of being categorised as Class 3 as opposed to Class 2 (odds ratio = 0.97, p = .011). A higher positive-self schema score increased the likelihood of being categorised as Class 3 as opposed to Classes 1-2 (odds ratios = 1.07 and 1.09 respectively, ps < .001). The results remained comparable after controlling for site.

3.4 Class comparisons on pro-health behaviours against COVID-19 infection

Estimated average counts of pro-health behaviours reported by Classes 1, 2, and 3 were 6.27 (SE = 0.07), 6.23 (SE = 0.16), and 4.60 (SE = 0.18), respectively. There was an overall difference among classes ($\chi^2(2) = 74.34$, p < .001). Class 3 endorsed fewer pro-health behaviours than Classes 1 and 2 ($\chi^2(2) = 73.75$ and $\chi^2(2) = 43.35$, ps < .001, respectively), which did not differ from each other ($\chi^2(2) = 0.06$, p = .811).

4. **Discussion**

The present study examined the subjective report of general paranoia and pandemic paranoia in the context of COVID-19, using a large international sample of 2510 adults. Paranoid ideations in specific relation to the COVID-19 pandemic were assessed using the new Pandemic Paranoia Scale (PPS, Kingston et al., 2021). On the basis of a positive correlation between the two scales reported by Kingston et al. (2021), this study addressed the extent to which the two constructs of paranoia co-occur in the general population using a data-driven approach, and compared the classes with varying levels of the two constructs on psychological correlates that have previously been shown to be related to general paranoia. Our study extends the current literature of psychological responses to the COVID-

19 pandemic, which focused mainly on fears or anxieties (e.g. Ahorsu et al., 2020; Mertens et al., 2021; Schimmenti et al., 2020; Taylor et al., 2020a), by addressing paranoid concerns.

Three classes of individuals emerged from the latent class analysis (LCA). The majority of the sample (74.3%) were most likely to belong to Class 1 and had low scores on both R-GPTS and PPS. This contextualises our research question where, despite an increase in reports of paranoid thinking in stressful times such as in the pandemic (e.g. Brown et al., 2020; Chacko et al., 2020; Chandra et al., 2020), and an apparently higher R-GPTS score in our sample than the pre-pandemic national norm reported by Freeman et al (2021), most people remain to have low scores on both general paranoia and pandemic paranoia (see also Shevlin et al, 2021). Class 2 (15.1%) consisted of individuals who had a high R-GPTS score and a moderate PPS score, whereas Class 3 (10.6%) had high scores on both R-GPTS and PPS. Of note, classification was characterised by the following: (i) there was no class with a high PPS score and a low/moderate R-GPTS score; (ii) in Classes 2-3, where the PPS scores were moderate/high, the R-GPTS scores were high; (iii) while the PPS score was higher in Class 3 than Class 2, the R-GPTS score was also higher in Class 3 than Class 2. These results pointed to at least two directions of interpretation. The first one is that general paranoia needs to be present for there to be notable pandemic paranoia. The idea that occurrence of significant pandemic paranoia builds on a strong tendency for general paranoia may imply that the paranoid concerns during this global threat situation are the results of the interaction between environmental stress and an individual's existing predisposition (Freeman et al., 2002, 2011). The second possibility concerns the psychometrics of the new scale. As there is a moderate correlation between the R-GPTS and the PPS, any differences between Classes 2 and 3 may be driven by the non-shared components between the two scales.

As hypothesised, trait worry was exacerbated in the two classes with heightened paranoia (Classes 2-3). While correlation analyses showed that worry was positively correlated with both R-GPTS and PPS scores (see Supplemental Table), the correlation coefficient was stronger for R-GPTS than PPS. In addition, although Class 3 scored higher on PPS than Class 2, the two groups did not differ on worry. Therefore, our results are consistent with previous findings that worry contributes to both general paranoia (Bell & O'Driscoll, 2018) and pandemic paranoia (Mertens et al., 2020; Taylor et al., 2020a), but perhaps more strongly for the former than the later.

As hypothesised, Classes 2-3 tended to have more negative-self schemas than Class 1. In addition, we found that the same pattern of group differences occurred to other-schemas as well, where Classes 2-3 viewed others as more negative (and less positive) than Class 1. In other words, individuals who have a high general tendency of paranoia, regardless of their levels of pandemic paranoia, are characterised by negative views of themselves and others. This extends the current literature (Addington & Tran, 2009; Freeman et al., 2019; Kesting &

Lincoln, 2013; Tiernan et al., 2014) by linking paranoia to not only self-beliefs, but other-beliefs as well.

The findings about positive-self beliefs create more ambiguity. On the one hand, Class 3 scored higher than Class 2 on both paranoia variables (and anxiety), which are associated with negative rather than positive self-beliefs in this study as well as others (e.g. Kesting & Lincoln, 2013; Tiernan et al., 2014). On the other hand, both negative and positive self-beliefs were more marked in Class 3 than Class 2. A closer look at the score distribution revealed that while Class 2 had a skewed distribution on positive-self beliefs (with the majority scoring at the lower end), Class 3 showed a more diffuse distribution on positive-self beliefs, with a higher mean and greater SD than Class 2. It is also intriguing that Class 3 had a higher education level and average income than the other two classes. To what extent does such finding in Class 3 reflect high self-esteem (Bentall et al, 2008), fluctuations in self-concept especially under stress (Kinderman et al., 2003; Murphy et al., 2018; Palmier-Claus et al., 2011; Thewissen et al., 2008; Udachina et al., 2012), or a desire to uphold a positive self-image in relation to conspiracy beliefs (Cichocka et al., 2016; Douglas et al., 2017) awaits further research.

Pro-health behaviour was more commonly adopted by Classes 1-2 than Class 3. The fact that there was no significant difference in pro-health behaviours between Classes 1 and 2 implies that the general tendency of paranoia is not likely to explain the variation in pro-health behaviour. We found preliminary evidence for differential associations between engagement in pro-health behaviour and PPS subscales, with pro-health behaviour increasing with interpersonal mistrust and decreasing with paranoid conspiracy and persecutory threat (see Supplemental Table). Although these correlations were of small magnitudes, our results add to recent evidence that paranoia is linked to poor adherence to COVID health guidelines, perhaps via conspiracy beliefs (Allington et al., 2020; Freeman et al., 2020; Georgiou et al., 2020; Kowalski et al., 2020; Marinthe et al., 2020). Future studies on the roles of mistrust and conspiracy beliefs on engagement in pro-health behaviours would inform public health education strategies and policies.

This study had the following limitations: (i) we used the same sample as the PPS validation study (Kingston et al., 2021), (ii) all measures were self-reported, and (iii) we restricted variances across classes in our LCA models because an unrestricted model did not converge beyond two classes. The extent to which these design issues might have affected the findings is unclear. In addition, due to heterogeneity of government-imposed restrictions across nations and parts of nations, we did not have a reliable account about how these restrictions may have impacted on our study findings. As many of our results are novel, further exemplification by future research would be beneficial.

To conclude, we found that pandemic paranoia was most marked in individuals who had a pre-existing paranoia tendency. While the two paranoid classes were characterised by exacerbated worry and negative self/other-beliefs, the class with high pandemic paranoia had the lowest engagement in pro-health behaviours.

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This research received no specific grant from any funding agency, commercial or not-for-profit sectors.

6. Conflicts of Interest

None

7. Ethical Standards

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

8. Availability of Data and Materials

The authors have not obtained explicit permission from our participants to share the data beyond this project.

9. References

Addington J, Tran L (2009) Using the brief core schema scales with individuals at clinical high risk of psychosis. *Behavioural and Cognitive Psychotherapy* **37**, 227.

Ahorsu DK, Lin CY, Imani V, Saffari M, Griffiths MD, Pakpour AH (2020) The fear of COVID-19 scale: development and initial validation. *International Journal of Mental Health and Addiction*, pp. 1.

Akoglu H (2018) User's guide to correlation coefficients. *Turkish Journal of Emergency Medicine* **18***,* 91-93.

Allington D, Duffy B, Wessely S, Dhavan N, Rubin J (2020) Health-protective behaviour, social media usage and conspiracy belief during the COVID-19 public health emergency. *Psychological Medicine*, pp.1-7.

Amundson GJG, Taylor S (2020) How health anxiety influences responses to viral outbreaks like COVID-19: What all decision-makers, health authorities, and health care professionals need to know. *Journal of Anxiety Disorders* **71***,* 102211.

Antony MM, Bieling P J, Cox BJ, Enns MW, Swinson RP (1998) Psychometric properties of the 42-item and 21-item versions of the Depression Anxiety Stress Scales in clinical groups and a community sample. *Psychological Assessment* **10**, 176.

Bebbington PE, McBride O, Steel C, Kuipers E, Radovanovic M, Brugha T, Jenkins R, Meltzer HI, & Freeman D (2013) The structure of paranoia in the general population. *British Journal of Psychiatry* **202***,* 419-427.

Bell V, & O'Driscoll C (2018) The network structure of paranoia in the general population. *Social Psychiatry and Psychiatric Epidemiology* **53**, 737-744.

Bentall RP, Corcoran R, Howard R, Blackwood N, Kinderman P (2001) Persecutory delusions: a review and theoretical integration. *Clinical Psychology Review* **21**, 1143-1192.

Bentall RP, Kinderman P, Kaney S (1994) The self, attributional processes and abnormal beliefs: towards a model of persecutory delusions. *Behaviour Research and Therapy* **32,** 331-341.

Bentall R, Rouse G, Kinderman P, Blackwood N. Howard R, Moore R, Cummins S, Corcoran R (2008). Paranoid delusions in schizophrenia and depression. The transdiagnostic role of expectations of negative events and negative self-esteem. *Journal of Nervous and Mental Disease* **199,** 375-383.

Bentall RP, Taylor JL (2006) Psychological processes and paranoia: implications for forensic behavioural science. *Behavioural Science and the Law* **24,** 277-294.

Berle D, Starcevic V, Moses K, Hannan A, Milicevic D, Sammut P (2011) Preliminary validation of an ultra-brief version of the Penn State Worry Questionnaire. *Clinical Psychology & Psychotherapy* **18**, 339-346.

Bolck A, Croon M, Hagenaars J (2004) Estimating latent structure models with categorical variables: One-step versus three-step estimators. *Political Analysis* **12**, 3-27.

Brown E, Gray R, Monaco SL, O'Donoghue B, Nelson B, Thompson A, Francey S, McGorry, P (2020) The potential impact of COVID-19 on psychosis: a rapid review of contemporary epidemic and pandemic research. *Schizophrenia Research* **222**, 79-87.

Celeux G, Soromenho G (1996). An entropy criterion for assessing the number of clusters in a mixture model. *Journal of Classification* **13**, 195-212.

Chacko M, Job A, Caston F, George P, Yacoub A, Cáceda R (2020) COVID-19-Induced Psychosis and Suicidal Behavior: Case Report. *SN Comprehensive Clinical Medicine* **2**, 2391-2395.

Chandra PS, Shiva L, Nagendrappa S, Ganjekar S, Thippeswamy H (2020) COVID 19 related Psychosis as an interface of fears, socio-cultural issues and vulnerability-case report of two women from India. *Psychiatry Research* **290**, 113136.

Cheng SKW, Tsang JSK, Ku KH, Wong CW, Ng YK (2004) Psychiatric complications in patients with severe acute respiratory syndrome (SARS) during the acute treatment phase: a series of 10 cases. *The British Journal of Psychiatry* **184**, 359-360.

Chung YC, Kim HM, Lee KH, Zhao T, Huang GB, Park TW, Yang JC (2013) Clinical characteristics of patients who have recovered from schizophrenia: the role of empathy and positive-self schema. *Early Intervention in Psychiatry* **7**, 138-45.

Cichocka A, Marchlewska M, Golec de Zavala (2016) Does self-love or self-hate predict conspiracy beliefs? Narcissism, self-esteem, and the endorsement of conspiracy theories. *Social Psychological and Personality Science* **7**, 157-166.

Douglas KM, Sutton RM, Cichocka A (2017) The psychology of conspiracy theories. *Current Directions in Psychological Science* **26,** 538-542.

Ellett L, Freeman D, Garety PA (2008) The psychological effect of an urban environment on individuals with persecutory delusions: the Camberwell walk study. *Schizophrenia Research **99***, 77-84.

Fischer M, Coogan AN, Faltraco F, Thome J (2020) COVID-19 paranoia in a patient suffering from schizophrenic psychosis–a case report. *Psychiatry Research* **288**, 113001.

Fowler D, Freeman D, Smith BEN, Kuipers E, Bebbington P, Bashforth H, Coker S,

Hodgekins J, Gracie A, Dunn G, Garety P (2006) The Brief Core Schema Scales (BCSS): psychometric properties and associations with paranoia and grandiosity in non-clinical and psychosis samples. *Psychological Medicine* **36**, 749-759.

Fowler D, Hodgekins J, Garety P, Freeman D, Kuipers E, Dunn G, Smith B, Bebbington PE (2012) Negative cognition, depressed mood, and paranoia: a longitudinal pathway analysis using structural equation modeling. *Schizophrenia Bulletin* **38**, 1063-1073.

Freeman D (2007) Suspicious minds: the psychology of persecutory delusions. *Clinical Psychology Review* **27**, 425-457.

Freeman D (2016) Persecutory delusions: a cognitive perspective on understanding and treatment. *The Lancet Psychiatry* **3**, 685-692.

Freeman D, Dunn G, Startup H, Pugh K, Cordwell J, Mander H, Černis E, Wingham G, Shirvell K, Kingdon D (2015) Effects of cognitive behaviour therapy for worry on persecutory delusions in patients with psychosis (WIT): a parallel, single-blind, randomised controlled trial with a mediation analysis. *The Lancet Psychiatry* **2**, 305-313.

Freeman D, Evans N, Lister R, Antley A, Dunn G, Slater M (2014a) Height, social comparison, and paranoia: an immersive virtual reality experimental study. *Psychiatry Research* **218**, 348-352.

Freeman D, & Garety P (2014) Advances in understanding and treating persecutory delusions: a review. *Social Psychiatry and Psychiatric Epidemiology* **49**, 1179-1189.

Freeman D, Garety PA, Bebbington PE, Smith B, Rollinson R, Fowler D, Kuipers E, Ray K, Dunn G (2005) Psychological investigation of the structure of paranoia in a non-clinical population. *The British Journal of Psychiatry* **186**, 427-435.

Freeman D, Garety PA, Kuipers E, Fowler D, Bebbington PE (2002) A cognitive model of persecutory delusions. *British Journal of Clinical Psychology* **41***,* 331-347.

Freeman D, Garety PA, KuipersE, Fowler D, Bebbington PE, Dunn G (2007) Acting on persecutory delusions: the importance of safety seeking. *Behaviour Research and Therapy* **45**, 89-99.

Freeman D, Gittins M, Pugh K, Antley A, Slater M, Dunn G (2008) What makes one person paranoid and another person anxious? The differential prediction of social anxiety and persecutory ideation in an experimental situation. *Psychological Medicine* **38**, 1121-1132.

Freeman D, Loe BS, Kingdon D, Startup H, Molodynski A, Rosebrock L, Brown P, Sheaves B, Waite F & Bird JC (2021). The revised Green et al., Paranoid Thoughts Scale (R-GPTS):

psychometric properties, severity ranges, and clinical cut-offs. *Psychological Medicine* **51**, 244-253.

Freeman D, McManus S, Brugha T, Meltzer H, Jenkins R, Bebbington P (2011) Concomitants of paranoia in the general population. *Psychological Medicine* **41***,* 923-936.

Freeman D, Stahl D, McManus S, Meltzer H, Brugha T, Wiles N, Bebbington P (2012) Insomnia, worry, anxiety and depression as predictors of the occurrence and persistence of paranoid thinking. *Social Psychiatry and Psychiatric Epidemiology* **47**, 1195-1203.

Freeman D, Taylor KM, Molodynski A, Waite F (2019) Treatable clinical intervention targets for patients with schizophrenia. *Schizophrenia Research* **211**, 44-50.

Freeman D, Waite F, Rosebrock L, Petit A, Causier C, East A, Jenner L, Teale A, Carr L, Mulhall S, Bold E, Lambe S (2020) Coronavirus conspiracy beliefs, mistrust, and compliance with government guidelines in England. *Psychological Medicine*, pp. 1-13.

Garety PA, Freeman D (2013) The past and future of delusions research: from the inexplicable to the treatable. *The British Journal of Psychiatry* **203**, 327-333.

Georgiou N, Delfabbro P, Balzan R (2020) COVID-19-related conspiracy beliefs and their relationship with perceived stress and pre-existing conspiracy beliefs. *Personality and Individual Differences* **166**, 110201.

Green CEL, Freeman D, Kuipers E, Bebbington P, Fowler D, Dunn G, Garety PA (2008) Measuring ideas of persecution and social reference: the Green et al. Paranoid Thought Scales (GPTS). *Psychological Medicine* **38**, 101.

Haddad PM, Al Abdulla M, Latoo J, Iqbal Y (2020) Brief psychotic disorder associated with quarantine and mild COVID-19. *BMJ Case Reports CP* **13**, e240088.

Henry JD, Crawford JR (2005) The short-form version of the Depression Anxiety Stress Scales (DASS-21): Construct validity and normative data in a large non-clinical sample. *British Journal of Clinical Psychology* **44**, 227-239.

Jaki T, Kim M, Lamont A, George M, Chang C, Feaster D, Van Horn ML (2019) The effects of sample size on the estimation of regression mixture models. *Educational and psychological measurement* **79**, 358-384.

Kertz SJ, Lee J, Björgvinsson T (2014) Psychometric properties of abbreviated and ultra-brief versions of the Penn State Worry Questionnaire. *Psychological Assessment* **26**, 1146.

Kesting ML, Lincoln TM (2013) The relevance of self-esteem and self-schemas to persecutory delusions: a systematic review. *Comprehensive Psychiatry* **54**, 766-789.

Kinderman P, Prince S, Waller G, Peters E (2003) Self-discrepancies, attentional bias and persecutory delusion. *British Journal of Clinical Psychology* **42**, 1-12.

Kingston JL, Schlier B, Ellett L, So SH, Gaudiano BA, Morris EMJ, Lincoln TM (2021). The Pandemic Paranoia Scale (PPS): factor structure and measurement invariance across languages. *Psychological Medicine* [ePub ahead of print].

Kowalski J, Gawęda Ł (2020) Persecutory beliefs predict adherence to epidemiological safety guidelines over time–a longitudinal study. *Psychological Medicine,* pp. 1-2.

Kowalski J, Marchlewska M, Molenda Z, Górska P, Gawęda Ł (2020) Adherence to safety and self-isolation guidelines, conspiracy and paranoia-like beliefs during COVID-19 pandemic in Poland-associations and moderators. *Psychiatry Research* **294**, 113540.

Leibovitz T, Shamblaw AL, Rumas R, Best MW (2021) COVID-19 conspiracy beliefs: Relations with anxiety, quality of life, and schemas. *Personality and Individual Differences* **175**, 110704.

Lincoln TM, Peter N, Schäfer M, Moritz S (2009) Impact of stress on paranoia: an experimental investigation of moderators and mediators. *Psychological Medicine* **39**, 1129.

Liu QW, Zhao GZ, Ji B, Liu YT, Zhang JY, Mou QJ, Shi TY (2020) Analysis of the influence of the psychology changes of fear induced by the COVID-19 epidemic on the body: COVID-19. *World Journal of Acupuncture and Moxibustion* **30***,* 85-89.

Lopes B, Pinto-Gouveia J (2013) The role of predisposition to hallucinations on non-clinical paranoid vs. socially anxious individuals after hearing negative affective-laden sounds: An experimental investigation. *Behavioural and Cognitive Psychotherapy* **41**, 221-237.

Lopes B, Bortolon C, Jaspal R (2020) Paranoia, hallucinations and compulsive buying during the early phase of the COVID-19 outbreak in the United Kingdom: a preliminary experimental study. *Psychiatry Research* **293**, 113455.

Lovibond SH, Lovibond PF (1995) *Manual for the Depression Anxiety Stress Scales, 2nd Edition*. Sydney: Psychology Foundation of Australia.

Marinthe G, Brown G, Dulouvée S, Jolly D (2020) Looking out for myself: Exploring the relationship between conspiracy mentality, perceived personal risk, and COVID-19 prevention measures. *British Journal of Health Psychology* **25***,* 957-980.

Mertens G, Gerritsen L, Duijndam S, Salemink E, Engelhard IM (2020) Fear of the coronavirus (COVID-19): Predictors in an online study conducted in March 2020. *Journal of Anxiety Disorders* **74**, 102258.

Mertens G, Duijndam S, Smeets T, Lodder P (2021) The latent and item structure of COVID-19 fear: A comparison of four COVID-19 fear questionnaires using SEM and network analyses. *Journal of Anxiety Disorders* **81**, 102415.

Meyer TJ, Miller ML, Metzger RL, Borkovec TD (1990) Development and validation of the Penn State Worry Questionnaire. *Behaviour Research and Therapy* **28**, 487-495.

Murphy P, Bentall RP, Freeman D, O'Rourke S, Hutton P (2018) The paranoia as defence model of persecutory delusions: a systematic review and meta-analysis. *Lancet Psychiatry* **5,** 913-929.

Muthén LK, Muthén BO (2019) *Mplus User's Guide. Eighth Edition.* Los Angeles, CA: Muthén & Muthén.

Palmier-Claus J, Dunn G, Drake R, Lewis S (2011) The negative and positive self: a longitudinal study examining self-esteem, paranoia and negative symptoms in individuals with first episode psychosis**.** *Early Intervention in Psychiatry* **5**, 150-155

Qiu J, Shen B, Zhao M, Wang Z, Xie B, Xu Y (2020) A nationwide survey of psychological distress among Chinese people in the COVID-19 epidemic: implications and policy recommendations. *General Psychiatry* **33**, e100213.

Ritchie L, Cervone D, Sharpe BT (2021) Goals and Self-Efficacy Beliefs During the Initial COVID-19 Lockdown: A Mixed Methods Analysis. *Frontiers in Psychology* **11**, 559114.

Schimmenti A, Starcevic V, Giardina A, Khazaal Y, Billieux J (2020) Multidimensional Assessment of COVID-19-Related Fears (MAC-RF): A theory-based instrument for the assessment of clinical relevant fears during pandemics. *Frontiers in Psychiatry* **11***,* 748.

Shaller M, Park JH (2011) The behavioral immune system (and why it matters). *Current Directions in Psychological Science* **20***,* 99-103.

Sheng B, Cheng SKW, Lau KK, Li HL, Chan ELY (2005) The effects of disease severity, use of corticosteroids and social factors on neuropsychiatric complaints in severe acute respiratory syndrome (SARS) patients at acute and convalescent phases. *European Psychiatry* **20**, 236-242.

Shevlin M, Butter S, McBride O, Murphy J, Gibson-Miller J, Hartman TK, Levita L, Mason L, Martinez AP, McKay R, Stocks TVA, Bennett K, Hyland P, Bentall RP (2021) Refuting the myth of a 'tsunami' of mental ill-health in populations affected by COVID-19: evidence that response to the pandemic is heterogeneous, not homogeneous. *Psychological Medicine* [online ahead of print].

Shevlin M, McBride O, Murphy J, Miller JG, Hartman TK, Levita L, Mason L, Martinez AP, McKay R, Stocks TVA, Bennett KM, Hyland P, Karatzias T, Bentall RP (2020) Anxiety, depression, traumatic stress and COVID-19-related anxiety in the UK general population during the COVID-19 pandemic. *BJPsych Open* **6**, e125.

Sorokowski P, Groyecka-Bernard A, Kowal M, Sorokowska A, Bialek M, Lebuda I, Dobrowolska M, Zdybek P, Karwowski M (2020) Can information about pandemics increase negative attitudes toward foreign groups? A case of COVID-19 outbreak. *Sustainability* **12***,* 4912.

Sun X, So SH, Chan RC, Chiu CD, Leung PW (2019) Worry and metacognitions as predictors of the development of anxiety and paranoia. *Scientific Reports* **9**, 1-10.

Taylor S, Landry CA, Paluszek MM, Fergus TA, McKay D, Asmundson GJ (2020a) COVID stress syndrome: Concept, structure, and correlates. *Depression and Anxiety* **37**, 706-714.

Taylor S, Landry CA, Paluszek MM, Fergus TA, McKay D, Asmundson GJ (2020b) Development and initial validation of the COVID Stress Scales. *Journal of Anxiety Disorders* **72**, 102232.

Taylor S (2019) *The Psychology of Pandemics: Preparing for the Next Global Outbreak of Infectious Disease*. Cambridge Scholars Publishing.

The jamovi project (2021) jamovi (Version 1.6) [Computer Software].

Thewissen V, Lecomte T, Myin-Germeys I, Bentall R, van Os J (2008) Fluctuations in self-esteem and paranoia in the context of daily life**.** *Journal of Abnormal Psychology* **117**, 143-153.

Tiernan B, Tracey R, & Shannon C (2014) Paranoia and self-concepts in psychosis: a systematic review of the literature. *Psychiatry Research* **216**, 303-313.

Torales J, O'Higgins M, Castaldelli-Maia JM, Ventriglio A (2020) The outbreak of COVID-19 coronavirus and its impact on global mental health. *International Journal of Social Psychiatry* **66**, 317-320.

Udachina A, Varese F, Oorschot M, Myin-Germeys I, Bentall P (2012) Dynamics of self-esteem in "poor me" and "bad me" paranoia**.** *Journal of Nervous and Mental Disease* **200**, 777-783.

Vermunt JK (2010) Latent class modeling with covariates: Two improved three-step approaches. *Political Analysis* **18**, 450-469.

Wang C, Pan R, Wan X, Tan Y, Xu L, Ho CS, Ho RC (2020) Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease

(COVID-19) epidemic among the general population in China. *International Journal of Environmental Research and Public Health* **17**, 1729.

Zavlis O, Butter S, Bennett K, Hartman T, Hyland P, Mason L, McBride O, Murphy J, Gibson-Miller J, Levita L, Martinez AP, Shevlin M, Stocks TVA, Vallières F, Bentall EP (2021) How does the COVID-19 pandemic impact on population mental health? A network analysis of COVID influences on depression, anxiety and traumatic stress in the UK population. *Psychological Medicine* [ePub ahead of print]

Zhao SZ, Wong JYH, Luk TT, Wai AKC, Lam TH, Wang MP (2020) Mental health crisis under COVID-19 pandemic in Hong Kong, China. *International Journal of Infectious Diseases* **100**, 431-433.

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Declarations of interest

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SHS and EMJM came up with the research idea. All authors planned and coordinated the data collection and analysis. CZ conducted data analysis under the supervision of SHS. SHS and EMJM compiled the first draft of the manuscript. All authors contributed to the editing of the manuscript and approved the final version for submission.

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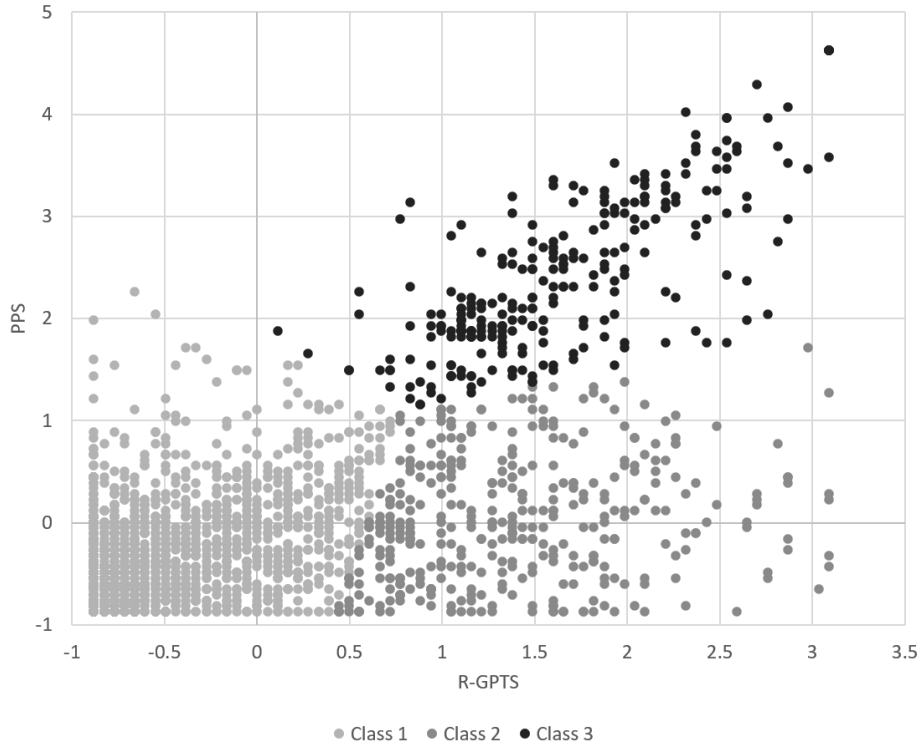
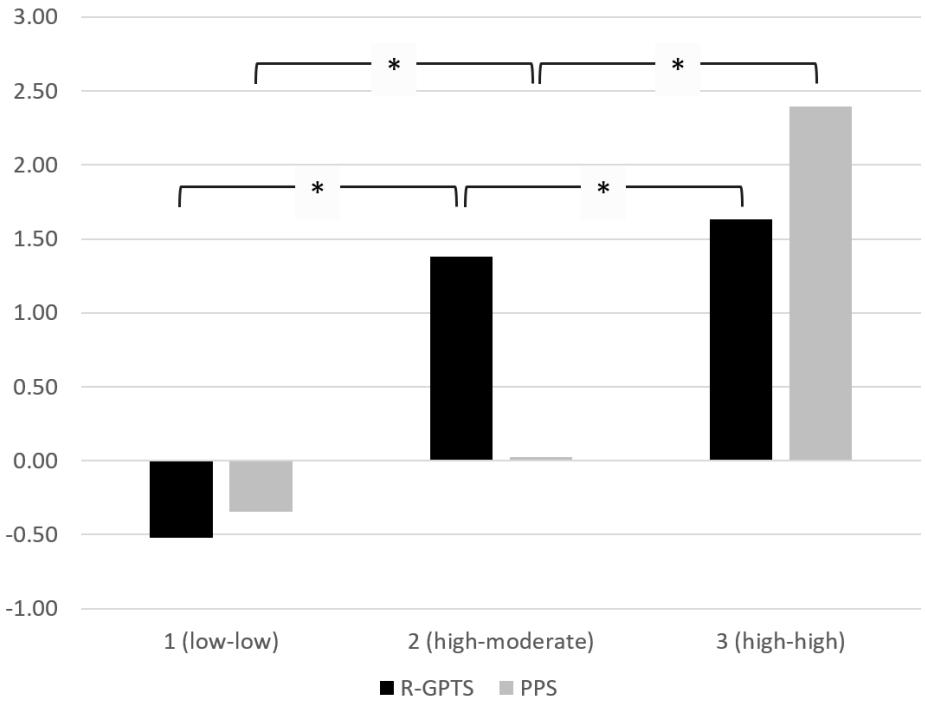
Figure 1 (a-b). Class Distribution and Comparison (N = 2510)



(a)



(b)

Note. (a) scatter plot of classes. (b) class comparison. R-GPTS, The Revised Green et al., Paranoid Thoughts Scale. PPS, Pandemic Paranoia Scale. Classification is based on the most likely latent class membership (N'). All scores are standardised. * suggests a significant difference ($p < .05$).

Table 1. Model Fit Indices (N = 2510)

Classes	LL	AIC	BIC	CAIC	ssBIC	CLC	NEC	Entropy	ICL-BIC
1	-20926.83	41863.66	41892.80	41897.80	41876.91	41853.66	1.00	NA	41892.80
2	-20250.87	40519.74	40572.19	40581.19	40543.60	40627.01	0.09	0.96	40697.46
3	-19740.75	39507.50	39583.27	39596.26	39541.96	39906.16	0.18	0.92	40007.92
4	-19545.57	39125.13	39224.21	39241.21	39170.20	40984.03	0.69	0.73	41117.11
5	-19440.61	38923.22	39045.61	39066.61	38978.89	39551.81	0.23	0.92	39716.20
6	-19311.74	38673.48	38819.18	38844.18	38739.75	39504.96	0.27	0.90	39700.66
7	-19214.81	38487.62	38656.63	38685.63	38564.49	39299.01	0.25	0.91	39526.03

Note. LL, log-likelihood value. AIC, Akaike Information Criteria. BIC, Bayesian Information Criteria. CAIC, Bozdogan's consistent AIC. ssBIC, sample-size adjusted BIC. CLC, Classification Likelihood information Criterion. NEC, Normalized Entropy Criterion. ICL, Integrated Complete Likelihood.

Table 2. Classification based on the Estimated Model, and within-class descriptives and correlations of the two paranoia scores

	Latent Class 1 ('low-low')		Latent Class 2 ('high-moderate')		Latent Class 3 ('high-high')	
N (%)	1852.86	(73.82%)	393.36	(15.67%)	263.77	(10.51%)
N' (%)	1860	(74.10%)	384	(15.30%)	266	(10.60%)
Female (%)	1011	(54.38%)	236	(61.46%)	76	(28.57%)
Age: mean (SD)	45.85	(16.05)	36.02	(13.70)	36.15	(9.55)
Education (%)						
Primary	36	(1.94%)	7	(1.82%)	4	(1.50%)
Secondary or equivalent	465	(25.00%)	112	(29.17%)	38	(14.29%)
A-level or equivalent	581	(31.24%)	124	(32.29%)	69	(25.94%)
Bachelor or equivalent	572	(30.75%)	110	(28.65%)	104	(39.10%)
Master's or equivalent	190	(10.22%)	24	(6.25%)	36	(13.53%)
PhD or equivalent	16	(0.86%)	7	(1.82%)	15	(5.64%)
Income (%)						
< £18,500	382	(20.54%)	82	(21.35%)	20	(7.52%)
£18,500-36,999	569	(30.59%)	116	(30.21%)	34	(12.78%)
£37,000-55,999	387	(20.81%)	82	(21.35%)	54	(20.30%)
£56,000-74,999	229	(12.31%)	39	(10.16%)	40	(15.04%)
£75,000-92,999	139	(7.47%)	30	(7.81%)	48	(18.05%)
£93,000-111,999	85	(4.57%)	20	(5.21%)	37	(13.91%)
£112,000+	69	(3.71%)	15	(3.91%)	33	(12.41%)
R-GPTS	6.59		40.39		45.52	
PPS	9.48		16.74		59.35	
r	0.53	***	0.13	**	0.63	***

Note. N, class counts based on the estimated model. N', class counts based on the most likely latent class membership. ** $p < .010$, *** $p < .001$. *r*, correlation between R-GPTS and PPS within each class. SDs for R-GPTS = 8.86, PPS = 10.24

Table 3. Multinomial Logistic Regression of Latent Classes Using Vermunt's 3-Step Approach

	Referent Class	Odds ratios	*S.E.*	*t*	two-tailed p
PSWQ					
Class 2	Class 1	1.35	0.03	12.55	< .001
Class 3	Class 1	1.35	0.03	13.50	< .001
Class 3	Class 2	1.00	0.02	−0.14	0.888
BCSS NegSelf					
Class 2	Class 1	1.11	0.02	6.69	< .001
Class 3	Class 1	1.13	0.02	7.05	< .001
Class 3	Class 2	1.02	0.02	1.29	0.198
BCSS PosSelf					
Class 2	Class 1	0.98	0.01	-1.44	0.150
Class 3	Class 1	1.07	0.02	4.38	< .001
Class 3	Class 2	1.09	0.02	4.60	< .001
BCSS NegOther					
Class 2	Class 1	1.10	0.01	7.45	< .001
Class 3	Class 1	1.06	0.01	4.71	< .001
Class 3	Class 2	0.97	0.01	-2.53	0.011
BCSS PosOther					
Class 2	Class 1	0.95	0.01	-4.14	< .001
Class 3	Class 1	0.97	0.01	-2.15	0.032
Class 3	Class 2	1.03	0.02	1.54	0.124

Note. PSWQ, Penn State Worry Questionnaire. BCSS, Brief Core Schema Scale.

Supplemental Table. Correlation Matrix

	Mean	SD	1	2	3	4	5	6	7	8	9	10
1 R-GPTS total	15.98	18.14	—									
2 PPS total	15.86	18.20	0.60 ***	—								
3 PPS_PT	5.34	11.24	0.60 ***	0.74 ***	—							
4 PPS_PC	5.69	6.61	0.47 ***	0.84 ***	0.52 ***	—						
5 PPS_IM	4.82	4.28	0.45 ***	0.73 ***	0.53 ***	0.36 ***	—					
6 PSWQ	8.52	3.67	0.50 ***	0.34 ***	0.29 ***	0.23 ***	0.35 ***	—				
7 BCSS_NS	3.51	5.17	0.41 ***	0.25 ***	0.18 ***	0.18 ***	0.25 ***	0.48 ***	—			
8 BCSS_PS	11.40	6.74	-0.23 ***	-0.11 ***	-0.05 **	-0.06 **	-0.15 ***	-0.37 ***	-0.55 ***	—		
9 BCSS_NO	5.13	6.32	0.39 ***	0.29 ***	0.22 ***	0.21 ***	0.26 ***	0.36 ***	0.42 ***	-0.20 ***	—	
10 BCSS_PO	9.88	6.32	-0.29 ***	-0.20 ***	-0.13 ***	-0.15 ***	-0.18 ***	-0.28 ***	-0.37 ***	0.58 ***	-0.28 ***	—
11 Pro-health	6.09	2.91	-0.09 ***	-0.09 ***	-0.08 ***	-0.20 ***	0.17 ***	0	-0.03	0.04 *	-0.02	0.03

Note. Spearman's correlation. R-GPTS, The Revised Green et al., Paranoid Thoughts Scale. PPS, Pandemic Paranoia Scale (PT: Persecutory Threat subscale; PC: Paranoid Conspiracy subscale; IM: Interpersonal Mistrust subscale). PSWQ, Penn State Worry Questionnaire. BCSS, Brief Core Schema Scale (NS: Negative-Self subscale; PS: Positive-Self subscale; NO: Negative-Other subscale; PO: Positive-Other subscale). Pro-health, Counts of pro-health behaviours.

* $p < .05$, ** $p < .01$, *** $p < .001$