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COVID-19 conspiracy theories and compliance with governmental restrictions: The
mediating roles of anger, anxiety, and hope

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Abstract

The COVID-19 pandemic has been an ideal breeding ground for conspiracy theories. Yet, different beliefs could have different implications for individuals' emotional responses, which in turn could relate to different behaviours and specifically to either a greater or lesser compliance with social distancing and health protective measures. In the present research, we investigated the links between COVID-19 conspiracy beliefs, emotions (anger, anxiety, and hope), attitudes towards government restrictions, and self-reported compliant behaviour. Results of a cross-sectional survey amongst a large UK sample ($N = 1,579$) provided support for the hypothesis that COVID-19 conspiracy beliefs showed a polarising relationship with compliant behaviour through opposing emotional pathways. The relation was mediated by higher levels of anger, itself related to a *lesser* perceived importance of government restrictions, and simultaneous higher levels of anxiety, related to a *greater* perceived importance. Hope was also related to conspiracy beliefs and to greater perceived importance but played a weaker role in the mediational model. Results suggest that the behavioural correlates of conspiracy beliefs might not be straightforward, and highlight the importance of considering the emotional states such beliefs might elicit, when investigating their potential impact.

Keywords: COVID-19; conspiracy theory beliefs; emotions; compliance.

COVID-19 conspiracy theories and compliance with governmental restrictions: The mediating roles of anger, anxiety, and hope

At the end of 2019 a viral outbreak in Wuhan, China, evolved from a regional health crisis to a global pandemic (Sohrabi et al., 2020). Since then, Sars-CoV-2, commonly referred to as COVID-19, has changed the lives of citizens around the globe. Measures to control the pandemic have influenced how people interact with each other, and have caused significant economic uncertainty (Fornaro & Wolf, 2020). Events of such magnitude are intuitively assigned causes of proportional significance (Leman & Cinnirella, 2007), and in the absence of an official account for the source of the virus as of today (World Health Organization, 2021), the coronavirus pandemic has proven to be the ideal breeding ground for conspiracy theories (Douglas, 2021). Indeed, conspiracy theories tend to flourish in times of crisis and uncertainty, and the pandemic seems no exception (van Prooijen & Douglas, 2017). One such conspiracy theory supposes that the virus was manufactured in China as a bioweapon to be used against the West. Another supposes that the virus is all a hoax. Yet another supposes that the rollout of 5G technology is somehow linked to COVID-19. These conspiracy theories have been widespread on social media (Allington et al., 2020), have been regularly covered by mainstream news (Spring, 2020) and have sometimes even been endorsed by people in high office (Beer, 2020).

Emerging theorising and research suggests that these conspiracy theories could have serious consequences for how the public responds to COVID-19 (Van Bavel et al., 2020). Conspiracy beliefs have already been linked to lower compliance with social distancing and other health protective measures, including vaccination (e.g., Bertin et al., 2020; Bierwiazzonek et al., 2020; Earnshaw et al., 2020). However, COVID-19 conspiracy theories differ in important ways. Specifically, some conspiracy theories downplay the severity of the virus, whereas others augment it. Belief in these different conspiracy theories could therefore

have different implications for individuals' perceptions of threat, their emotional responses, and subsequent behaviour. Specifically, some conspiracy beliefs may be associated with decreased feelings of threat and hence public compliance with social distancing and health protective measures, whereas others might be associated with improvements in such responses. Yet, little is known about the psychological processes through which conspiracy beliefs translate into personal behaviour. In the present research, we looked at the relationship between belief in conspiracy theories (general and COVID-19 related), attitudes towards government restrictions, and self-reported compliant behaviour. More specifically, we investigated the roles of specific emotions (anger, anxiety and hope) as potential mediators of these links.

Conspiracy Theories and Behaviour during the COVID-19 Pandemic

Adherence to government policies and public health advice is considered crucial in efforts to control the spread of COVID-19 (Islam et al., 2020). Compliance with restrictive policies will partly depend on whether citizens deem them appropriate, and this in part depends on how dangerous citizens believe the virus to be (Lalot et al., 2021). Conspiracy theories associated with people's perceptions of the virus could then impact compliance with government policies and recommendations. A growing body of research has identified links between conspiracy beliefs and *lower* compliance with governmental restrictions (notably with lockdown rules, Marinthe et al., 2020; Oleksy et al., 2021), lesser adoption of health protective behaviours, and lower intentions to get vaccinated (e.g., Allington et al., 2020; Biddlestone et al., 2020; Bierwiazzonek et al., 2020; Earnshaw et al., 2020; Imhoff & Lamberty, 2020). It seems that the negative impact of conspiracy theories on compliance is at least partly explained by a decrease in trust in both the government (Pavela Banai et al., 2020) and in health authorities, and more generally science (Plohl & Musil, 2021; Rutjens et al., 2021).

However, other studies have found that conspiracy beliefs predict *higher* compliance with governmental restrictions. Marinthe et al. (2020) investigated the links between general conspiracy beliefs and different health behaviours. In one study they found that conspiracy beliefs were associated with greater preventive health behaviour (i.e., following government advice on personal contact as well as following self-imposed social distancing rules), at least as long as participants were afraid of personal contamination or death due to the virus (i.e., when they thought the risk was high). Similarly, Imhoff and Lamberty (2020) found that some conspiracy beliefs related to more cautious behaviour (i.e., stocking up on food).

Taken together, these studies suggest that the relationships between conspiracy beliefs and social behaviours are by no means uniform. On the contrary, belief in COVID-19 conspiracy theories seem to correlate with responses that reflect different evaluations of the seriousness of the pandemic: either that the danger is overstated (e.g., hoax beliefs) or that the danger is understated (e.g., bioweapon or government take-over beliefs). To capture this ambiguity, the present study used a general statement reflecting COVID-19 conspiracy beliefs (i.e., whether official authorities “hide the truth about COVID-19”). Such a single-item measure makes it more likely that respondents focus on aspects and information on this issue that are relevant to them and ignore other aspects (for similar considerations, see e.g., Nagy, 2002). We anticipated that this would allow respondents to interpret the statement in accordance with their own type of conspiracy belief and that the measure could elicit a stronger agreement amongst people with different evaluations of the pandemic.

Crucially, the different evaluations should relate to different attitudes, emotional states, and behaviours with regard to official government guidelines. More specifically, people who believe in a conspiracy deeming the virus non-existent or harmless would be more likely to disregard containment-related behaviours. On the other hand, people who believe that the pandemic is more dangerous than authorities acknowledge should be particularly cautious and engage in more health behaviours. We propose in the current

research that emotions are a relevant psychological process to account for such effects of conspiracy beliefs. Specifically, we propose that different positive and negative emotions (related to perceptions of the pandemic as more or less serious and threatening) will help to explain whether and how conspiracy beliefs relate to compliance.

The Role of Emotions

A large body of research recognises the key role of affective processes in determining collective action and more broadly social behaviour (e.g., Drouvelis & Grosskopf, 2016; Marcus, 2003; van Zomeren, 2013; Włodarczyk et al., 2017). Several fields of research, from health psychology to media and political communication research, also highlight how emotions conveyed in news, the media, or simply persuasion messages, can translate into important attitude and behaviour change. These effects of emotions can prove complex (see e.g., Chaiken et al., 1989; Konijn, 2013; Wirth & Schramm, 2005; Witte & Allen, 2000). In the context of COVID-19, there is already evidence that people's affective responses (notably through risk assessment and resulting levels of anxiety versus quietness) relate to their behaviour in the face of the pandemic (Imhoff & Lamberty, 2020; Marinthe et al., 2020). We focus here specifically on three affective responses: anger, anxiety, and hope. The sections below present these emotions in turn and their theorised role in the link between conspiracy beliefs and COVID-19 compliant behaviour.

Anger

Anger is a negative, arousing, action-oriented emotion that leads people to tackle the obstacles preventing them to achieve their goals. In the broader social context, anger urges people to confront perceived threats and injustices (Lambert et al., 2019; van Zomeren, 2013). However, anger also reinforces existing attitudes on a topic, as people are more likely to rely on heuristics to evaluate information and use sources that validate their pre-existing beliefs (Parker & Isbell, 2010). With respect to COVID-19, a recent study found that anger increases the rate at which people accept and disseminate false information about COVID-19 online

(Han et al., 2020). Further, Jolley and Paterson (2020) found that belief in conspiracy theories about the role of 5G networks in the spread of COVID-19 predicted higher levels of anger, which in turn led to justification and support for violence towards 5G technology.

In the context of evaluating government restrictions and compliance, anger could be relevant for individuals who believe in virus-as-a-hoax theories. Such individuals should perceive the restrictive government guidelines (e.g., forceful lockdowns, social distancing measures) as unfair and unjustified. As injustice is a reliable trigger of anger, the restrictive policies would likely become the target of protest behaviour and personal noncompliance. Importantly, however, past research found that specific, mutually incompatible conspiracy beliefs are often endorsed by the same individual (Goertzel, 1994; Wood et al., 2012). In the aforementioned research by Imhoff and Lamberty (2020) for example, beliefs in the bioweapon and hoax theories were strongly and positively correlated. Thus, we hypothesised that COVID-19 conspiracy beliefs in general – not solely hoax beliefs – would be linked with higher levels of anger, which in turn would relate to perceptions of the government health guidelines as less important, and ultimately to lower personal compliance with these guidelines.

Anxiety

Whereas anger leads to approach behaviours, the emotional response of anxiety is defined as a negative and arousing but experiential *avoidance* emotion. Anxiety is linked to cautious information processing and behaviour to avoid dangerous and harmful consequences (Friman et al., 1998). It reflects “a state of helplessness, because of a perceived inability to predict, control, or obtain desired results or outcomes in certain upcoming personally salient situations or contexts” (Barlow, 2000, p. 1248). Conspiracy beliefs imply that authorities behave in nefarious ways and are responsible for negative events which are beyond the control of the ordinary individual. As such, it is not surprising that conspiracy beliefs are commonly linked to higher levels of anxiety (Douglas et al., 2017). Feelings of anxiety

elicited by conspiracy theories can lead to different withdrawal behaviours, which usually aim “to avoid the suspected conspiracy” (van Prooijen & van Vugt, 2018, p. 776). For example, Jolley and Douglas (2014) found that exposure to climate change conspiracies increased levels of uncertainty, which in turn led to lower action intentions to reduce one’s carbon footprint.

Research on COVID-19 conspiracy theories has also demonstrated that levels of anxiety, or the lack thereof, relate to health behaviours. In this context, heightened anxiety was associated with greater hoarding behaviour (Jovančević & Milićević, 2020) and generally greater prepping behaviour (Imhoff & Lamberty, 2020), but also greater adherence to self-protective health behaviours, even those not mandatory (Marinthe et al., 2020). We therefore hypothesised that COVID-19 conspiracy beliefs would also be linked with higher levels of anxiety, which in turn would relate to perception of the government health guidelines as more important, and ultimately to higher personal compliance with these guidelines.

Hope

Lastly, we consider the role of hope. Hope is a positive approach-based emotion that reflects the belief that one can find pathways to desired goals and the motivation to use those pathways (Snyder et al., 2002). The role of hope has been largely ignored in earlier accounts of collective action (Jarymowicz & Bar-Tal, 2006). However, some recent studies have identified a positive impact of feelings of hope on, for example, collective action intentions (Sabucedo & Vilas, 2014) and collective mobilizations participation (Włodarczyk et al., 2017), at least partly through increased perceived efficacy (Páez et al., 2015). Hope is also related to the adoption of personal health protective behaviour (Yarcheski et al., 2004) and greater behaviour change (Feldman & Sills, 2013).

Turning to conspiracy beliefs, research has usually found associations between conspiracy beliefs and higher levels of negative emotions, as well as lower levels of positive emotions (e.g., Tomljenovic et al., 2020; van Prooijen & Douglas, 2017). As stated above,

conspiracy beliefs typically imply low personal control in the face of powerful authorities and groups who act to the detriment of the individual. Hence, it seems reasonable to expect that COVID-19 conspiracy beliefs would coincide with feelings of powerlessness (see Jolley & Douglas, 2014) and low levels of hope, especially given the overwhelming (global) scale of the alleged conspiracy and the escalating impact on people's lives. Thus, and finally, we hypothesised that COVID-19 conspiracy beliefs would be linked with lower levels of hope, undermining the potential beneficial effect of this emotion on perception of government health guidelines, and personal compliance with these guidelines.

Overview and Hypotheses

In the present research, we investigated the link between belief in conspiracy theories (general and COVID-19 related) and support for, as well as compliance with, government health policies. We hypothesised that COVID-19 conspiracy beliefs (i.e., beliefs that authorities are hiding the truth about the virus) would be related to perceived importance of government measures aiming to tackle the spread of the pandemic.

First, we expected that COVID-19 conspiracy beliefs would be a more relevant correlate than general conspiracy beliefs with personal compliance with COVID-19 rules and restrictions because evidence shows specific conspiracy theories, just like specific attitudes generally (Ajzen & Fishbein, 1977), are stronger predictors of specific behaviours (e.g., Imhoff & Lamberty, 2020).

Moreover, in light of previous findings that conspiracy beliefs can translate into different reactions and behaviours (Allington et al., 2020; Imhoff & Lamberty, 2020), we suggest that the link between COVID-19 conspiracy theories and attitudes towards government restrictions and health protective behaviour would be underlay by the simultaneous activation of different emotions driving attitudes and behaviours in different directions. Greater levels of anger and lower levels of hope would be related to *weaker*

perceptions and behaviours, while greater levels of anxiety would be related to *stronger* perceptions and behaviours.

To test these hypotheses, we relied on a structural equation model investigating the role of anger, anxiety, and hope as potential mediators of the relationship between COVID-19 conspiracy beliefs and attitudes towards government restrictions and, from there, to self-reported compliant behaviour (that is, how much participants report having complied with the governmental measures themselves over the past week).

Method

Participants and Procedure

This investigation took place in a cross-sectional survey conducted the early months of the pandemic. The data were part of a large-scale research project aiming to track social cohesion in the UK during COVID-19. The survey assessed the views of a panel of respondents regarding the current political situation, social cohesion, political views, and views on COVID-19. Participants were drawn from the general population of the regions of Scotland and Wales as well as the county of Kent in England. These areas were chosen because of their disparities in terms of demographics, political preferences, and history – so that considering them together would provide a comprehensive overview of citizens' perceptions in the UK. An external research partner (Qualtrics Panels) distributed the online survey, recruiting and remunerating the participants directly. The sample was stratified to be representative on gender and age categories.ⁱ

Data were collected between 7 and 19 May 2020 while the UK had effectively been under its first national lockdown for more than six weeks. To provide some temporal context, the first national lockdown in the UK was introduced on 26 March 2020 but number of cases and deaths continued to increase for several weeks, with a peak of COVID-19 deaths recorded during the third week of April. Cases then started to decline, and on 30 April 2020 the Prime Minister declared the country was “past the peak” of the pandemic. During the data collection

period (7-19 May 2020), the UK recorded an average of 3,400 deaths per week. A conditional plan for lifting lockdown was announced on 10 May 2020 but the first rules were only relaxed in June starting with a phase re-opening of schools from 1 June 2020 (Institute for Government, 2021).

A total of 1,579 respondents (50.5% female, $M_{\text{age}} = 55.98$, $SD = 14.78$) completed the online questionnaire. We determined sample size prior to data collection based on feasibility and funding capacities. In addition, the general design of the study, sample size, and rules for participants exclusions was preregistered.ⁱⁱ Alongside other measures that are part of separate projects, participants completed measures for conspiracy beliefs, emotions, perceived importance of government restrictions, and self-reported compliance with government restrictions. Participants also reported their political orientation (1 = Left, 7 = Right, $M = 4.03$, $SD = 1.36$), and whether they had personally been exposed to COVID-19.ⁱⁱⁱ Due to length constraints, most constructs were measured with one or two items. Unless specified otherwise, all items were measured on 5-point scales (1 = Not at all, 5 = Extremely). Zero-order correlations between all items are reported in Table 1. Data is publicly available on the OSF page dedicated to the project: [link].

Materials

General Conspiracy Beliefs

General conspiracy beliefs were measured with a single item scale developed and validated by Lantian et al. (2016). As a preamble, participants read, “*Some people suggest that the ‘official version’ of events such as the 9/11 attacks or the death of Princess Diana, could be an attempt to hide the truth from the public. This ‘official version’ could mask the fact that these events have been planned and secretly prepared by a covert alliance of powerful individuals or organizations (for example secret services or government). What do you think?*”, followed by the question: “I think that the official version of the events given by the authorities very often hides the truth” (7-point scale ranging from 1 = Completely false to

7 = Completely true; $M = 4.63$, $SD = 1.62$). 21.3% of respondents ticked the statement as false or completely false, 19.0% were neutral, and 59.7% ticked it as true or completely true (although most participants were more nuanced and only 12.6% considered the statement to be *completely* true).

COVID-19 Conspiracy Beliefs

We then asked respondents about potential suspicions about the authorities' account of the pandemic with the following item, "I think that the official version of the COVID-19 pandemic given by the authorities hides the truth" (similar 7-point scale; $M = 4.56$, $SD = 1.72$).^{iv} Not unlike the previous item, 24.7% of respondents ticked the statement as false or completely false, 17.9% were neutral, and 57.3% ticked it as true or completely true (although only 13.7% considered the statement to be *completely* true).

Emotions: Anger, Anxiety and Hope

Participants reported to what extent they were experiencing different emotions when reflecting on the current global situation during the pandemic: "Thinking about the current situation in the UK, how do you feel about the way the future looks for people in the UK?" Pairs of items were aggregated to represent anger ("angry", "resentful", $M = 2.32$, $SD = 1.12$, $\alpha = .79$) and hope ("hopeful", "confident", $M = 2.49$, $SD = 0.98$, $\alpha = .78$) while a single item measured anxiety ("anxious", $M = 3.17$, $SD = 1.21$).

Perceived Importance of Government Restrictions

Two items measured the perceived importance of governmental restrictions aiming to limit the spread of the virus: "How important do you think it is that you respect these restrictions?" and "How important do you think it is that everyone respects the restrictions enacted by the government?", and were aggregated ($M = 4.58$, $SD = 0.65$, $\alpha = .79$).

Self-Reported Compliant Behaviour

Finally, participants self-reported their own compliant behaviour with respect to these restrictions: "In all honesty, if you think about your behaviour this past week, how much

would you say you respected the government rules about restrictions on movement and distancing?" ($M = 4.45$, $SD = 0.74$).

Table 1. Zero-order correlations between all measures.

	2	3	4	5	6	7	8	9
1 General conspiracy beliefs	.74***	-.12***	.03	.22***	.12***	-.12***	-.06*	-.03
2 COVID-19 conspiracy beliefs		-.15***	.02	.32***	.17***	-.17***	-.11***	-.08**
3 Political orientation			-.04	-.21***	-.13***	.28***	.00	.01
4 Personal exposure to the virus				.13***	.15***	-.07**	.03	.02
5 Anger					.46***	-.24***	-.06*	-.06*
6 Anxiety						-.24***	.13***	.08**
7 Hope							.05*	-.02
8 Perceived importance of restrictions								.61***
9 Compliant behaviour								

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

Results

General versus COVID-19 Related Conspiracy Beliefs

We first conducted regression analyses to test the relationships between conspiracy beliefs and perceived importance of government restrictions as well as compliant behaviour (while controlling for demographics, political orientation as well as personal exposure to COVID-19) with the aim of directly comparing the role of general conspiracy beliefs and COVID-19 conspiracy beliefs. It can already be noted that including the covariates in the models did not influence the findings.^v Consistent with expectations, results showed that only COVID-19 conspiracy beliefs was related with both perceived importance of government restrictions and self-reported compliant behaviour, while general conspiracy beliefs were not once other effects had been taken into account (Table 2).

Table 2. Results of the regression models testing the relationships between general and COVID-19 related conspiracy beliefs on perceived importance of governmental restrictions and self-reported compliant behaviour, controlling for demographics, political orientation and personal exposure to COVID-19.

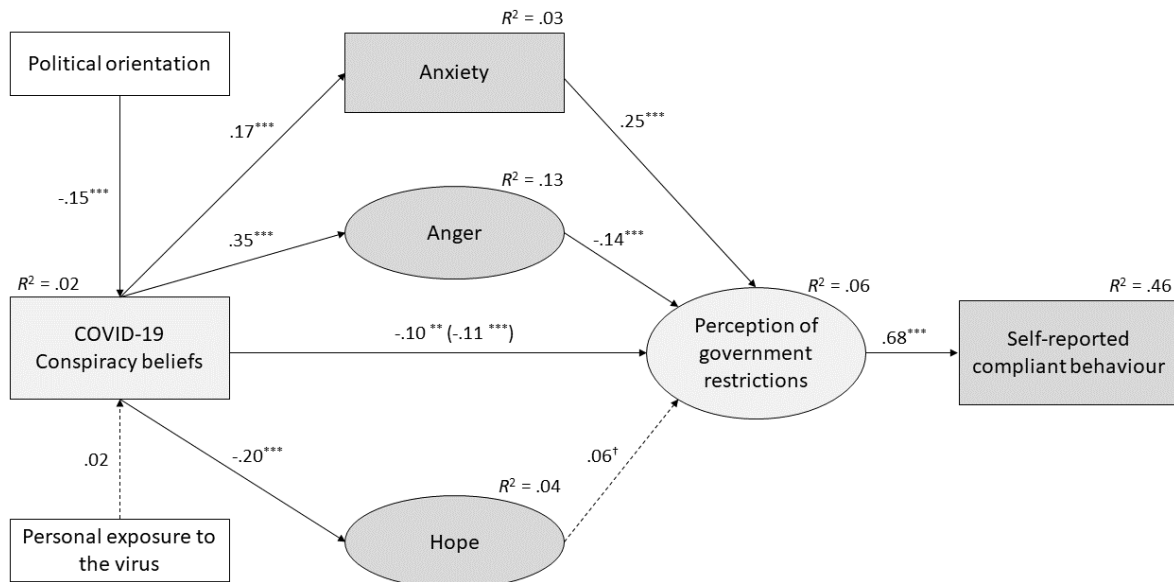
	<i>Perceived importance of governmental restrictions</i>				<i>Compliant behaviour</i>			
	<i>b (SE)</i>	<i>95% CI</i>	<i>t-test</i>	<i>p-value</i>	<i>b (SE)</i>	<i>95% CI</i>	<i>t-test</i>	<i>p-value</i>
Intercept	4.38 (.068)	[4.24, 4.51]	64.26	<.001	4.24 (.077)	[4.05, 4.39]	55.25	<.001
Age	.003 (.001)	[-.001, .006]	3.19	.001	.003 (.001)	[-.001, .007]	2.95	.003
Gender	.05 (.017)	[-.019, .086]	3.05	.002	.05 (.019)	[-.010, .086]	2.50	.012
Political orientation	-.02 (.017)	[-.051, .015]	-1.10	.27	-.01 (.019)	[-.047, .027]	-0.52	.60
Personal exposure	.02 (.017)	[-.010, .056]	1.38	.17	.02 (.019)	[-.019, .054]	0.93	.35
Conspiracy beliefs: General	.01 (.025)	[-.038, .059]	0.42	.67	.04 (.028)	[-.019, .091]	1.29	.20
Conspiracy beliefs: COVID-19	-.08 (.025)	[-.127, -.029]	-3.12	.002	-.08 (.028)	[-.136, -.026]	-2.87	.004
	$F(6, 1523) = 5.87, p < .001, R^2_{adj} = .02$				$F(6, 1523) = 3.87, p = .001, R^2_{adj} = .01$			

Emotions as Mediators of COVID-19 Conspiracy Beliefs

We then conducted a structural equation model testing the mediating role of emotions between COVID-19 conspiracy beliefs and perceived importance of restrictions, as well as the link from perceived importance to personal compliance with the restrictions. Following recommendations by Yzerbyt et al. (2018), we ran a joint-significance test to examine the component paths, then relied on a bootstrap resampling method to examine the magnitude of the indirect effect (percentile bootstrap confidence intervals). Analyses were conducted on R with the package *lavaan* (Rosseel, 2012) and used case-wise (or ‘full information’) maximum likelihood estimation, including the measurement model (i.e., definition of the latent variables) and the structural model.

As detailed in Table 3, the model supported our hypotheses, showing a significant indirect path from conspiracy beliefs to perceived importance of the restrictions through anger, anxiety, and – although not reaching the traditional threshold for statistical significance – hope (see Figure 1). The indirect effects through anger and hope were negative (i.e., conspiracy beliefs were linked to lesser perceived importance through greater anger and lesser hope), while the indirect effect through anxiety was positive (i.e., conspiracy beliefs were linked to greater perceived importance through greater anxiety). These variables explained $R^2 = .06$ of the variance of perceived importance. In turn, perceived importance of the restrictions was linked to greater personal compliant behaviour with these restrictions. The overall model showed a satisfactory fit, $\chi^2(35) = 301.56$, CFI = .940, RMSEA = .069, 90% CI [.062, .077], SRMR = .057.

Figure 1. *Structural equation model testing the relationship between COVID-19 conspiracy beliefs and perceived importance of governmental restrictions, mediated by anxiety, anger, and hope (controlling for political orientation and personal exposure to the virus).*



Notes. The measurement model is not represented in the figure, but estimates are reported in a note.^{vi} Values reported above paths are standardised estimates (β). Constructs estimated with a single item are treated as observed variables (i.e., no specified measurement error).

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

Table 3. Results of the structural equation model testing the relationship between COVID-19 conspiracy beliefs and perceived importance of governmental restrictions, mediated by anxiety, anger, and hope.

	<i>b</i> (<i>SE</i>)	95% CI	<i>z</i> -test	<i>p</i> -value	β
<i>Regressions</i>					
Conspiracy ~					
Political orientation	-.25 (.043)	[-.33, -.16]	-5.76	< .001	-.145
Personal exposure	.03 (.043)	[-.05, .12]	0.75	.456	.019
Anger ~					
Conspiracy	.20 (.016)	[.17, .23]	12.22	< .001	.354
Anxiety ~					
Conspiracy	.12 (.018)	[.09, .16]	6.84	< .001	.171
Hope ~					
Conspiracy	-.10 (.015)	[-.13, -.07]	-6.64	< .001	-.198
Perceived importance ~					
Anger	-.10 (.027)	[-.15, -.04]	-3.57	< .001	-.143
Anxiety	.14 (.018)	[.10, .17]	7.68	< .001	.249
Hope	.04 (.024)	[-.01, .09]	1.76	.078	.058
Conspiracy (direct effect)	-.04 (.011)	[-.06, -.02]	-3.45	.001	-.100
Indirect effect: Anger	-.02 (.005)	[-.03, -.01]	-3.51	< .001	-.050
Indirect effect: Anxiety	.02 (.003)	[.01, .02]	5.10	< .001	.043
Indirect effect: Hope	-.004 (.003)	[-.01, .001]	-1.68	.093	-.011
Total effect	-.05 (.010)	[-.07, -.03]	-4.44	< .001	-.119
Personal behaviour ~					
Perceived importance	.76 (.031)	[.70, .82]	24.97	< .001	.678
<i>Covariances</i>					
Anger ~ Hope	-.20 (.032)	[-.26, -.13]	-6.12	< .001	-.248
Anxiety ~ Hope	-.26 (.031)	[-.32, -.20]	-8.48	< .001	-.251
Anger ~ Anxiety	.54 (.036)	[.47, .61]	14.94	< .001	.497
Pol. orientation ~ Personal exp.	-.04 (.025)	[-.09, .01]	-1.75	.080	-.044

Discussion

This paper presented the results of a cross-sectional survey investigating the relationships between conspiracy beliefs, emotions, and compliance with COVID-19 governmental restrictions. The research provided support for the hypothesis that specific COVID-19 conspiracy beliefs predict conspiracy related attitudes and behaviours more accurately than general conspiracy beliefs, illustrating the importance of the context of these beliefs.

Furthermore, this research is one of the few to examine the psychological processes by which COVID-19 conspiracy beliefs can contribute to different behavioural outcomes by focussing on emotional states that are most relevant for engagement in social action and public health behaviour (i.e., anxiety, anger, and hope). As anticipated, COVID-19 conspiracy belief-related levels of anger were linked to lower levels of perceived importance of government restrictions, while levels of anxiety were linked to greater perceived importance. COVID-19 conspiracy beliefs were also linked to lower levels of hope, which then related to greater perceived importance of the restrictions, although this effect was much weaker than through anger and anxiety and did not reach the threshold for statistical significance. Overall, anxiety and anger had significant, opposing, indirect effects on the level of caution amongst stronger COVID-19 conspiracy believers, which in turn was associated with more or less law-abiding containment behaviour, respectively. This suggests that the behavioural correlates of conspiracy beliefs might not always be straightforward, and highlights the importance of taking into account the different emotional states that can be related to such beliefs.

Conspiracy Beliefs and Emotions

The present research might help reconcile past findings showing different effects of COVID-19 conspiracy beliefs. For example, varying levels of anxiety and anger possibly played a role for Imhoff and Lamberty's (2020) findings that hoax-beliefs predict lesser containment behaviour, whereas bio-weapon beliefs predicted greater prepping behaviour.

Similarly, anxiety might have played a role in the link between beliefs that some unidentified group is responsible for COVID-19 and support for xenophobic policies (Oleksy et al., 2021), whereas anger could have contributed to the relationship between belief in government-related theories (i.e., that the government uses the pandemic to restrict individual freedoms) and lesser compliance with government guidelines (e.g., Earnshaw et al., 2020). However, the current study does not allow to rule out that believers in the same COVID-19 conspiracy theory might have different emotional responses, or that conspiracy-related emotions draw on additional factors unrelated to theory content. More research is needed to examine whether conspiracy theory content is tied to specific emotions.

Our results also speak more broadly to the underexplored role of emotions in conspiracy beliefs and their behavioural outcomes. Given that different emotional states are linked to different behavioural tendencies (e.g., anger – confrontation, fear – avoidance), investigating the emotional correlates of different conspiracy beliefs could allow researchers to draw more nuanced conclusions as to their expected behavioural outcomes. In addition, studies that examine the role of emotions but focus either on individual states (e.g., anger predicting support for violence, Jolley & Paterson, 2020), or average a variety of emotional states into single indicators (e.g., negative emotions predicting anti-vaccination intentions, Tomljenovic et al., 2020), also risk missing potential ambiguous effects. Furthermore, a more nuanced understanding of the underlying emotional factors connecting conspiracy beliefs and a corresponding behaviour might also help tailor and improve potential intervention messages, for example aiming to address potential false beliefs *before* people are exposed to conspiracy theories (Jolley & Douglas, 2017).

Conspiracy Beliefs and Political Orientation

The results revealed small but significant correlations between conspiracy beliefs (both general and COVID-19 related) and political orientation. As it turned out, suspicion towards official health advice from the current (Conservative) UK government was stronger

amongst more politically liberal participants. This is a noteworthy finding, given the long-standing debate as to whether conspiracy theorising is inherently connected with ideological predispositions (e.g., Sutton & Douglas, 2020b). Some have shown that susceptibility to conspiracy beliefs is higher amongst conservatives (see e.g., Enders & Smallpage, 2019; van der Linden et al., 2021), and reactance to COVID-19 government restrictions is predicted by various right-wing ideology subfactors (Clarke et al., 2021). Others argue that conspiracy beliefs are strongest amongst both extreme ends of the ideological spectrum, expressed to a similar extent by extreme right- and left-wing ideologues (van Prooijen et al., 2015). Testing for this possibility, the present data showed a quadratic relationship between ideology and general conspiracy beliefs, but a linear relationship with COVID-19 conspiracy beliefs. This could reflect defiance amongst left-wing British voters towards the current Conservative government and their handling of the pandemic, and as such support the idea that conspiracy beliefs can be tied to a lack of political power (e.g., Uscinski & Parent, 2014), wherein supporters of the opposition are more likely to believe in conspiracy theories targeting the incumbent political power. Thus, intergroup processes likely play an important role in the COVID-19 pandemic, shaping relations to the authorities, social attitudes, and social fragmentation or unity (Abrams et al., 2021; Krings et al., 2021). While it is beyond the scope of this paper to discuss this link in greater detail, future research on this topic could help to better understand the relationships between ideology, COVID-19 conspiracy beliefs, and compliant behaviour.

Limitations and Future Directions

Some limitations of the present work must be noted. A first is the reliance on self-report measures, specifically to capture compliant behaviour. Social desirability bias may have led respondents to overstate their level of compliance, especially in the context of the study (during the first national lockdown) where non-compliance could reflect illegal behaviour. In addition, we specifically captured compliance with restrictions about movement

and social distancing, which may rely on the respondents' knowledge of the rules and could reflect different behaviours based on the interpretation of the rules (e.g., 'movement' between regions or between households; social distancing in public or private settings). Furthermore, our measure omits other important health measures such as hand washing or mask wearing. Future studies could investigate in greater detail what behaviours are influenced by conspiracy beliefs and differentiate between categories (e.g., normative vs non-normative behaviours; see Imhoff & Lamberty, 2020; Marinthe et al., 2020), or degrees of compliant behaviour (e.g., van Rooij et al., 2020). This could further allow researchers to draw more nuanced conclusions about the impact of (mis)information on citizen behaviour.

Second, the reliance on single item measures for key variables (conspiracy beliefs, anxiety) is not ideal. We provided some validation that the single item measure of COVID-19 conspiracy beliefs correlates in an expected manner with other relevant constructs^{iv}. In addition, average levels of COVID-19 conspiracy beliefs were similar to those observed in other studies with comparable designs (e.g., Oleksy et al., 2020). Nevertheless, it remains difficult to establish the predictive validity of single or two-item scales, and measurement models remain underidentified (Diamantopoulos et al., 2012). Future studies could ensure that constructs are assessed with reliable multi-item measures.

Third, it must be acknowledged that emotions explained only a relatively small part of the relationship between COVID-19 conspiracy beliefs and perception of governmental restrictions (i.e., a partial mediation), and had a limited direct effect on behavioural outcomes. There are most likely other mediators that further explain this relationship. Future studies could broaden the investigation of affective processes and include other emotions (e.g., guilt, shame, pride, satisfaction) and investigate whether and to what extent conspiracy beliefs boost negative and undermine positive affect. Another avenue of research could investigate other psychological mechanisms, such as the fulfillment of social motives (see Douglas et al.,

2017), further examining how distrust towards official restrictions is related to assignment of blame to (political) outgroups.

Lastly, we note that the relationship between COVID-19 conspiracy beliefs and social behaviours is undoubtedly shaped by particular social expectations relevant at the time, and thus, is extremely context-bound. Since the beginning of the pandemic in early 2020, the amount of available factual information, misinformation, levels of knowledge and personal experiences regarding COVID-19 have changed dramatically, along with the waves of impact of the virus itself. Our results reflect a snapshot of social attitudes and behaviours among UK nationals during the first national lockdown in May 2020. Different results could arise in different time and space contexts and future studies could investigate the mediating role of emotions in different countries as well as different points of the crisis, as the pandemic progresses, as circumstances change (e.g., repeated lockdowns, vaccination rollouts), and as different behaviours are expected from people.

Practical Implications

As pointed out at the start of this paper, a global pandemic is the ideal breeding ground for conspiracy beliefs (Douglas, 2021). The scale of the event, combined with the many uncertainties surrounding its origin, progression, current and future impact fed into various, often contradictory, conspiracy theories which have been widely shared. Even if the prevalence of COVID-19 conspiracy theories in the wider population remains open for debate (see e.g., McManus et al., 2020; Sutton & Douglas, 2020a), most people have been exposed to such theories one way or another (Mitchell & Oliphant, 2020; Schaeffer, 2020). It is hence important to understand better the role of such beliefs and their emotional correlates for people's behaviour as the pandemic progresses.

Like others (Allington et al., 2020; Earnshaw et al., 2020) we were able to show that belief in such theories relates to lower support for, and compliance with the restrictions deemed necessary by official authorities to control the spread of the virus. Thus, conspiracy

beliefs may further contribute to the progression of the pandemic, which highlights the importance of government efforts to contain the spread of misinformation (see also Commission for Countering Extremism, 2020). Even when conspiracy beliefs relate to more protective behaviour, they do so out of fear and suspicion, which does not seem like an adequate strategy to sustain compliance and cohesion in the longer term.

Further, we show that emotions play an important role in how (mis)information relates to attitudes, which highlights the importance of affective processes for attitudes and behaviours during the pandemic. Indeed, this has been acknowledged by other scholars. Notably, examining the impact of emotions in public messages, Trnka and Lorencova (2020) illustrated how pessimistic communication by mass media can amplify negative affect within the general public. Authorities have also expressed awareness of how emotional states can influence reaction to their own messages. The *Scientific Advisory Group for Emergencies* (SAGE), which counsels the British Government, has asserted that both positive and negative emotions are important to persuade citizens to adhere to social distancing measures. They recommended that government messages aim to simultaneously increase perceptions of threat and citizens' feelings of efficacy, so that individuals would more likely to take the virus seriously and engage in a national collective effort to stop the spread when they believe they can make a difference (Scientific Advisory Group for Emergencies, 2020). In other words, they suggest that information about the virus is more effective when it evokes anxiety and hope. The present findings suggest that the same psychological processes play a role when it comes to COVID-19 conspiracy beliefs, and corroborate the idea that increased perceptions of threat – if not too high – can be effective to increase compliant behaviour (Harper et al., 2020). Whether government messages should, where appropriate, consider addressing citizens' anger to increase compliance remains unclear, as there is no evidence yet linking (the lack of) compliant behaviour to anger in the general public (Brouard et al., 2020).

Conclusions

Overall, the present findings show that the attitudinal and behavioural correlates of conspiracy beliefs are not straightforward. These complex relationships are underpinned by specific emotional routes, emphasising the need for a more nuanced understanding of different theories and their behavioural implications. In addition, general and COVID-19 related beliefs are not associated with the same outcomes. This indicates the great variability in the consequences of having certain conspiracy beliefs and highlight the importance of being precise and specific when assessing a person's beliefs in order to adequately understand their behaviour.

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Notes

ⁱ Comparisons with the 2011 UK Census data showed the sample was representative in terms of gender quotas. Age-wise, the youngest category (18-24) was underrepresented (2.5% of the sample versus 11.9% of the general adult population), while older adults (55-64 and 65-74) were overrepresented (25.4% versus 14.9%, and 29.0% versus 11.0%, respectively). Other age categories were adequately represented. Although not included as a quota, ethnicity was also fairly represented in the sample with 96.9% of White/White British respondents (corresponding to the Census reports of 96.0% White ethnicity in Scotland, 95.6% in Wales, and 93.7% in Kent).

ⁱⁱ Specifically, we aimed to recruit $n = 500$ participants in each of the three regions surveyed, i.e., $N = 1,500$. Participants who failed to answer correctly to an attention check, and participants who completed the questionnaire in too short a time, were excluded from the sample. Exclusions were handled by our partner Qualtrics Panel who determined the criteria for "too quick answers" based on the times distribution of the first dozens of participants. Exclusions were made on a rolling basis so that the final sample size matched the expected minimum of 1,500. Preregistrations for the three regions are accessible at: <https://aspredicted.org/blind.php?x=xy7bv7> (first region), <https://aspredicted.org/blind.php?x=uz5g9v> (second region), and <https://aspredicted.org/blind.php?x=ic9xh7> (third region).

ⁱⁱⁱ Personal exposure to COVID-19 was considered as the sum score of three indicators: whether the participant had personally contracted the virus, whether someone close to them had contracted the virus, and whether they had personally been seriously affected by COVID-19 (0 = No, 1 = Not sure, 2 = Yes) – resulting in a summed score ranging 0 to 6 ($M = 1.31$, $SD = 1.45$).

^{iv} It was beyond the scope of the present paper to formally validate the items used to measure conspiracy beliefs, as the first item was drawn verbatim from previous research and the second was built on the exact same sentence structure. However, we are able to present some convergent evidence that the two conspiracy beliefs items behave as in previous research. Specifically, we investigated correlations with a measure of general trust as Lantian and colleagues (2016) did. We similarly found a significant negative correlation with trust,

respectively with general conspiracy beliefs, $r(1544) = -.16, p < .001$, with COVID-19 conspiracy beliefs, $r(1544) = -.21, p < .001$ (Lantian found a correlation of $r = -.27$). We also tested correlations with perceived socio-political control, as Bruder et al. (2013) found a negative relation between control and conspiracy beliefs ($r = -.22$). In the present data we similarly observed negative correlations between socio-political control and both general, $r(1544) = -.33, p < .001$, and COVID-19, $r(1544) = -.32, p < .001$, conspiracy beliefs. Hence, we are confident the single-item measures can be considered reliable indicators of conspiracy beliefs.

^v Although not the central purpose of the present paper, we additionally explored the relationships between political orientation and conspiracy beliefs. Previous work has both argued that conspiracy beliefs are more common amongst Conservatives who hold a more ‘paranoid’ style of thinking, and that conspiracy beliefs are more common amongst the extreme ends of the political spectrum, both right- and left-wing. We hence tested for both linear and quadratic relations between political orientation and conspiracy beliefs. For general conspiracy beliefs, results showed both a linear, $b = -.18, SE = .041, t(1537) = -4.47, p < .001$, and quadratic effect of political orientation, $b = .06, SE = .029, t(1537) = 2.21, p = .027$, supporting the idea of greater conspiracy beliefs amongst the extremes. For COVID-19 conspiracy beliefs, however, only the linear effect was significant, $b = -.25, SE = .044, t(1537) = -5.69, p < .001$, indicating stronger beliefs amongst the more *left-wing* oriented (quadratic effect: $b = .01, SE = .031, t(1537) = 0.23, p = .82$).

^{vi} All items loaded significantly on their theoretical latent variables. Specifically, for anger: “angry”, $b = 1.00, \beta = .79$, “resentful”, $b = 1.05, SE = .047, z = 22.45, p < .001, \beta = .83$; for hope: “hopeful”, $b = 1.00, \beta = .80$, “confident”: $b = .95, SE = .087, z = 10.96, p < .001, \beta = .79$. For perceived importance of restrictions, “importance for self”: $b = 1.00, \beta = .93$, “importance for everyone”: $b = .79, SE = .031, z = 25.64, p < .001, \beta = .71$.