COVID-19-related conspiracy beliefs and their relationship with perceived stress and pre-existing conspiracy beliefs

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ABSTRACT

Previous studies have down that erroneous Conspiracy Theory (CT) beliefs develop more strongly in people who have underlying conspiratorial reasoning styles and psychopathological traits and particularly when they are faced with stressful external events (Swami et al., 2013; van Prooijen, 2018). In this study, we test this proposition by examining the individual differences associated with the development of COVID-19-related CT beliefs during the pandemic. A total of 660 adults completed a survey that captured COVID–related CT beliefs and broader conspiracy beliefs, education, perceived stress and attitudes towards government responses. The results showed that COVID-19 related CT beliefs were: strongly related to broader CT beliefs, higher in those with lower levels of education; and, positively (although weakly) correlated with more negative attitudes towards government responses. However, no relationship was found between COVID-19 beliefs and self-reported stress. These findings hold implications for why some people are more likely to be resistant to public health interventions relating to COVID-19. The findings encourage more detailed exploration of the causes and sources of CTs and, in particular, the role of social media use and other information sources in the development and perpetuation of health-related CT beliefs.

1. Introduction

According to Swami, Voracek, Stieger, Tran, & Furnham (2014), conspiracy theories (CTs) can be defined as a set of "false beliefs in which the ultimate cause of an event is believed to be due to a plot by multiple actors working together with a clear goal in mind, often lawfully and in secret" (Swami et al., 2014). Such theories can take several different forms. Some apply to an array of specific events – such as whether Acquired Immunodeficiency Syndrome was a human-generated disease, to whether the moon landing of 1967 was fabricated (Ford, Wallace, Newman, Lee, & Cunningham, 2013; Swami et al., 2013a, 2013b; Jolley & Douglas, 2017). Others take the form of grandiose worldviews that span multiple countries and time-periods. For example, the most common of these being the CTs which suggest the world is ruled by a small global elite, comprised of powerful banking groups or mysterious figures (e.g. the Illuminati), or alien reptilians whose aim is to being about a "New World Order" (Swami & Coles, 2010; van Proojen, 2018). To fulfil this objective, these powerful groups are seen to manipulate and monitor the world. Major international events (e.g., global events or crises) are therefore framed as being part of larger conspiracies (Dagnall, Denovan, Drinkwater, Parker, &

Clough, 2017; Swami et al., 2013a, 2013b). Multiple governments, major political figures and even major international figures (e.g., Bill Gates, The Queen) can then be considered complicit in the events.

Although many of these CTs are clearly fanciful, such beliefs can also have negative implications for society. Apart from leading to distrust in political institutions, they can also lead to resistance to important medical and public health interventions (Ford et al., 2013; Landrum & Olshansky, 2019; Oliver & Wood, 2014). Examples include an unwillingness to receive vaccinations; rejection of conventional medical or dental treatments (e.g., use of fluoride); or possible gravitation towards unsupported and potentially dangerous treatments based on other belief systems (e.g., religious or pseudoscience; Ford et al., 2013; Douglas, Sutton, & Cichocka, 2017; Galliford & Furnham, 2017; Jolley & Douglas, 2017; Oliver & Wood, 2014).

CT beliefs are thought to arise from a range of factors (Douglas et al., 2017). One view is that CT beliefs are a result of underlying psychopathological traits which make a person more likely to develop erroneous beliefs (Georgiou, Delfabbro, & Balzan, 2019; Hart & Graether, 2018). An important correlate, for example, has been schizotypy (Barron, Morgan, Towell, Altemeyer, & Swami, 2014; Barron et al., 2018; Buchy, Woodward & Liotti, 2007; Eisenacher & Zink, 2017;

Ettinger et al., 2015; Georgiou et al., 2019; Swami et al., 2013a, 2013b). This personality style is often associated with a proneness to delusions, excessive focus on the details of events rather than the overall situation, and unfounded inferences (Eisenacher & Zink, 2017; Moritz et al., 2013; Warman, Lysaker, & Martin, 2007; Woodward, Buchy, Moritz, & Liotti, 2007; Woodward, Duffy, & Karbasforoushan, 2014).

Several sociological factors are also known to influence CT formation. One of the most important of these is a persons' level of education (van Prooijen, 2017). Higher levels of education appear to act as a buffer against conspiracy belief (Georgiou et al., 2019; van Prooijen, 2017). This is thought to be due to more educated people having greater knowledge, training in analytical thought, and awareness of counterarguments and rebuttals (Swami & Furnham, 2012; van Prooijen, 2017). Another important factor is political orientation (Van Prooijen, Krouwel, & Pollet, 2015). Those on the more extreme left or right-side of politics are seen as being more prone to CT beliefs than other people who are more moderate in their beliefs. van Proojen and Krouwel (2017) and van Proojen (2018) further argues that CTs can arise from mistrust in leaders or as result of political or financial turmoil. In this context, CTs could almost be seen as a form of rational coping strategy to make sense of the chaos or uncertainty arising from significant events (van Prooijen & Douglas, 2017).

A further potential influence is anxiety or stress. It has been found that heightened levels of anxiety or psychological distress, can prompt a person to find meaning, order or controllability for otherwise ambiguous events (Swami et al., 2013a, 2013b; Swami et al., 2016; van Proojen, 2018; van Prooijen & Douglas, 2018). Anxiety reactions may be particularly acute if caused by major external events – such as a natural disaster, or human-caused event such as a terror attack. In these situations, it may take the form of "hypervigilance", a syndrome of behaviour characterised by elevated autonomic arousal, anxiety and a strong desire to obtain information about the causes and effects of the event (Johnson, Driskell, & Salas, 1997; Janis & Mann, 1977). Situations of this nature may lead to the rapid generation of hypotheses, conjecture, and potentially CTs, particularly when the person is exposed to large volumes of information on social media (Spohr, 2017; Vicario et al., 2016). There is also evidence that some individuals may be more prone to find patterns, connections or meaning in casually unrelated events as a reaction to complex events experienced under stressful conditions (Balzan, Delfabbro, Galletly, & Woodward, 2012).

Although conspiracies could be seen as arising from hyper-vigilance and reactions to stressful situations, (van Proojen, 2018), evidence of conspiracy research suggests that this is unlikely to be the only explanation. Not only are some people more prone than others to CTs, there often appears to be a 'conspiratorial style of reasoning' that leads to strong correlations between beliefs in unrelated events and across multiple domains (Swami et al., 2017). This occurs because current events tend to be interpreted in the context of pre-existing world-views. Attempts will, therefore, be made to match new evidence to perceived hypotheses of systems of logic (e.g., that there is always something hidden, not being said, or to believe that someone out there aims to benefit from the event) (Byford, 2011; Swami, Chamorro-Premuzic, & Furnham, 2010). For example, those whom adopt CT beliefs which suggest the United States of America entered World War II by inciting the Pearl Harbour attack, are likely to use such events as evidence that the events of 9/11 were also fraudulent on the grounds of being able to draw on 'foreknowledge' (Sutton & Douglas, 2020). As a result, beliefs in one CT has been found to be one of the strongest predictors for future CTs (Swami et al., 2017). These findings have important implications for understanding the development of the CT beliefs examined in the current study.

1.1. The COVID-19 crisis

The 2020 COVID-19 crisis would appear to be a situation that is very likely to lead to hyper-vigilance and erroneous CTs. Not only is it a highly stressful for individuals, but it has led to considerable uncertainty about the limits and appropriateness of government action; raised questions about the role of peak bodies such as the WHO; and, had created enormous amounts of social media attention. In support of these views, it can be observed that *Wikipedia* was quickly able to compile a list of numerous conspiracies relating to COVID-19. These range from unconfirmed explanations for the emergence of the disease; the suppression of vaccines; the development of bio-weapons; and, even the role of 5G technology. As with some CTs relating to other health issues, some of these beliefs are potentially harmful and some could lead to public rejection of public health measures to suppress the spread of the virus. For example, in protests in the US against the 'lockdown' measures, protestors were seen carrying posters that indicate support for the "Bill Gates conspiracy". This conspiracy proposes that the former Microsoft CEO is planning to microchip individuals and force them into vaccination[1] or that vaccination is a form of incursion into "bodily autonomy".

1.2. The present study

The aim of this study was to extend previous studies that have largely focused on retrospective reflection on earlier world events. Here, we examine the individual-difference variables that make certain individuals more susceptible to conspiratorial beliefs about COVID-19, a current and ongoing global crisis. It was hypothesised that those who are more likely to believe in unfounded or CTs about COVID-19 would score higher on measures that capture general conspiratorial reasoning as well as CT beliefs about other major events. A second hypothesis investigated in this study is whether perceived stress is associated with greater conspiratorial belief. This prediction is based on previous work which has viewed CT beliefs as a defence mechanism or reaction to uncertain or anxiety-provoking events. We also examined whether greater CT endorsement would be negatively related to the perceived appropriateness of government responses to the crisis. In this study, we also investigate how COVID conspiracy beliefs vary by level of education (which is also included as a control variable in analyses) and some indicative differences between countries that have been differentially affected by the virus.

2. Method

2.1. Participants

A total of 640 participants (323 men, 317 women) participated in the study in April 2020 in the midst of the worldwide COVID-19 pandemic. Demographic details of the sample are summarised in Table 1. As can be observed, the majority of participants (two-thirds) were aged 18–34 years. The majority lived in the UK, US and Continental Europe, with small percentage from other parts of the world. The majority (around 80%) were well-educated and had either a degree or some college and over 60% were in some form of paid employment. The sample size obtained was more than sufficient to provide adequate statistical power for (0.80) for a multiple-regression with up to 8 predictors and anticipated R-squared value of 0.30.

The majority (474) or 74.6% reported being at home during the crisis and only able to go out for essential things; 68 (10.6%) were at

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[1] The Bill Gates conspiracy arose from misinterpretation of a Reddit quote in which Gates spoke of the need to use security certificates (in the electronic validation sense) to confirm the COVID-19 status of potential businesses in supply chains. Online bloggers conflated this statement with Gates Foundation research in *Science* that wrote about the value of temporary skin codes/tattoos in COVID-19 testing. These pieces of information led to the view that Gates was promoting the micro-chipping of individuals.

Table 1
Demographic characteristics of sample (*n* = 640).

	N (%)
Gender	
Male	323 (50.5)
Female	317 (49.5)
Age	
18–24	208 (32.5)
25–34	216 (33.8)
35–44	122 (19.1)
45–54	61 (9.5)
55–64	26 (4.1)
65+	7 (1.1)
Country	
Oceania	18 (2.8)
Affect Europe (Italy, Spain)	36 (5.6)
Other continental Europe	143 (22.3)
UK	260 (40.6)
USA	137 (21.4)
Canada	15 (2.3)
Rest of the world	
Education	
University degree	374 (58.4)
Some college	146 (22.8)
High school only	105 (16.4)
Less than high school	15 (2.3)
Employment status	
Working (as employee)	350 (54.7)
Self-employed	63 (9.8)
Temporarily off work	41 (6.4)
Looking for work	61 (9.5)
Other	125 (19.5)
Household structure	
1 person	75 (11.7)
2–3 people	330 (51.6)
4+ people	235 (36.7)

home and free to go out for a range of activities; 48 (7.5%) were still able to go to work; 21 (3.3%) did not report much change to their lives at all and another 29 (4.5%) were under full lockdown conditions and could not leave their home at all.

2.2. Sampling procedure

The study used an international panel sample obtained using the participation website Prolific and was promoted as an investigation of people's explanations for real-world events. All participants received a small monetary compensation for their time and effort (around 12–15-minute survey).

2.3. Study design

The study was conducted entirely online. Participants completed demographic questions as well as range of measures relating to their beliefs about COVID-19, other broader and specific conspiracy beliefs as well as questions relating to their anxiety, the level of perceived threat, and questions about sources of information about COVID-19 (which we will discuss in another paper). The Human Research Ethics Subcommittee in the University of Adelaide, School of Psychology approved the study as a low risk application.

2.4. Measures

2.4.1. Demographic background and situation
Participants completed questions relating to the list of demographic characteristics summarised in Table 1: gender, age, country of residence, highest education level, employment status and household structure. They also completed a question that asked about their current living situation: 1–5 ordinal scale that ranged from: 1 = Lockdown not leaving home, 2 = Staying at home, but only allowed out for essential

things, 3 = Staying mostly at home, but can go out, 4 = Going to work and going out, but with social distancing, 5 = Life largely unchanged.

2.5. Exposure to COVID-19 and perceived threat

This 7-point ordinal scale ranged from 1 = Currently or have been affected by COVID-19, 2 = Someone close to you infected, 3 = Persons you know affected, 4 = COVID in local area, 5 = COVID in your city, 6 = COVID in your country and 7 = Unaware of any COVID in country. Participants also rated how much at risk they were personally of contracting a serious case of the disease, 1 = Very low, 2 = Low, 3 = Moderate, 4 = High, 5 = Very high and the same question was then about those people who were 'close to them'. This yielded two indicators of perceived risk.

2.6. Perceived Stress Scale (PSS)

The Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983) was administered to captures participants' subjective appraisal of current life stress. There were 10 items and each was rated on a 5-point scale ranging from 0 (*Never*) to 4 (*Very often*). The PSS has strong psychometric properties in diverse populations and has been shown to have good predictive validity in studies relating to conspiracy beliefs (Swami et al., 2016). The Cronbach's Alpha for the present study was very good: 0.86.

2.7. The beliefs in conspiracy theory inventory (BCTI)

This measure is a 15-item self-report measure developed by Swami et al., (2010); Swami et al. (2011). It captures a range of well-known CTs (i.e. 'A powerful and secretive group, known as the New World Order, are planning to eventually rule the world'). All items are rated from 1 (*Completely false*) to 9 (*Completely true*), and an overall score is computed as the total of all items. Higher CT beliefs are indicated by higher scores. The Cronbach's Alpha was very good in this sample: 0.94.

2.8. The generalised conspiracy beliefs scale (GCBS)

This measure, developed by Brotherton, French, and Pickering (2013), captures whether people tend to perceive the world from a conspiratorial perspective and focuses less on specific beliefs (Brotherton et al., 2013). Items are scores from 1 (*Definitely not true*) to 5 (*Definitely true*) to yield an overall score between 15 and 75 (higher scores reflect greater conspiracy ideation). The Cronbach's Alpha for the present study was very good: 0.94.

2.9. COVID-19 conspiracy beliefs

A 9-item COVID-19 conspiracy scale was developed for this study. No such scale of this nature is going to be fully inclusive because of the changing nature of conspiracies during the pandemic. However, we tried to capture most of the beliefs summarised on the Wikipedia entry for COVID-19 in March 2020. Participants responded to X questions and had to indicate on a 7-point scale ranging from 1 = Strongly disagree to 7 = Strongly degree, the extent to which they endorsed each statement. Statements included items relating to whether the virus had escaped from a lab and was a bioweapon, whether bodies had been secretly burned in China, the involvement of Bill Gates, the availability and suppression of an existing vaccine. Although the lab hypothesis is not necessarily incorrect, anyone who endorses this now without strong evidence is still likely to be displaying a form of conspiracy reasoning. Higher scores indicated strongly conspiracy beliefs. The Alpha for this scale was good: 0.86, which suggests the irrational items (Bill Gates was behind it) correlated with the more rational but unproven theories.

2.10. Government responses

Participants were asked to rate to what extent they endorsed their government's response to the crisis. Nine descriptors, mostly drawn from *Statistica* (www.Statistica.com), were used: too strict; too lenient; professional; illogical; in interests of public; in interests of leaders; information hidden from public; information made available to public; correct course of action. Participants had to rate each item on a 5-point Likert scale from 1 = Strongly disagree to 5 = Strongly agree.

2.11. Analytical approach

Pearson correlations were used to examine the relationship between the different conspiracy belief scales and perceived stress level. The study also used ANOVA to compare the level of conspiracy belief across different countries and by educational level. To examine whether the data was amenable to hierarchical modelling within country, we ran a base intercept only model in SPSS v.24 with COVID beliefs as the dependent measure. The intra-class correlation was only 3.8% which suggested that over 96% of variation was between individuals rather than individuals within countries. In other words, aggregate analyses appear to be an accurate representation of the results.

3. Results

Table 2 provides a summary of the descriptive results for the different measures. Participants generally perceived themselves and those close to them as being moderately to high risk of contracting a serious illness (as based upon mean scores that were above the midpoint of the scale for the first two items in Table 2). Endorsement of COVID conspiracy beliefs fell below the midpoint of the scale and this was generally true of the other conspiracy measures. Scores on the Perceived Stress Scale generally fell in the middle range of the scale. In other words, the sample had modest levels of stress, but was not strongly in support of conspiratorial beliefs.

3.1. Correlation analysis

Table 3 summarises the correlations between the measures. As anticipated, COVID-19 conspiracy beliefs were strongly related to the other measures of conspiracy belief. However, respondent's level of stress was unrelated to any of the conspiracy belief scales.

We also examined the relationship between COVID-19 conspiracy beliefs and attitudes towards the government response to the pandemic. (Table 4) Those who were more conspiratorial were more likely to report that the government's response was too strong, illogical and that the government had kept information from the public. The action was also seen as being more in the interests of the leader.

There was a small negative association between perceived situation (where higher scores indicated little change) ($r = -0.15$), so that less impact from the pandemic was associated with lower COVID conspiracy beliefs. There was no significant correlation between COVID beliefs and the level of risk perceived to self or others.

Table 2
Descriptive statistics for measures.

	M (SD)	Actual range of scores
Perceived risk to self	2.8 (0.91)	1–5
Perceived risk to others	3.3 (0.80)	1–5
COVID conspiracy scale	27.0 (10.25)	9–53
Perceived stress	41.3 (8.1)	17–65
General conspiracy beliefs (GCBS)	35.1 (13.6)	15–73
Specific conspiracy beliefs (BCTI)	50.5 (25.6)	15–127

Note: Perceived risk was rated on a 1–5 scale where 1 = No risk and 5 = Very high risk.

Table 3
Correlation of conspiracy belief scores and perceived stress.

	Perceived stress	COVID beliefs	GBCS
COVID beliefs	0.03		
GBCS	0.10	0.63**	
BCTI	0.07	0.65**	0.82**

** $p < .01$.

Table 4
COVID-19 beliefs and beliefs about government response: Pearson correlations.

	r-Value
Too strict	0.23**
Too lenient	−0.03
Professional approach	0.05
Illogical	0.10**
In interests of public	−0.05
In interests of leaders	0.12**
Info hidden from the public	0.28**
Info made available to public	0.04
Correct course of action	−0.02

** $p < .01$.

3.2. Conspiracy beliefs, stress by education level and country

The principal measures were also compared across three groups defined by their education level (Table 5). Table 5 indicated that COVID-19 conspiracy beliefs and specific conspiracy beliefs (BCTI scores) were lower in respondents with a college degree, but higher in those who reported only a high school education.

Table 6 presents the COVID-19 conspiracy scores for the different countries in the sample. A significant difference was observed, $F (6, 633) = 4.41$, $p < .01$. Bonferroni post-hoc comparisons showed that scores were generally lower in those countries that had been most badly affected at the time (Italy, Spain and France).

3.3. Multiple regression

It was important to examine how well general conspiracy beliefs predicted COVID-19 beliefs while also controlling for education. A linear multiple regression was undertaken with COVID conspiracy scores as the dependent measure and with three predictors: the general conspiracy scale (not the BCTI to avoid issues of multi-collinearity) and education binary coded into high-school vs. college. The results showed that only general conspiracy belief scores (GRCS) were significantly related to COVID beliefs (Table 7).

4. Discussion

The results in this study confirmed the hypothesis that stronger endorsement of conspiracy beliefs relating to COVID-19 would be related to broader CT beliefs. We found this for both the general

Table 5
Differences by education level.

	High school (n = 120) *M (SD)*	Some college (n = 146) *M (SD)*	Degree (n = 346) *M (SD)*	*F*-value
COVID scale	29.0 (9.6)	26.8 (10.1)	26.3 (10.5)	3.09*
PSS	41.5 (7.90)	41.6 (8.63)	41.1 (8.05)	< 1
GCBS	37.3 (13.5)	34.8 (13.3)	35.5 (13.6)	1.95
BCTI	55.8 (27.1)	50.4 (25.6)	48.9 (25.0)	3.28**

* $p < .05$.
** $p < .01$.

Table 6
Mean (SD) COVID-19 conspiracy beliefs by country.

	M (SD)
Oceania	27.7 (8.7)
Affected Europe (Spain, Italy, France)	22.0 (8.7)
Rest of Europe	29.2 (9.2)
UK	27.8 (10.8)
USA	24.4 (10.5)
Canada	26.1 (6.9)
Other	26.9 (9.3)

Table 7
Multiple regression: predictors of COVID conspiracy beliefs.[**]

	B	Beta	t-Value
GCBS	0.47	0.63	10.0**
Education (binary)	−1.25	−0.05	1.55

Notes: Education binary: 1 = High school only, 2 = At least some college/Uni.
** $p < .01$

conspiracy scale (GCBS) as well as a measure of specific beliefs (BCTI). Support was also found for the prediction that those who endorsed COVID-19 conspiracy beliefs would have lower levels of education and would have less favourable views about the government's response to the crisis. However, contrary to predictions, we found no significant association between people's level of stress and the strength of their beliefs. In other words, beliefs appeared to be more strongly related to pre-existing belief systems than current emotional states. Some modest differences were also observed between countries with respondents from the most badly affected European countries (at the time of the study) scoring lower on the COVID-19 conspiracy questions.

The results relating to conspiracy beliefs are consistent with the view that people are prone to interpret events in terms of pre-existing belief systems (Sutton & Douglas, 2020; Swami et al., 2017). This phenomenon is likely to have multiple, but related, psychological and sociological explanations. As shown in previous studies, those who endorse multiple CTs are likely to have a pre-existing tendency to interpret information in a way that finds patterns, connections and causal relationships in events (Georgiou et al., 2019; van Prooijen, Douglas, & De Inocencio, 2018; van Prooijen et al., 2018). Such people may also be prone to focus only on evidence that is consistent with existing hypotheses (Balzan et al., 2012) and thereby display a form of confirmation bias. Any attempt to adopt a different point of view may result in cognitive dissonance (Festinger, 1962), or be a result of a negative psychological reactance (Steindl, Jonas, Sittenthaler, Traut-Mattausch, & Greenberg, 2015), so that all new information will tend to be explained by existing belief systems when facing unexplainable events. In particular, CT believers may find it hard to believe that a virus could originate randomly from the natural world because it does not fit with their preconceived view that events have a reason and usually a human or government influence behind it.

This tendency towards the development of a general 'conspiratorial style of reasoning' is evident in the correlations observed in this study and also in the strong psychometrics of the CT measures. General CT orientations (as measured by the GCBS) correlated strongly with specific beliefs on the BCTI. The BCTI, in turn, was found to have very good internal reliability despite referring to a range of unrelated conspiracy beliefs ranging from the moon landing, to 911 and alien craft. These observations suggest that CTs relating to events such as the COVID-19 crisis probably arise, not just as a defensive reaction to this one event, but out of longer standing dispositional factors.

As van Prooijen et al. (2018) and Van Prooijen and Van Lange (2014) point out, CTs often arise from disaffection and so it is common to find that stronger CT beliefs will be related to more negative attitudes towards government. This was confirmed in the present study,

where we found positive associations between COVID-19 CTs and stronger endorsement of the belief that the government was: hidings things from the public; doing things for its own interest; and was too strict in its measures.

4.1. Education differences

We also investigated the hypothesis that COVID-19 conspiracy beliefs would vary according to a person's level of education. On the whole, our results were consistent with other studies in that CT beliefs were found to be highest in those with only a high-school education (Georgiou et al., 2019; van Prooijen, 2017). Evidence suggests that those who are more educated are more likely to be exposed to analytical or critical thinking skills that enable them to find flaws in evidence. Such people may also have greater scientific knowledge, training in numerical concepts and may have better cognitive reasoning skills (Kovic & Fuchslin, 2018). However, the effects for education were generally small and education level was found to be non-significant once other CT beliefs were controlled. Although this could be a reflection of the sample (all Prolific users have the Internet and are technologically able), our own observation of the CT phenomenon suggests that having stronger scientific skills is not always protective. Those who have scientific knowledge have been prone to what might be described as "cognitive blind spots".[2]

4.2. CT beliefs and stress

We had also anticipated that people reporting higher levels of stress would report having stronger conspiracy beliefs. However, we found no such effect. One reason for this is that the sample was quite young and so respondents may not have perceived significant threat from the COVID-19 disease. The study was also conducted early in the lockdown period in many countries so that it may have been too early to detect the flow-on effects of prolonged periods of isolation. Some respondents may have considered social isolation and lockdowns as necessary public health strategies and felt safe from the disease, so that boredom rather than stress might have been a stronger emotion. The fact that those in countries such as Italy, France and Spain reported lower scores is noteworthy and might reflect the fact that the reality of the disease may have been stronger for those respondents. These results could also be explained by frameworks such as Protection Motivation Theory (Rogers, 1975). According to this theory, people tend to be most receptive to objective health-related advice when they feel most threatened and this would very likely have been the case in the world affected countries.

4.3. Limitations

It is important to acknowledge that several factors need to be taken into account when interpreting the results in this study. The findings are based upon a convenience sample so that the findings can only be generalised to the sorts of people who undertake online panel surveys (usually younger and more highly educated than the general population). The study was also conducted early during the COVID-19 crisis, so possibly stronger results might be obtained once people have experienced longer periods of social isolation: first, because of the opportunity to be exposed to greater information; and, second because of a longer exposure to the stressful conditions. The use of a self-report methodology also means that we cannot rule out response biases or

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[2] Perhaps one of the best documented examples is the expert metallurgist who disputed the official account of the 911 attacks because plane fuel would not have melted the girders of the World Trade Centre. The same expert should have had the knowledge to know that, even heating the girders to half the melting temperature, would have been enough to compromise the buildings.

common-method variance (e.g., that the correlation between measures arises from the use of a similar series of measures). Our measures may also not have captured all relevant CTs that are known to the sample. However, the study was sufficiently well powered to detect significant effects, used validated measures with good reliability, included data quality checks, and targeted a population that would have reasonable ecological validity given that CTs thrive in online communities.

4.4. Conclusions and future directions

We found that COVID-19 conspiracy beliefs are associated with more cynical views about government responses and are related to broader CT beliefs, with first-order correlations showing some link to lower levels of educational attainment. These findings contribute to broader debates about the issue of "fake news" and misinformation and the extent to which erroneous beliefs can reduce the potential effectiveness of public health campaigns.[3] Much of this behaviour appears to be based on CT logic and illogical interpretations of events (e.g., those who are congregating and protesting that their cites are safe for work seem to be ignoring that it is the strict social isolation measures that created these conditions). In further investigations, it will be useful to conduct more in-depth examinations of how events such as COVID-19 contribute to different patterns of information searching and whether greater insights can be obtained into the likely sources and causes of current conspiracy beliefs. It would also be useful to examine whether longer exposure to the crisis leads to changes in CT beliefs and how attitudes towards government actions changes over time. For example, it may be that some people are initially supportive of strict measures when they fear for their safety. However, people may become more cynical over time if they see that government measures might be a way for the government to instill new rules which are interpreted as having more sinister motivations.

CRediT authorship contribution statement

Neophytos Georgiou: Conceptualization, Resources, Investigation, Writing - review & editing.**Paul Delfabbro:**Writing - original draft, Formal analysis.**Ryan Balzan:**Methodology, Writing - review & editing.

References

Balzan, R. P., Delfabbro, P. H., Galletly, C., & Woodward, T. S. (2012). Reasoning heuristics across the psychosis continuum: The contribution of hypersalient evidence-hypothesis matches. *Cognitive Neuropsychiatry, 17*, 431–450.

Barron, D., Furnham, A., Weis, L., Morgan, K. D., Towell, T., & Swami, V. (2018). The relationship between schizotypal facets and conspiracist beliefs via cognitive processes. *Psychiatry Research, 259*, 15–20. https://doi.org/10.1016/j.psychres.2017.10.001.

Barron, D., Morgan, K., Towell, T., Altemeyer, B., & Swami, V. (2014). Associations between schizotypy and belief in conspiracist ideation. *Personality and Individual Differences, 70*, 156–159. https://doi.org/10.1016/j.paid.2014.06.040.

Brotherton, R., French, C. C., & Pickering, A. D. (2013). Measuring belief in conspiracy theories: The generic Conspiracist beliefs scale. *Frontiers in Psychology, 4*, 279. https://doi.org/10.3389/fpsyg.2013.00279.

Buchy, L., Woodward, T. S., & Liotti, M. (2007). A cognitive bias against disconfirmatory evidence (BADE) is associated with schizotypy. *Schizophrenia Research, 90*, 334–337.

Byford, J. (2011). *Conspiracy theories: A critical introduction.* London: Palgrave McMillan.

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24*, 386–396.

Dagnall, N., Denovan, A., Drinkwater, K., Parker, A., & Clough, P. (2017). Statistical Bias and endorsement of conspiracy theories. *Applied Cognitive Psychology, 31*. https://doi.org/10.1002/acp.3331.

Douglas, K. M., Sutton, R. M., & Cichocka, A. (2017). The psychology of conspiracy theories. *Current Directions in Psychological Science, 26*, 538–542. https://doi.org/10.1177/0963721417718261.

Eisenacher, S., & Zink, M. (2017). The importance of metamemory functioning to the

pathogenesis of psychosis. *Frontiers in Psychology, 8*, 304. https://doi.org/10.3389/fpsyg.2017.00304.

Ettinger, U., Mohr, C., Gooding, D. C., Cohen, A. S., Rapp, A., Haenschel, C., & Park, S. (2015). Cognition and brain function in Schizotypy: A selective review. *Schizophrenia Bulletin, 41*, 417–S426. https://doi.org/10.1093/schbul/sbu190.

Festinger, L. (1962). Cognitive dissonance. *Scientific American, 207*, 93–107.

Ford, C. L., Wallace, S. P., Newman, S. P., Lee, S.-J., & Cunningham, W. E. (2013). Belief in AIDS-related conspiracy theories and mistrust in the government: Relationship with HIV testing among at-risk older adults. *The Gerontologist, 53*, 973. https://doi.org/10.1093/geront/gns192.

Galliford, N., & Furnham, A. (2017). Individual difference factors and beliefs in medical and political conspiracy theories. *Scandinavian Journal of Psychology, 58*, 422–428. https://doi.org/10.1111/sjop.12382.

Georgiou, M., Delfabbro, P. H., & Balzan, R. (2019). Conspiracy beliefs in the general population: The importance of psychopathology, cognitive style and educational attainment. *Personality and Individual Differences, 151*.

Hart, J., & Graether, M. (2018). Something's going on here: Psychological predictors of belief in conspiracy theories. *Journal of Individual Differences, 39*, 229–237. https://doi.org/10.1027/2f1614-0001/2fa000268.

Janis, I. L., & Mann, L. (1977). *Decision making: A psychological analysis of conflict, choice, and commitment.* New York: Free Press.

Johnson, J. H., Driskell, J. E., & Salas, E. (1997). Vigilant and hypervigilant decision making. *Journal of Applied Psychology, 82*, 614–622.

Jolley, D., & Douglas, K. M. (2017). Prevention is better than cure: Addressing anti-vaccine conspiracy theories. *Journal of Applied Social Psychology, 47*, 459–469. https://doi.org/10.1111/jasp.12453.

Kovic, M., & Fuchslin, T. (2018). Probability and conspiratorial thinking. *Applied Cognitive Psychology, 32*. https://doi.org/10.1002/acp.3408.

Landrum, A. R., & Olshansky, A. (2019). The role of conspiracy mentality in denial of science and susceptibility to viral deception about science. *Politics and the Life Sciences, 38*, 193–208.

Moritz, S., Favrod, J., Andreou, C., Morrison, A. P., Bohn, F., Veckenstedt, R., & Karow, A. (2013). Beyond the usual suspects: Positive attitudes towards positive symptoms is associated with medication noncompliance in psychosis. *Schizophrenia Bulletin, 39*, 917–922. https://doi.org/10.1093/schbul/sbs005.

Oliver, J. E., & Wood, T. J. (2014). Medical conspiracy theories and health behaviours in the United States. *JAMA Internal Medicine*. https://doi.org/10.1001/jamainternmed.2014.190.

Rogers, R. W. (1975). A protection motivation theory of fear appeals and attitude change. *Journal of Psychology, 91*, 93–114.

Spohr, D. (2017). Fake news and ideological polarization filter bubbles and selective exposure on social media. *Business Information Review, 34*, 150–160. https://doi.org/10.1177/0266382117722446.

Steindl, C., Jonas, E., Sittenthaler, S., Traut-Mattausch, E., & Greenberg, J. (2015). Understanding psychological reactance: New developments and findings. *Zeitschrift fur Psychologie, 223*(4), 205–214. https://doi.org/10.1027/2151-2604/a000222.

Sutton, R. M., & Douglas, K. M. (2020). Conspiracy theories and the conspiracy mindset: Implications for political ideology. *Current Opinion in Behavioural Sciences, 34*, 118–122.

Swami, V., Barron, D., Weis, L., Voracek, M., Stieger, S., & Furnham, A. (2017). An examination of the factorial and convergent validity of four measures of conspiracist ideation, with recommendations for researchers. *PLoS One, 12*. https://doi.org/10.1371/journal.pone.0172617.

Swami, V., Chamorro-Premuzic, T., & Furnham, A. (2010). Unanswered questions: A preliminary investigation of personality and individual difference predictors of 9/11 conspiracist beliefs. *Applied Cognitive Psychology, 24*, 749–761. https://doi.org/10.1002/acp.1583.

Swami, V., & Coles, R. (2010). The truth is out there: Belief in conspiracy theories. *The Psychologist, 23*, 560–563.

Swami, V., Coles, R., Stieger, S., Pietschnig, J., Furnham, A., Rehim, S., et al. (2011). Conspiracist ideation in Britain and Austria: Evidence of a monological belief system and associations between individual psychological differences and real-world and fictitious conspiracy theories. *British Journal of Psychology, 102*, 443–463. https://doi.org/10.1111/j.2044-8295.2010.02004.x.

Swami, V., & Furnham, A. (2012). Examining conspiracist beliefs about the disappearance of Amelia Earhart. *The Journal of General Psychology, 139*, 244–259. https://doi.org/10.1080/00221309.2012. 697932.

Swami, V., Furnham, A., Smyth, N., Weis, L., Lay, A., & Clow, A. (2016). Putting the stress on conspiracy theories: Examining associations between psychological stress, anxiety, and belief in conspiracy theories. *Personality and Individual Differences, 99*, 72–76. https://doi.org/10.1016/j.paid.2016.04.084.

Swami, V., Pietschnig, J., Tran, U. S., Nader, I. W., Stieger, S., & Voracek, M. (2013a). Lunar lies: The impact of informational framing and individual differences in shaping conspiracist beliefs about the moon landings. *Applied Cognitive Psychology, 27*(1), 71–80. https://doi.org/10.1002/acp.2873.

Swami, V., Pietschnig, J., Tran, U. S., Nader, I. W., Stieger, S., & Voracek, M. (2013b). Lunar lies: The impact of informational framing and individual differences in shaping conspiracist beliefs about the moon landings. *Applied Cognitive Psychology, 27*, 71–80. https://doi.org/10.1002/acp.287l.

Swami, V., Voracek, M., Stieger, S., Tran, U. S., & Furnham, A. (2014). Analytic thinking reduces belief in conspiracy theories. *Cognition, 133*, 572–585. https://doi.org/10.1016/j.cognition.2014.08.006.

van Prooijen, J. W. (2017). Why education predicts decreased belief in conspiracy theories. *Applied Cognitive Psychology, 31*, 50–58. https://doi.org/10.1002/acp.3301.

van Prooijen, J. W., & Douglas, K. M. (2018). Belief in conspiracy theories: Basic principles of an emerging research domain. *European Journal of Social Psychology, 48*,

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[3] Some resistance Marches in the US against the COVID-19 social distancing have included posters indicating support for the Bill Gates microchip conspiracy.

897–908. https://doi.org/10.1002/ejsp.2530.

van Prooijen, J.-W., & Douglas, K. M. (2017). Conspiracy theories as part of history: The role of societal crisis situations. *Memory Studies, 10*(3), 323–333.

van Prooijen, J. W., Douglas, K. M., & De Inocencio, C. (2018). Connecting the dots: Illusory pattern perception predicts belief in conspiracies and the supernatural. *European Journal of Social Psychology, 48*, 320–335. https://doi.org/10.1002/ejsp.2331.

Van Prooijen, J. W., Krouwel, P. M., & Pollet, T. V. (2015). Political extremism predicts belief in conspiracy. *Social Psychological and Personality Science, 6*, 570–578. https://doi.org/10.1177/1948550614567356.

Van Prooijen, J. W., & Van Lange, P. A. M. (2014). *Power, politics, and paranoia: Why people are suspicious of their leaders.* Cambridge, UK: Cambridge University Press https://doi.org/10.1017/CBO9781139565417.

van Proojen, J-W. (2018). *). The psychology of conspiracy theories.* London: Routledge.

van Proojen, J-W., & Krouwel, A. P. M. (2017). Extreme political beliefs predict dogmatic intolerance. *Social Psychological and Personality Science, 8*, 292–300.

Vicario, M. D., Bessi, A., Zollo, F., Petroni, F., Scala, A., Caldarelli, G., & Quattrociocchi, W. (2016). The spreading of misinformation online. *Proceedings of the National Academy of Sciences of the United States of America, 113*, 554–559. https://doi.org/10.1073/pnas.1517441113.

Warman, D. M., Lysaker, P. H., & Martin, J. M. (2007). Cognitive insight and psychotic disorder: The impact of active delusions. *Schizophrenia Research, 1-3*, 525–533. https://doi.org/10.1016/j.schres.2006.09.011.

Woodward, N. D., Duffy, B., & Karbasforoushan, H. (2014). Response selection impairment in schizophrenia transcends sensory and motor modalities. *Schizophrenia Research, 152*, 446–449. https://doi.org/10.1016/j.schres.2013.11.038.

Woodward, T. S., Buchy, L., Moritz, S., & Liotti, M. (2007). A bias against disconfirmatory evidence is associated with delusion proneness in a nonclinical sample. *Schizophrenia Bulletin, 3*, 1023–1028. https://doi.org/10.1093/schbul/sbm01.