Paranoia, hallucinations and compulsive buying during the early phase of the COVID-19 outbreak in the United Kingdom: a preliminary experimental study

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Abstract

This study examines the impact of COVID-19 (in the early phase of the outbreak) on symptoms of psychosis, namely paranoia and hallucinations. Three hundred and sixty-one people in the United Kingdom participated in a 2 (self-isolation vs. no self-isolation) x 2 (perceived COVID-19 symptomatology vs. no perceived COVID-19 symptomatology) x 2 (exposure to COVID-19 news vs. control) experiment online. Participants completed measures of political trust, social network, fear of COVID-19, current paranoid thoughts, hallucinatory experiences and compulsive buying. Kruskal-Wallis results showed that employed people and students are more prone to paranoia and hallucinatory experiences in response to COVID-19 news. A multigroup model showed a moderation effect of the news conditions - in the COVID-19 news condition, fear of COVID-19 and political trust significantly predict the variance of paranoia, hallucinatory experiences and compulsive buying and these co-vary with each other but not in the control condition. In line with cognitive and social theories of paranoia, results suggest that negative affect and low political trust are linked to the presence of paranoid thoughts and hallucinatory experiences and compulsive buying amid COVID-19. Digitized and Tailored Cognitive and Behavioral Therapy are proposed to address the psychiatric impact of COVID-19.

Keywords

paranoia; hallucinations; compulsive buying; fear of COVID-19; COVID-19.

1. Introduction

There is increasing concern that the outbreak of COVID-19 in the United Kingdom (UK), as a major stress-inducing event, will have a deleterious impact on mental health, especially depression and anxiety disorders (Kanter & Manbeck, 2020; Shevlin, et al., 2020; Torales et al., 2020 for a review). Much of the emerging research has a cross-sectional design and thus does not allow us to infer causality (Jaspal, Lopes & Lopes, 2020ab; Qiu et al., 2020; Wang et al., 2020). Moreover, less common mental health issues symptomatic of psychosis, such as paranoia and hallucinations, have been largely overlooked (see Shevlin et al., 2020). There is already evidence that in the UK people are engaging in the maladaptive behavior of compulsive buying to cope with COVID-19-related psychological stress (Jaspal, Lopes, & Lopes, 2020ab). However, this has not been studied in relation to psychotic symptomatology, such as paranoia and hallucinations. Using an experimental design, this study combines clinical and social theories of paranoia to understand the presence of paranoia, hallucinatory experiences and compulsive buying in response to COVID-19 news during the early phase of the outbreak in a UK sample.

1.1. Paranoia and hallucinations

Paranoia and hallucinations (that is, anomalous experiences e.g., seeing or hearing things that are not really there, see Morrison, Wells & Nothard, 2000) are considered in the clinical

literature to be symptomatic of psychosis (see clinical criteria of the International Statistical Classification of Diseases and Related Health Problems- ICD-10 for psychotic disorders, World Health Organization, 1993). Hallucinations may even affect people who do not meet the clinical criteria for mental illness and may be prompted by stressful experiences (e.g., hearing self-critical voices when abandoned by a loved one) (Waters & Fernyhough, 2017). Hallucinations are also part of the diagnostic criteria of many mental disorders, including psychotic disorders (van Os et al., 2009; Waters & Fernyhough, 2017). Paranoia in turn has been defined as a symptom of psychosis characterized by the belief that other people are intentionally and maliciously trying to persecute and cause one harm (see Freeman et al., 2005). Paranoia normally ranges from more common beliefs that are based on day-to-day threats and issues, such as interpersonal concerns and fears (e.g., fearing that others do not like you) to more uncommon beliefs that are based on unfounded and severe personalized threat (e.g., conspiracy ideas) (see Freeman et al., 2005 for a hierarchy of paranoid thoughts). In a review, Freeman and colleagues (2011) found that 5 to 6% of the population in the UK have delusions of persecution of mild severity, which suggests that paranoia is relatively common. Current accounts of the formation and maintenance of paranoia often include a cognitive style involving worry, the presence of negative affect like fear and, in the present case, fear of COVID-19, anxiety and depression, negative thoughts about the self, interpersonal sensitivities, anomalous experiences such as hallucinations, insomnia and reasoning biases (Freeman & Garety, 2014).

In the vulnerability x stress model which has been used by Freeman et al. (2008) to explain the onset of persecutory delusions and hallucinations, there is a strong emphasis on the role of stress-inducing events in prompting paranoia and hallucinations. Similarly, the COVID-19 outbreak may exacerbate these cognitions in the general population, especially when one is exposed to stimuli concerning the outbreak (such as the news) (Thompson et al., 2017). Indeed, research has shown that people in the UK are viewing news very frequently to keep informed about COVID-19 (Jaspal, Lopes & Lopes, 2020a), and that exposure to news about public health crises induce stress and are associated with psychological distress (Thompson et al., 2017). Likewise, the perception that one has symptoms of COVID-19 might also be stress-inducing and thus prompt COVID-19-related psychiatric issues (Lopes et al., 2020; Shevlin et al., 2020).

Moreover, some groups in the UK population may be at greater risk of poor mental health. Indeed, research has consistently found that social deprivation and loneliness may put people at higher risk of psychosis, including paranoia and hallucinations (Rocha et al., 2018). For example, past research has found that students and younger people are particularly vulnerable to paranoia and hallucinations (see Ellett, Lopes & Chadwick, 2003; Harper & Timmons, 2019). Furthermore, Harper and Timmons (2019) argue that students and younger people are more likely to experience paranoia because part of the student experience in the UK is characterized by loneliness and a lack of social support - all concomitants of paranoia and hallucinations.

Previous history of mental health issues and sudden unemployment and financial difficulties due to COVID-19 induced economic crisis (Statista, 2020) may also put employed people at increased risk of paranoia and hallucinations (Berg et al., 2011). Indeed, past research has found that employed people in the UK and particularly those of lower rank in the organization are at risk of developing paranoia when they face personally "threatening" work environments that are characterized by abusive supervision (Lopes, Kamau & Jaspal, 2018ab) and critical organizational changes (e.g., dismissals, layoffs) (Terry & Timmieson, 2003). Therefore, against the backdrop of the COVID-19 induced economic crisis and associated changes to the workplace, employees may construe their workplace environment as being extremely threatening and develop paranoid cognitions as a result. Overall, these authors argue in favor of the stress-inducing hypothesis that status anxiety, social defeat and disadvantage, loneliness, lack of social support and social exclusion all contribute to increased risk of psychosis.

1.2. Psychological stress amid COVID-19

The COVID-19 outbreak in the UK may exacerbate some of these social factors, notably loneliness and social isolation due to government imposed social distancing measures (Kanter & Manbeck, 2020; Lopes & Jaspal, 2020; Shevlin et al., 2020). Research has found that experimentally induced loneliness and self-isolation lead to increases in anxiety, panic and associated paranoid thoughts (Lamster et al., 2017). Therefore, it is likely that, amid the social distancing measures, having a weak social network may underpin the onset and maintenance of paranoia and hallucinations in the UK population. Accordingly, this study examines the links between length of self-isolation, strength of social network and the presence of paranoia, hallucinations and compulsive buying.

Social theories of paranoia (e.g., Kramer, 2002; Harper. 2008) emphasize the social aspects of paranoia, such as cultural influences and the mistrust-oriented ideological political discourse, and refer to paranoia as a general sense of mistrust (Fenigstein & Vanable, 1992; Harper, 2008; Raihani & Bell, 2017), sometimes oriented toward the current establishment or authorities. It is embedded in a culture of conspiracy and of suspicion, which in turn are related to socio-political processes of increased surveillance, persecution and large-scale competition for resources and profit (Gilbert, 2001; Kramer, 2002). In particular, epistemological doubts about validity of scientific knowledge claims, ontological insecurity about rationalized systems such as states, governments, authorities, multinationals and the media and also the nihilistic belief of a disenchanted world, are all thought to contribute to a paranoid culture in the West (Aupers, 2012).

Furthermore, in the context of COVID-19, conspiracy theories are on the rise with 29% of North Americans believing that COVID-19 was created in a lab (Pew Research Center, 2020). This may be attributed to decreased political trust in relation to the public health hazard of COVID-19 (Hier, 2003), with the general population feeling fear, anxiety and panic (Ahorsu et al., 2020) and possibly paranoia and associated conspiracy thoughts. Those negative and personally threatening feelings and thoughts may be attributed not only to the negative consequences of the global public health crisis of COVID-19 (e.g., deaths, unemployment, financial difficulties) but also to the general public's low levels of political trust in their own governments. Overall, this suggests that in Western societies, highly threatening public health crises like the outbreak of COVID-19 may be associated with an increase in paranoia and in conspiracy theorizing and that this may be associated both with a lack of political trust and with increased fear of COVID-19.

1.3. Negative cognitive, affective and behavioral responses

Fear is a common emotional reaction to outbreaks of disease, such as Ebola, HIV/AIDS and now COVID-19 (Ahorsu et al., 2020; Jaspal, Lopes & Lopes, 2020a, 2020b; Towers et al., 2015). It is thought to be associated not only with the development and maintenance of paranoia (Freeman et al., 2011) and hallucinations (Benrimoh et al., 2019), but it can also lead people to adopt coping behaviors (i.e. behaviors that are deemed to prevent adverse outcomes). When these preventive behaviors become excessive, fear can also lead to engagement in risk and or maladaptive compulsive behaviors, such as compulsive buying in response to COVID-19 (Hall, 2020; Jaspal, Lopes & Lopes, 2020ab).

Compulsive buying is a cognitive and behavioral condition characterized by the persistent, excessive, impulsive, and uncontrollable purchase of products in spite of potentially harmful psychological, social, occupational, and financial consequences (Müller, Mitchell & de Zwaan, 2015). Health crises, such as epidemics and pandemics, can constitute a key trigger for compulsive buying (also referred to as 'panic buying'). During the early phase of the COVID-19 outbreak, this occurred in the UK and elsewhere (e.g., Hall, 2020). Compulsive buying in the context of COVID-19 may be conceptualized as a maladaptive coping strategy,

especially in people with a diagnosed mental health disorder, such as depression (Gallagher et al., 2017; Jaspal, Lopes & Lopes, 2020b). It may also be associated with paranoia and political mistrust in relation to COVID-19.

To sum up, social factors such as low political trust, self-isolation, and reduced social support are thought to be associated with fear of COVID-19, which in turn might also increase paranoia and hallucinations. Compulsive buying could be a coping mechanism in response to the current situation and associated social (e.g., political trust) and clinical factors (e.g., paranoia).

1.4. Hypotheses

1. In line with literature showing that particular groups in UK society may be vulnerable to developing mental health issues, it is hypothesized that, when exposed to COVID-19 news, employed people should show much more paranoia and hallucinatory experiences than other occupational groups, whereas generally students should show much more paranoia and hallucinatory experiences than people in other occupations.

2a. It is hypothesized that there is a moderation effect of the news conditions (COVID-19 news vs. control) and a mediation effect of fear of COVID-19 for the impact of COVID-19 symptomatology, length of self-isolation, political trust and social network on the variance of current paranoia, hallucinatory experiences and compulsive buying.

2b. The effects of COVID-19 symptomatology, length of self-isolation, political trust, social network and of fear of COVID-19 on the variance of current paranoia, hallucinatory experiences and compulsive buying should be accentuated in the COVID-19 news condition while, in the control condition, these effects should be absent or weaker.

2. Method

2.1. Participants

Four hundred and eleven participants were recruited through *Prolific*, an online recruitment platform, to complete an online study on 26th March 2020. They were paid £2.30 ($3.00) for their participation. Only UK residents aged 18 or over were eligible to participate. The data of 50 participants were excluded due to inaccurate responses bringing the sample to 361. Participants were randomly and evenly exposed to COVID-19 news (N=185; 51.2%) vs. the control condition (N=176; 48.8%).

See Table 1 for a full overview of the socio-demographic characteristics of the participant sample.

* Table 1 here*

2.2. Design, procedure and measures

A 2 x (self-isolation vs. no self-isolation) x 2 (perceiving COVID-19 symptomatology vs. not) x 2 (exposure to COVID-19 news vs. control) between subjects experimental study was conducted with pre- and post-manipulation measures.

Pre-manipulation questions included socio-demographic questions (e.g., age, income, religion, occupation status, etc.), perceived COVID-19 symptomatology (yes vs. no), self-isolation (yes vs. no), and length of self-isolation (1=less than a week to 6=more than four weeks), diagnosis of a mental health disorder (yes vs. no) and, if so, the specific diagnosis and whether or not they were receiving treatment for it (yes vs. no). Moreover, they completed the following measures: ***The Trust in Politicians and the Trust in the Political System Scales*** (Mutz & Reeves, 2005) which consists of 12 items and measures level of political trust on a 5-point scale. (Sample items: "Politicians generally have good intentions." and "At present I feel very critical of our political system."). The higher the score, the higher the levels of political trust (α=.93); ***The Lubben Social Network Scale*** (Lubben et al., 2006) which consists of 6 items and measures strength of one's social network on a 5-point scale. (Sample item: "How

many relatives do you see or hear from at least once a month?"). Higher scores indicated a stronger social network whereas lower scores indicate social isolation (α=.82). The authors indicate a threshold of <12 to indicate risk of social isolation.

Participants were then randomly and evenly exposed to either British Broadcasting Corporation (BBC) news broadcast on the 18th March 2020, lasting 1 minute focusing on the increased death toll in the UK due to COVID-19 (COVID-19 news) or to news lasting 1.5 minutes about an environmental project (i.e. Eden reforestation project on the 23rd January, 2019) and its positive impact on the climate and human wellbeing (control condition).

After being exposed to the specific video, participants were asked to complete the following measures while thinking about the video that they had just viewed: ***The Fear of COVID-19 Scale*** (Ahorsu et al., 2020) consists of 10 items and measures people's level of fear of COVID-19 on a 5-point scale. (Sample item: " I am most afraid of COVID-19"). The higher the scores the more participants acknowledge fear of COVID-19 (α=.86); ***The Paranoia Checklist*** (Freeman et al., 2005) consists of 18 items and measures one's level of paranoia on a 5-point scale. (Sample item: "I need to be on my guard against others"). Higher scores indicate higher levels of paranoia (α=.93). Moreover, participants were asked to identify the targets of their paranoid thoughts by either stating their relationship to them, or their nationality or ethnicity or religion. See figures 1 and 2 for the most represented responses of targets of COVID-19 related paranoia in regards to their relationship to the participant and nationality (α=.93); ***The Launay and Slade Predisposition to Hallucinations Scale*** (Launay & Slade, 1981) consists of 12 items and measures hallucinatory predisposition by assessing clinical and sub-clinical hallucinatory phenomena on a 5-point scale (Sample item: "No matter how hard I try to concentrate, unrelated thoughts always creep into my mind"). Higher scores indicate the presence of state hallucinatory experiences (α=.87); ***The Compulsive Buying Behaviour Scale*** (Edwards, 1993) consists of 22 items and measures compulsive buying behaviors on a 5-point scale. (Sample item: "I buy things when I do not need anything."). Some items of the original scale were deleted because they were not related to compulsive buying behavior in the context of COVID-19. Higher scores indicate more compulsive buying (α=.92). The study took approximately 30 minutes to complete.

Ethical clearance was provided by Nottingham Trent University's School of Business, Law and Social Sciences Ethics Committee. Data were provided anonymously and cannot be traced back to the participants. Participants were fully debriefed and received information about counseling services in the UK.

3. Results
3.1. Statistical analyses
Statistical package*s R* and *SPSS* version 20 were used to perform analyses. Kruskal-Wallis tests with the Monte Carlo method for bootstrap to control for power were used to evaluate differences between occupation status groups for the key variables of paranoia, compulsive buying and hallucinatory experiences. Mann-Whitney tests were performed to evaluate between groups differences (perceived COVID-19 symptomatology vs. not; self-isolation vs. no self-isolation and the video conditions: COVID-19 news vs. control) for the key variables. A multigroup model was performed with Structural Equation Modeling with lavaan package (Rosseel, 2012) to examine the moderation effect of the different news for the impact of vulnerability social factors (political trust, social network) and affective factors (fear of COVID-19) on paranoia, compulsive buying and hallucinatory experiences. A maximum likelihood estimation with robust standard errors and a Satorra-Bentler scaled test statistic were used to calculate the equation (Rosseel, 2012). It provides robust standard errors for non-normal data.

3.2. Descriptive statistics
For information on descriptive statistics, please see table 2.

Table 2 here

Figures 1 and 2 here

3.3. Normality checks
Kolmogorov-Smirnov tests showed that length of self-isolation [$D(361)=5.21$, $p<0.001$] and the dependent variables of non-clinical paranoia [$D(361)=3.78$, $p<0.001$], hallucinatory experiences [$D(361)=3.85$, $p<0.001$] and compulsive buying [$D(361)=3.80$ $p<0.001$] were not normally distributed, and that the variables of political trust, strength of social network and fear of COVID-19 were normally distributed. Non-parametric tests were performed for between groups differences.

3.4. Hypothesis 1

3.4.1. Effects of occupation status in the COVID-19 news condition for paranoia, hallucinatory experiences, compulsive buying and fear of COVID-19
Of those exposed to COVID-19 news, 96 were employed, 39 self-employed, 17 unemployed, 11 students and 30 with other occupations. Kruskal-Wallis tests showed statistically significant effects of occupation status under exposure to COVID-19 news for paranoia [$H(4, 185) =15.50$, $p=0.003$; 95% CIs (0.001, 0.004)] and for hallucinatory experiences [$H(4, 185) =10.52$, $p=0.031$; 95% CIs (0.027, 0.036)] but not for compulsive buying [$H(4, 185) =4.48$, $p=0.35$; 95% CIs (0.337, 0.361)] or fear of COVID-19 [$H(4, 185) =2.29$, $p=0.68$; 95% CIs (0.669, 0.663)].

When exposed to COVID-19 news, employed people showed the highest levels of paranoia ($M=26.75$, $SD=7.65$), followed by students ($M=25.30$, $SD=10.31$) in comparison to unemployed people ($M=24.31$, $SD=8.13$), self-employed people ($M=22.81$, $SD=3.91$) and, in particular, people in other occupations who showed the lowest levels of paranoia when exposed to COVID-19 news ($M=22.70$, $SD=6.09$).

Similarly, when exposed to COVID-19 news, employed people showed the highest levels of hallucinatory experiences ($M=19.08$, $SD=7.66$) followed by unemployed people ($M=17.77$, $SD=5.73$) and students ($M=17.44$, $SD=5.13$), in comparison to people in other occupations ($M=16.97$, $SD=6.09$) and self-employed people who showed the lowest levels of hallucinatory experiences in this condition ($M=16.53$, $SD=6.56$). This supports hypothesis 1 and suggests that employed people are particularly vulnerable to stress induced by exposure to COVID-19 news, which may influence their levels of paranoia and hallucinatory experiences.

When analyzing both conditions, Kruskal-Wallis tests showed statistically significant effects of employment status for non-clinical paranoia [$H(4, 361) =20.83$, $p<0.001$; 95% CIs (0.000, 0.000)] and hallucinatory experiences [$H(4, 361) =10.11$, $p=0.036$; 95% CIs (0.031, 0.041)] but not for compulsive buying [$H(4, 361) =5.16$, $p=0.28$; 95% CIs (0.264, 0.287)] or fear of COVID-19 [$H(4, 361) =3.77$, $p=0.44$; 95% CIs (0.430, 0.456)]. Students showed the highest levels of non-clinical paranoia ($M=27.83$, $SD=9.74$) followed by employed people ($M=27.30$, $SD=12.48$) compared to unemployed people ($M=26.66$, $SD=8.62$), self-employed people ($M=24.63$, $SD=7.99$), and people with other occupations who showed the lowest levels of non-clinical paranoia ($M=23.58$, $SD=8.32$).

Students showed more hallucinatory experiences followed by employed people who also showed more hallucinatory experiences ($M=19.73$, $SD=9.79$ for students and $M=19.26$, $SD=6.40$ for employed people, respectively) compared to unemployed people ($M=19.12$, $SD=7.83$), self-employed people ($M=16.96$, $SD=6.77$) and people with other occupations who showed less hallucinatory experiences ($M=16.33$, $SD=5.13$).

These results suggest that, when taking into account both conditions, both students and employed people are more vulnerable to non-clinical paranoia and sub-clinical and clinical

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hallucinatory experiences than other occupational groups. Therefore, this result supports hypothesis 1.

3.5. Hypotheses 2a and 2b
3.5.1. Path analyses

Spearman Rho's correlation analyses (see table 3 after corrections were performed) suggested moderate positive relationships between fear of COVID-19 and paranoia, hallucinatory experiences and compulsive buying and also negative relationships between political trust and paranoia, hallucinatory experiences and compulsive buying and between social network and paranoia. Length of self-isolation was not significantly correlated with the other variables except for a negative relationship with political trust, and fear of COVID-19 was not significantly correlated with political trust, length of self-isolation or social network (see table 3).

Table 3 here

Mann-Whitney tests showed no statistically significant differences between participants who perceived COVID-19 symptomatology compared to those who did not in terms of paranoia, hallucinatory experiences, compulsive buying, political trust, social network or fear of COVID-19 ($p > 0.050$). Also, no statistically significant differences were found between those participants who were in self-isolation vs. those who were not for paranoia, hallucinatory experiences, compulsive buying, political trust, strength of social network and fear of COVID-19 ($p>.050$). Further Mann-Whitney tests showed no statistically significant differences between exposure to COVID-19 news vs. control for paranoia, hallucinatory experiences and compulsive buying and fear of COVID-19 (all p values >.050).

Following the results of Mann-Whitney tests and of correlations, it was not possible to test the hypothesized mediation because fear of COVID-19 did not relate significantly to the other predictors (political trust, social network, length of self-isolation, having symptoms of COVID-19). However, since fear of COVID-19 was significantly related to the dependent variables, we inserted this variable into a multigroup model as a predictor and not as a mediator and tested moderation effects by analyzing whether each condition (COVID-19 news vs. control) moderated the relationships between the predictors of fear of COVID-19, political trust and social network and the dependent variables of compulsive buying, paranoia and hallucinatory experiences (see models in figure 3 table 4 and figure 4 table 5)

The multigroup model had a significant chi-square of 9187.3 ($df = 5978$, $p < 0.0001$). The goodness of fit indices (Kline, 2005) revealed good model fit (CMIN/ Degrees of Freedom (DF) = 1.54; Comparative Fit Index (CFI) robust = 0.73; Tucker-Lewis Index (TLI) robust = 0.72; Normed Fit Index (NFI) = 0.78; Root Mean Square Residual (RMSEA) robust = .06), so the model was acceptable (see Schermelleh-Engel, Moosbrugger & Müller, 2003). The lavTestLRT function was applied to compare both models using the method proposed by Satorra (2000). Results indicated that both models are statistically different, Chi-square (5978) = 12817, $p < 0.0001$. Therefore, the type of video news moderated the relationships between the independent and dependent variables.

When comparing the results of the pathway models for the two different conditions, the direct paths between both fear of COVID-19 and political trust and paranoia and hallucinatory experiences were statistically significant in the model for COVID-19 news, but not in the model for the control condition. Nevertheless, in both models, social network did not significantly predict the variance of paranoia. Moreover, the direct paths between political trust and both hallucinatory experiences and compulsive buying were statistically significant in the model for COVID-19 news only - not in the control condition (see Figures 3 and 4). Likewise, changes were observed in the covariances between variables. Regarding the proportion of the variance for the dependent variables that is explained by an independent variable, R^2 for Paranoia,

Hallucinations and Compulsive Buying equals, respectively, to 0.19, 0.18 and 0.19 for COVID-19 news. For the model of the control condition, they equal to 0.11, 0.10, 0.11, respectively.

This partially supports hypothesis 2a by indicating that perceiving COVID-19 symptomatology and social network had no direct effects on the variance of paranoia, hallucinatory experiences or compulsive buying in the COVID-19 news condition and fear of COVID-19 was not a mediator. However, there was a moderation effect of type of news on the relationships between the predictors of fear of COVID-19 and political trust and the dependent variables, partially supporting hypothesis 2b.

Tables 4 and 5 here

Figures 3 and 4 here

4. Discussion

This study set out to explore differences between occupational groups in the UK for their levels of paranoia, hallucinations and compulsive buying in response to COVID-19 news, examining the moderating effects of COVID-19 news vs. a control for the relationships between fear of COVID-19, political trust and social network and paranoia, hallucinations and compulsive buying.

First, this study shows that employed people are more likely to exhibit paranoia when exposed to COVID-19 news. This may be attributed to the precarious economic conditions associated with the outbreak, which may in turn lead employed people to fear for their job security and to develop a cognitive bias whereby they perceive others as attempting to cause them harm (by taking their job or laying them off) (see Lopes, Kamau & Jaspal, 2018ab; Rothstein & Talbott, 2007; Zhou et al., 2020). Furthermore, there is evidence that organizational change of any kind can be threatening for employees and, in view of the outbreak, that such change has become extremely commonplace (e.g., working from home, furlough, etc.) (Terry & Timmieson, 2003). Also, it is likely that employed people exhibited much more paranoia than people who were unemployed at the time of the study because they believed themselves to be at risk of infection due to the potential need to work away from home. This was not the case for the unemployed, for instance, who conversely could stay at home during the lockdown.

In contrast to previous research showing the mental health burden of unemployment on paranoia (see Stansfeld et al., 2016), this study suggests that being unemployed before the COVID-19 outbreak does not have as strong an effect on paranoia in the context of COVID-19, than being employed or a student during COVID-19 outbreak in the UK. Indeed, students in both conditions also seem to be vulnerable to symptoms of psychosis. Students are known to be at risk of loneliness and decreased social support - both concomitants of paranoia and hallucinations (Harper & Timmons, 2019). Moreover, challenges associated with the developmental transition from adolescence to early adulthood (Harrop & Trower, 2001) and heightened psychological distress in the student population in the UK (Macaskill, 2013) may also be related to increased susceptibility to paranoia and hallucinations (see Freeman et al., 2011).

Contrary to speculation about the impact of self-isolation on mental health (e.g. Butter et al., 2017; Kanter & Manbeck, 2020; Lamster et al., 2017; Rocha et al., 2018), our study showed no effects of self-isolation or of perceived COVID-19 symptomatology on paranoia, hallucinatory experiences or compulsive buying. This is supported by recent research by Bortolon et al. (2020) that found that amid the COVID-19 outbreak in France, self-isolation did not predict paranoia in a sample of French participants. It is possible that there were no effects of self-isolation on the dependent variables because, when the study was conducted, most people had been in self-isolation for only a relatively short period of time. However, it is

also possible that, on the whole, individuals have been able to retain social contact and to derive social support in other ways, such as through the use of technology and social media.

Furthermore, in previous studies (Lopes et al., 2020; Shevlin et al., 2020), perceived COVID-19 symptomatology has been shown to be related to the presence of depressive symptoms in UK samples. Although perceived COVID-19 symptomatology was not related with psychotic symptoms in this study, it may well be that prolonged perception of having symptoms may induce significant stress that in turn may prompt the onset of paranoia and hallucinatory experiences in vulnerable individuals (see Corcoran et al., 2002).

The results of the multigroup pathway models showed a moderation effect of the types of news people watched on the impact of the predictors of fear of COVID-19 and of political trust on the variance of current paranoia, hallucinations and compulsive buying, partially supporting hypotheses 2a and 2b. Fear of COVID-19 did not mediate the impact of self-isolation, perceived COVID-19 symptomatology and political trust and social network on the variance of paranoia, hallucinations and compulsive buying because fear of COVID-19 is a form of negative affect specific to the current situation. This was unrelated to the social variables of political trust, social network and perceived COVID-19 symptomatology. However, fear of COVID-19 and political trust emerged as the two sole predictors of the variance of current paranoia, hallucinatory experiences and compulsive buying and those effects were stronger in the COVID-19 news condition. Participants who experienced fear (which was pervasive across the sample) and who were exposed to COVID-19 news exhibited increased levels of paranoia, hallucinatory experiences and compulsive buying, suggesting a relationship between increased fear of COVID-19 and more paranoia, hallucinatory experiences and compulsive buying in response to COVID-19 (see Ahorsu et al., 2020; Hall, 2020). This supports the cognitive model of persecutory delusions which highlights the important role of negative affect (e.g., fear) in prompting and maintaining paranoia (Freeman et al., 2011). Furthermore, these people's levels of political trust also had an impact on their levels of paranoia, hallucinatory experiences and compulsive buying - the less political trust they had, the more current paranoia, hallucinatory experiences and compulsive buying they exhibited in response to COVID-19 news.

In contrast, in the control condition, the relationships between fear of COVID-19 and paranoia, hallucinatory experiences and compulsive buying were weaker or entirely absent. It is clear that social representations of COVID-19 are pervasive and that they contributed to participants' general cognition in relation to COVID-19 at the time of the study (Jaspal, Lopes & Lopes, 2020ab). Yet, in the COVID-19 news condition, the relationships between these variables strengthen, suggesting that COVID-19-related stimuli, and particularly news which tends to focus on negative aspects of the outbreak, can further accentuate the relationship between the outbreak and poor mental health outcomes.

Past research has highlighted that exposure to stressors such as news about a sensitive topic induces paranoia and hallucinations (Lincoln et al., 2008; Lopes & Jaspal, 2015; Lopes & Pinto-Gouveia, 2013) and this seems to be particularly true in the context of COVID-19 news. These results do support previous research which has revealed a link between fear of COVID-19 and depression, anxiety and panic (Ahorsu et al., 2020). It would be beneficial if news reporting on COVID-19 would provide accurate and reliable information about the outbreak but also empower viewers to take appropriate steps to mitigate their risk of infection, to curb the pandemic, and to derive support from others (Jaspal & Nerlich, 2020). Furthermore, sensationalist reporting should be avoided and reporting should include not only the negative aspects of the pandemic but also the significant gains and progress made in the fight against COVID-19 (cf. Thompson et al., 2017).

The results also show the important role of political trust in predicting paranoia. Political trust is an important social and psychological variable in the context of public health crises, such as the COVID-19 outbreak and, without sufficient levels of trust, people may face additional psychological stress in the face of a significantly stressful situation (see Cheung &

Tse, 2008). Moreover, even constructive scrutiny of government policy in relation to the COVID-19 (e.g., Oliver, 2020) may inadvertently feed into public skepticism, mistrust and conspiracy theories (Aupers, 2012; Jolley & Lamberty, 2020). Hence, as our results suggest, lower political trust is associated with more paranoia, which was accentuated in the context of being exposed to COVID-19 news. Lower political trust is also associated with more hallucinations and compulsive buying when one is exposed to COVID-19 news only, suggesting that when people with decreased political trust are exposed to this type of news they are likely to engage in maladaptive strategies of this kind to cope with their COVID-19-related paranoia and hallucinations.

There are also positive relationships between paranoia, hallucinatory experiences and compulsive buying but in the COVID-19 news condition only. This suggests that paranoia and associated hallucinations might be related to the maladaptive coping behavior of compulsive buying when one is prompted to think about COVID-19.

4.1. Limitations and future research
First, the limited sample size after participants were excluded might have had an influence on the strength of relationships in the models. Second, it is possible that the experimental conditions were not sufficiently different from each other (COVID-19 news vs. environmental project news) in terms of their impact on the dependent variables, given that environmental issues are of significant concern to some people. Future research ought to include a less sensitive control condition than that used in this study. Third, since the outbreak of COVID-19 in the UK, it is likely that most people are thinking, talking and watching news about COVID-19, which renders it difficult to dissociate unequivocally the effects of COVID-19 news and their general cognitions about the outbreak. Fourth, given that the study was conducted in the early phases of the outbreak in the UK, its design was not longitudinal and could not ascertain the impact of length of self-isolation and of prolonged perceived COVID-19 symptomatology and actual diagnosis of COVID-19 on the dependent variables. Most participants had been self-isolating for a relatively short period of time. Fifth, future research should assess the roles of other correlates of paranoia (see Freeman et al., 2011), such as trait anxiety, general anxiety and worry-proneness in predicting COVID-19 related paranoia, hallucinations and compulsive buying in the UK.

4.2. Clinical implications
It is recommended that Digitized Cognitive Behavioral therapy (CBT) with components of mindfulness, emotional regulation strategies and management of fear and of distressing visual and auditory hallucinations and components of social and coping skills training should be provided in the UK (Lopes & Jaspal, 2020). Digitized CBT with components of mindfulness should take into account COVID-19 specific stressors such as unemployment, fears of contagion in the workplace, etc. as well as minority specific stressors such as discrimination and stressors that are especially associated with students and people in employment (e.g. how to deal with fear of contagion in universities and in workplaces) to have a better effect and reach.

4.3. Conclusions
The findings suggest that students and employed people are more vulnerable to paranoia in response to COVID-19 in the UK. Moreover, in the COVID-19 news condition, fear of COVID-19 and political trust are strongly associated with the presence of paranoia, hallucinations and compulsive buying, whereas in other contexts, these relationships are weaker or absent. Results generally suggest that low political trust and fear of COVID-19 are related to greater paranoia, hallucinations and compulsive buying when one is exposed to COVID-19 news and that paranoia, hallucinations and compulsive buying also co-vary when one is exposed to such news. Overall, this suggests that clinical and social theories are useful

for understanding paranoia in the context of COVID-19 and that digitized CBT with components of mindfulness which is tailored to address COVID-19 specific issues should be provided to the UK population.

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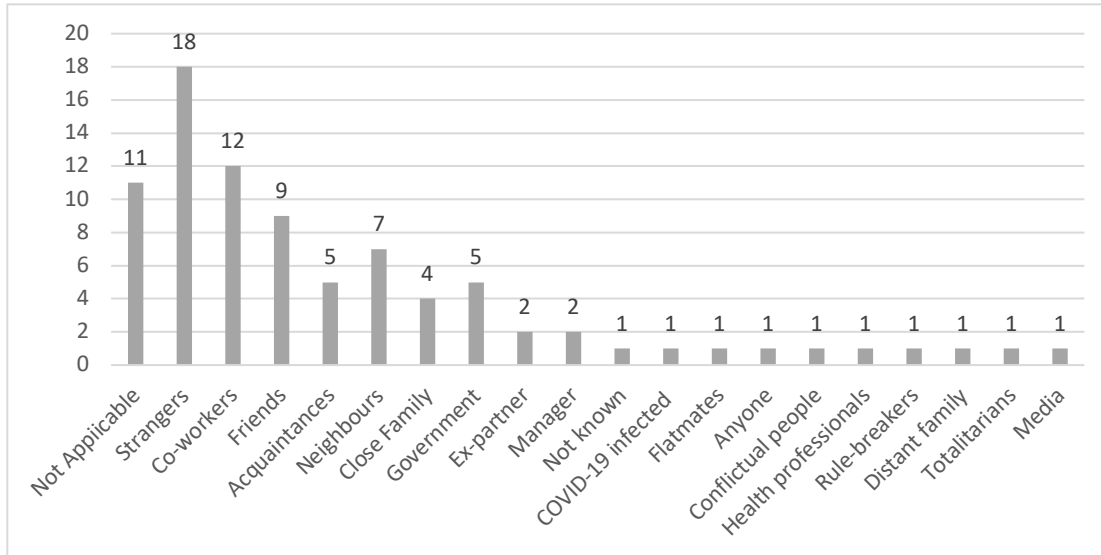
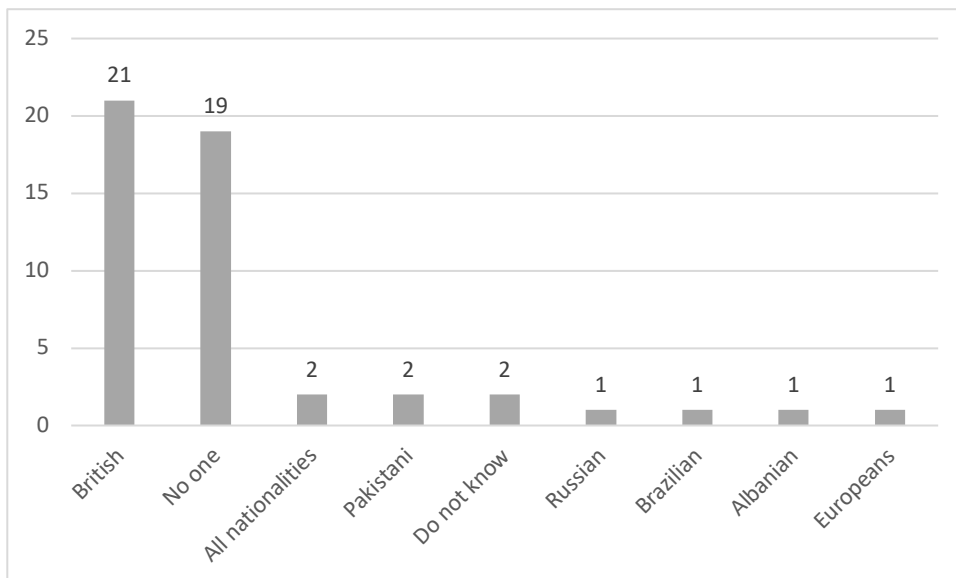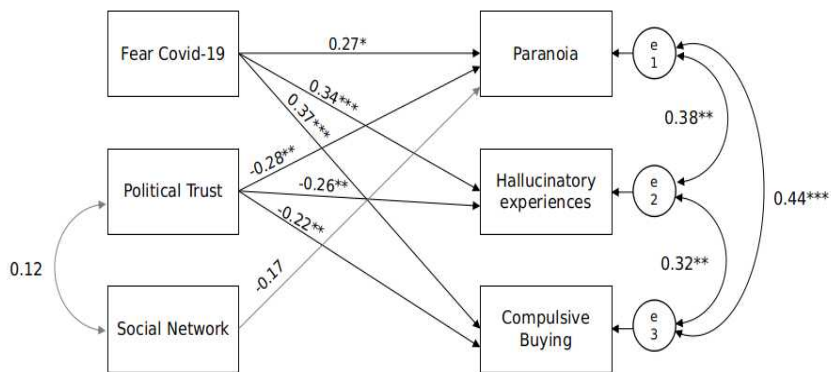Figure 1. Target of participants' COVID-19 related paranoia *N*=85

Figure 2. Nationality of the target of participants' COVID-19 related paranoia *N*=50

Note: *** p value < 0.001; ** p value < 0.01; * p value < 0.05
The paths that are not statistically significant are in grey color

Figure 3. Pathway model for exposure to COVID-19 news with pathways between predictors of fear of COVID-19, political trust and social network and the dependent variables of paranoia, hallucinatory experiences and compulsive buying
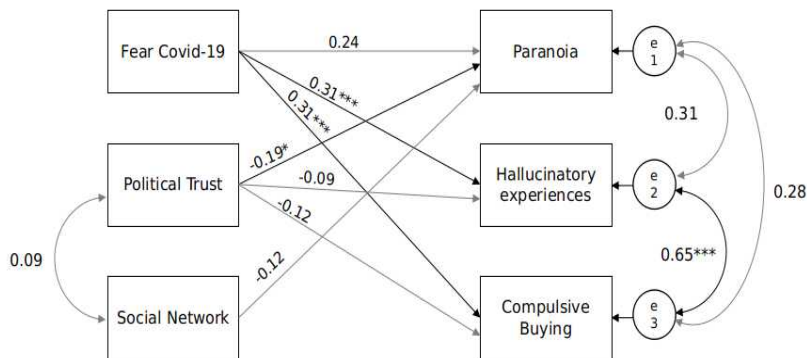
Note: *** p value < 0.001; ** p value < 0.01; * p value < 0.05
The paths that are not statistically significant are in grey color

Figure 4. Pathway model for exposure to environmental project news with pathways between predictors of fear of COVID-19, political trust and social network and the dependent variables of paranoia, hallucinatory experiences and compulsive buying

Table 1. Socio-demographic characteristics of the sample

Ethnicity	White British	White Other	Any other Asian	African	Any other Mixed/Multiple background	White and Black Caribbean	Any other ethnic background	Pakistani	White and Asian	Caribbean
	N=270 (74.8%)	*N*=28 (7.8%)	*N*=27 (5.5%)	*N*=10 (2.8%)	*N*=7 (1.9%)	*N*=6 (1.4%)	*N*=4 (1.1%)	*N*=4 (1.1%)	*N*=3 (0.8%)	*N*=2 (0.6%)
Religion	Non-religious *N*=213 (59%)	Christians *N*=120 (33.2%)	Muslims *N*=13 (3.6%)	Other *N*=7 (1.9%)	Hindu *N*=4 (1.1%)	Sikh *N*=2 (0.6%)	Jewish *N*=1 (0.3%)	Buddhist *N*=1 (0.3%)		
Relationship Status	Single *N*=116 (32.1%)	Married *N*=12 (3.3%)	Monogamous relationship *N*=58 (16.1%)	Other type *N*=144 (39.9%)	Engaged *N*=12 (3.3%)	Civil partnership *N*=9 (2.5%)	Open *N*=1 (0.3%)			
Income	Less than £10,000 *N*=78 (21.6%)	£10,000 to £14,999 *N*=48 (13.3%)	£15,000 to £19,999 *N*=52 (14.4%)	£20,000 to £24,999 *N*=47 (13%)	£25,000 to £29,999 *N*=35 (9.7%)	£30,000 to £34,999 *N*=27 (7.5%)	£35,000 to £39,999 *N*=16 (4.4%)	£40,000 to £50,000 *N*=24 (6.6%)	More than £50,000 *N*=34 (9.4%)	
Employment status	Employed *N*=169 (47%)	Self-employed *N*=54 (15%)	Unemployed *N*=37 (10.2%)	Students *N*=23 (6.4%)	Other occupations *N*=78 (21.6%)					
Education	Undergraduate Degree (e.g. BSc.) *N*=144 (39.9%)	A Levels *N*=81 (22.4%)	GCSE/O Level *N*=69 (19.1%)	Postgraduate Degree (e.g.M.A.) *N*=48 (13.3%)	PhD *N*=15 (4.2%)	Primary School *N*=4 (1.1%)				
Gender	Male *N*=181 (50%)	Female *N*=177 (49%)	Non-gendered/Non-binary *N*=2 (0.6%)	Transgender *N*=1 (0.3%)						

Table 2. Means and standard deviations for the key variables of this study

Continuous variables	Mean	SD	Minimum	Maximum
Age	46.03	15.11	18	76
Length of self-isolation	1.79; Median=2	0.94	1	6
Social Network	21.81	6.76	6	36
Political Trust	36.30	9.09	15	60
Fear of COVID-19	25.85	7.74	10	50
Paranoia	25.83; Median=23	9.08	18	74
Hallucinatory Experiences	18.27; Median=15	7.40	12	52
Compulsive Buying	38.07; Median=34	13.65	22	102

Categorical variables	Yes	No		
Self-isolation	325 (90%)	36 (10%)		
Belief that one has symptoms of COVID-19	44 (12.2%)	317 (87.8%)		
Belief that one has had COVID-19	20 (5.5%)	341 (91.5%)		
Diagnosis of a mental health disorder	53 (14.7%)	308 (85.3%)		
Depression	13 (3.6%)			
Depression/Anxiety	10 (2.8%)			
Anxiety	9 (2.5%)			
Borderline Personality Disorder	4 (1.1%)			
Post-Traumatic Stress Disorder/Anxiety/Depression	2 (0.6%)			
Obsessive Compulsive Disorder	2 (0.6%)			
Eating Disorder/Depression	2 (0.6%)			
Autism	1 (0.3%)			
Attention Deficit and Hyperactivity Disorder	1 (0.3%)			
Autism/ Attention Deficit and Hyperactivity Disorder	1 (0.3%)			
Depression/ Autism	1 (0.3%)			
Bipolar Disorder	1 (0.3%)			
Health Anxiety Disorder	1 (0.3%)			
Narcissistic Personality Disorder/Depression	1 (0.3%)			
Obsessive Compulsive Disorder/Post-traumatic Stress/Disorder/Generalized Anxiety Disorder	1 (0.3%)			
Treatment for mental health disorder	43 (11.9%)	318 (88%)		
Video condition	**BBC News about COVID-19**	**Environmental project news**		
	185 (51.2%)	176 (48.8%)		

Table 3. Correlations

	Length of Self-Isolation	Social Network	Political Trust	Fear of COVID-19	Paranoia	Hallucinatory Experiences
Social Network	-0.03					
Political Trust	-0.10*	0.11				
Fear of COVID-19	0.04	0.02	0.02			
Paranoia	0.01	-0.20***	-0.19***	0.28***		
Hallucinatory Experiences	0.00	-0.09	-0.16**	0.26***	0.45***	
Compulsive Buying	0.04	-0.01	-0.12*	0.14**	0.20***	0.37***

Note : *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Table 4. Estimates and standard error of Model 1 for exposure to COVID-19 news.

Dependent Variable	Independent Variable	Estimate	SE	Z	p-value	CI-lower	CI-upper
Paranoia	Fear of COVID-19	0.255	0.062	4.095	<0.001	0.13	0.376
Paranoia	Political Trust	-0.238	0.046	-5.216	<0.001	-0.32	-0.148
Paranoia	Social Network	-0.150	0.048	-3.149	0.002	-0.24	-0.057
Hallucinatory experiences	Fear of COVID-19	0.328	0.056	5.882	<0.001	0.21	0.437
Hallucinatory experiences	Political Trust	-0.186	0.060	-3.090	0.002	-0.30	-0.068
Compulsive Buying	Fear of COVID-19	0.326	0.057	5.762	<0.001	0.21	0.436
Compulsive Buying	Political Trust	-0.186	0.050	-3.738	<0.001	-0.28	-0.088
Covariation							
Paranoia	Hallucinatory experiences	0.356	0.066	5.358	<0.001	0.22	0.487
Paranoia	Compulsive Buying	0.384	0.070	5.456	<0.001	0.24	0.522
Hallucinatory experiences	Compulsive Buying	0.481	0.062	7.79	<0.001	0.36	0.602
Political Trust	Social Network	0.107	0.058	1.85	0.063	-0.00	0.220

Table 5. Estimates and standard error of Model 1 for exposure to Environmental Project news.

Dependent Variable	Independent Variable	Estimate	SE	Standardized Estimate	Z	p-value	CI -lower	CI-upper
Paranoia	Fear of COVID-19	0.049	0.027	0.240	1.805	0.071	-0.004	0.102
Paranoia	Political Trust	-0.054	0.028	-0.186	-1.956	0.050	-0.108	0.000
Paranoia	Social Network	-0.088	0.073	-0.122	-1.206	0.228	-0.231	0.055
Hallucinatory experiences	Fear of COVID-19	0.278	0.083	0.307	3.332	0.001	0.114	0.442
Hallucinatory experiences	Political Trust	-0.128	0.117	-0.099	-1.093	0.274	-0.357	0.101
Compulsive Buying	Fear of COVID-19	0.227	0.067	0.306	3.370	0.001	0.095	0.359
Compulsive Buying	Political Trust	-0.139	0.091	-0.131	-1.525	0.127	-0.317	0.040
Covariation								
Paranoia	Hallucinatory experiences	0.046	0.023	0.315	1.952	0.051	-0.000	0.091
Paranoia	Compulsive Buying	0.032	0.018	0.276	1.772	0.076	-0.003	0.068
Hallucinatory experiences	Compulsive Buying	0.344	0.082	0.656	4.205	<0.001	0.184	0.505
Political Trust	Social Network	0.016	0.016	0.094	1.010	0.313	-0.015	0.048

Note: Z and *p*-values were calculated for the non-standardized estimates.