

Original Article

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Coronavirus conspiracy beliefs, mistrust, and compliance with government guidelines in England

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Abstract

Background. An invisible threat has visibly altered the world. Governments and key institutions have had to implement decisive responses to the danger posed by the coronavirus pandemic. Imposed change will increase the likelihood that alternative explanations take hold. In a proportion of the general population there may be strong scepticism, fear of being misled, and false conspiracy theories. Our objectives were to estimate the prevalence of conspiracy thinking about the pandemic and test associations with reduced adherence to government guidelines.

Methods. A non-probability online survey with 2501 adults in England, quota sampled to match the population for age, gender, income, and region.

Results. Approximately 50% of this population showed little evidence of conspiracy thinking, 25% showed a degree of endorsement, 15% showed a consistent pattern of endorsement, and 10% had very high levels of endorsement. Higher levels of coronavirus conspiracy thinking were associated with less adherence to all government guidelines and less willingness to take diagnostic or antibody tests or to be vaccinated. Such ideas were also associated with paranoia, general vaccination conspiracy beliefs, climate change conspiracy belief, a conspiracy mentality, and distrust in institutions and professions. Holding coronavirus conspiracy beliefs was also associated with being more likely to share opinions.

Conclusions. In England there is appreciable endorsement of conspiracy beliefs about coronavirus. Such ideas do not appear confined to the fringes. The conspiracy beliefs connect to other forms of mistrust and are associated with less compliance with government guidelines and greater unwillingness to take up future tests and treatment.

Introduction

In times of national crisis, individual differences in explanatory beliefs may affect the degree of adherence to necessary collective responses. Accurate beliefs foster helpful behaviours; erroneous beliefs foster unhelpful behaviours. In the current coronavirus pandemic, we focus on the potential influence of false conspiracy theories (Sunstein & Vermeule, 2009) on the English population's response. Conspiracy theories typically have four common characteristics (Freeman & Bentall, 2017): the world or an event is held to be not as it seems; there is believed to be a cover-up by powerful others; the theory is accepted only by a minority; and the theory is unsupported by evidence. There are likely to be varying degrees of such mistrust, from excessive scepticism to detailed ideas concerning perpetrators, motivations, and *modi operandi*. This mistrust can be conceptualised as a conspiracy mentality (Brotherton, French, & Pickering, 2013; Goertzel, 1994; Imhoff & Bruder, 2014): a way of seeing the world that is marked by antipathy to official or mainstream accounts or to those in higher status positions. This conspiracy mind-set can be seen in evidence that holding one conspiracy belief raises the likelihood of unrelated conspiracy beliefs (Swami, Chamorro-Premuzic, & Furnham, 2010) and that individuals can simultaneously endorse mutually incompatible conspiracy beliefs (Wood, Douglas, & Sutton, 2012). Conspiracy beliefs are unlikely to be benign. For instance, parental belief in anti-vaccine conspiracy theories is associated with lower intent to vaccinate a child (Jolley & Douglas, 2014), while such theories are cited by parents who do not vaccinate their children (Attwell, Leask, Meyer, Rokkas, & Ward, 2017; Luthy, Beckstrand, Callister, & Cahoon, 2012). In our view multiple features of the current pandemic make conspiracy beliefs likely to develop and propagate. Such erroneous beliefs will weaken collective actions necessary to minimise harm to the population.

Our perspective on conspiracy beliefs is rooted in the psychology of mistrust. Conspiracy theories are attempts to explain world events that are threatening or inconsistent with

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personal expectations. The acceptance of conspiracy explanations is much more likely when an individual tends to mistrust. A mistrusting mind-set – a defensive response of wariness – will occur when there is perceived vulnerability and a sense of assault. Perceptions of vulnerability and attack can be linked to low self-esteem, poorer psychological well-being, powerlessness, and anger. Mistrust of authority or higher status groups is more likely when there is a perception of (real or subjective) social marginalisation. When emotion is heightened by perceived danger, individuals are likely to accept the explanations, however unlikely, that conform to preconceptions. The more cognitively taxing process of carefully weighing up the evidence for and against different explanations is unlikely to be adopted. Conspiracy beliefs are likely to bring short-term benefits, such as a reduction in uncertainty and increase in control; access (often online) to like-minded people; and a sense of having privileged information. It has been argued that the benefits can be categorised as epistemic (e.g. understanding), existential (e.g. control), and social (e.g. positive self-image) (Douglas *et al.*, 2019). Conspiracy beliefs and paranoia are associated (Goreis & Voracek, 2019) but the shared nature of conspiracy beliefs is most likely less unhealthy in comparison to paranoia, in which the individual alone is the target. Empirical evidence has linked conspiracy beliefs to perceptions of threat from societal change (Federico, Williams, & Vitriol, 2018), uncertainty (van Prooijen & Jostmann, 2013), powerlessness (Abalakina-Paap, Stephan, Craig, & Gregory, 1999), lack of socio-political control (Bruder, Haffke, Neave, Nouripannah, & Imhoff, 2013), perceptions of lower social status (Freeman & Bentall, 2017), less analytic thinking (Swami, Voracek, Stieger, Tran, & Furnham, 2014), lower levels of education and income (Douglas, Sutton, Callan, Dawtry, & Harvey, 2016; Freeman & Bentall, 2017), and being a member of a disadvantaged social group (Davis, Wetherell, & Henry, 2018). Political extremes (left or right) are most associated with the endorsement of conspiracy beliefs (Krouwel, Kutiyski, van Prooijen, Martinsson, & Markstedt, 2017; van Prooijen, Krouwel, & Pollet, 2015).

The coronavirus pandemic and associated countermeasures have created conditions in which conspiracy beliefs are likely to develop. Such conditions include the sense of vulnerability triggered by the sustained threat to physical health, psychological well-being, and financial security. Uncertainty about the future is widespread. Expectations about everyday life have changed rapidly and dramatically, with top-down imposition of explanations and required responses, enforceable by law. Normal routines and plans have been thwarted. The effects of the countermeasures are likely to have been greatest in those in lower socio-economic circumstances. There is much talk of medical tests and vaccinations, while many individuals have greater time to themselves, in isolation, and with the Internet to hand. We hypothesise that: a significant minority of the population hold excessively sceptical views, including clear false conspiracy beliefs, of official explanations of the coronavirus pandemic; these ideas connect with pre-existing conspiracy theories, especially about vaccinations; and conspiracy ideas are associated with less compliance with government guidance such as social distancing and less willingness to take up future tests and vaccinations. We would expect conspiracy beliefs to be more likely to be held by those who are more marginalised, reflected by lower levels of psychological well-being, education, and income. We also took the opportunity to survey individuals' appraisals of positive outcomes in the response to the pandemic.

Methods

Participants

An online survey with a quota sampled participant group was conducted by Lucid (<https://lucid.id/>) from 4th May 2020 to the 11th May 2020. The quotas used were based upon UK Office for National Statistics (ONS) population estimate data. The quotas were for gender (males = 49.35%, females = 50.65%), age (<18 = 21.30%, 18–24 = 9.4%, 25–34 = 13.4%, 35–44 = 14.00%, 45–54 = 13.7%, 55–64 = 11.70%, 65–99 = 16.50%), region (South East = 16.33%, North West = 13.04%, East = 11.09%, West Midlands = 10.55%, South West = 9.94%, East Midlands = 8.58%, North East = 4.76%, London = 15.92%, Yorkshire and the Humber = 9.79%), and income (<£ 15 000 = 17.06%, 15 000–19 999 = 9.11%, 20 000–29 999 = 18.63%, 30 000–39 999 = 15.32%, 40 000–49 999 = 11.81%, 50 000–59 999 = 7.51%, 60 000–69 999 = 5.58%, 70 000–99 999 = 8.58%, 100 000–149 000 = 4.15%, 150 000+ = 2.25%). Lucid's platform serves as a centralised source for survey responses, working with over 250 survey suppliers, all of whom adhere to the ESOMAR Guidelines (<https://www.esomar.org/what-we-do/code-guidelines>). Lucid operates a marketplace in which they advertise the survey to suppliers, who provide individual participants, with sampling by Lucid from this pool. The advantage of using multiple survey sources is substantially less reliant on any particular demographic or segment of the population. Respondents will have been sourced from: ads and promotions across digital networks, search, word of mouth and membership referrals, social networks, online and mobile games, affiliate marketing, banner ads, offerwalls, TV and radio ads, and off-line recruitment with mail campaigns. Participants have opted in to being a panel member for the supplier as well as providing informed consent to this particular survey. Individuals are not included if they have responded to all questions in the same way or have a completion time that is less than one-third of the median.

The Oxford Coronavirus Explanations, Attitudes, and Narratives Survey (OCEANS) was approved by the University of Oxford Central University Research Ethics Committee (R 69510/RE001) and all participants provided informed consent. Participants were given the following rationale for OCEANS: 'Coronavirus has been a shock and lives have changed dramatically. At times of crisis, people may think of lots of different explanations for what is occurring. We are interested in how common different views may be and how they influence responses to the crisis. It may inform the extent to which people follow current lockdown guidance and take-up future treatments... A wide-range of views are asked – some have a lot of evidence supporting them, others have no evidence supporting them. You may agree or disagree with explanations provided'.

Assessments

We collected demographic data, information on how the pandemic had affected each participant, and where they obtained information about the virus. On seven-point scales, participants rated religiosity (0 = not all religious, 6 = strongly religious) and political viewpoint (0 = strongly left wing, 6 = strongly right wing). They were also asked how they viewed the importance of voting in general elections.

Conspiracy mentality questionnaire (CMQ) (Bruder *et al.*, 2013)

This five-item scale assesses a non-content specific tendency to see secretive forces behind events (e.g. 'there are secret organizations that greatly influence political decisions'). Each item is rated

Table 1. Demographic information

	Mean (s.d.)/n (%)
Age (years)	46.6 (17.3)
Gender: male; female; other	1213; 1285; 3
Ethnicity:	
White	
English/Welsh/Scottish/Northern Irish/British	2009 (80.3)
Irish	24 (1.0)
Gypsy or Irish Traveller	10 (0.4)
Any other White background	117 (4.7)
Mixed/Multiple ethnic groups	
White and Black Caribbean	11 (0.4)
White and Black African	16 (0.6)
White and Asian	24 (1.0)
Any other Mixed/Multiple ethnic background	34 (1.4)
Asian/Asian British	
Indian	51 (2.0)
Pakistani	37 (1.5)
Bangladeshi	16 (0.6)
Chinese	35 (1.4)
Any other Asian background	30 (1.2)
Black/African/Caribbean/Black British	
African	40 (1.6)
Caribbean	25 (1.0)
Any other Black/African/Caribbean background	5 (0.2)
Other ethnic group	
Arab	11 (0.4)
Any other ethnic group	6 (0.2)
Marital status	
Single	712 (28.5)
Cohabiting	327 (13.1)
Married or civil partnership	1157 (46.3)
Divorced or separated	207 (8.3)
Widowed	98 (3.9)
Highest level of education	
No qualifications	119 (4.8)
GCSEs grades A*–C (or equivalent)	619 (24.8)
AS levels (or equivalent)	98 (3.9)
A levels (or equivalent)	599 (24.0)
Certificate of higher education (e.g. BA, BSc, or equivalent)	763 (30.5)
Post-graduate qualifications (e.g. MA, MSc, PhD, DPhil)	303 (12.1)
Total household income	
Less than £ 15 000	428 (17.1)

(Continued)

Table 1. (Continued.)

	Mean (s.d.)/n (%)
£ 15 000–£ 19 999	237 (9.5)
£ 20 000–£ 29 999	481 (19.2)
£ 30 000–£ 39 999	393 (15.7)
£ 40 000–£ 49 999	307 (12.3)
£ 50 000–£ 59 999	195 (7.8)
£ 60 000–£ 69 999	137 (5.5)
£ 70 000–£ 99 999	203 (8.1)
£ 100 000–£ 149 999	81 (3.2)
£ 150 000 and above	39 (1.6)
Housing situation	
Rented from council	377 (15.1)
Rented from private landlord	561 (22.4)
Homeowner	1460 (58.4)
Other	103 (4.1)
Living situation	
Living alone (no children)	522 (20.9)
Living alone with children	174 (7.0)
Living with husband/wife (no children)	545 (21.8)
Living with husband/wife with children	472 (18.9)
Living together as a couple	260 (10.4)
Living together as a couple (with children)	190 (7.6)
Living with parents	236 (9.4)
Living with other relatives	46 (1.8)
Living with others	56 (2.2)
Region	
South East	421 (16.8)
North West	331 (13.2)
East	252 (10.1)
West Midlands	262 (10.5)
South West	250 (10.0)
East Midlands	218 (8.7)
North East	115 (4.6)
London	411 (16.4)
Yorkshire and the Humber	241 (9.6)
Pre-coronavirus employment status	
Unemployed	203 (8.1)
Employed full-time	1043 (41.7)
Employed part-time	349 (14.0)
Self-employed	186 (7.4)
Retired	510 (20.4)
Student	90 (3.6)
Housewife/husband	120 (4.8)

(Continued)

Table 1. (Continued.)

	Mean (s.d.)/n (%)
<i>Employment change due to coronavirus</i>	
None	1135 (45.4)
None, but working from a different location (e.g. work from home)	373 (14.9)
Working hours have reduced	295 (11.8)
Working hours have increased	83 (3.3)
Furlough	468 (18.7)
Newly unemployed	118 (4.7)
Newly employed (full-time)	17 (0.7)
Newly employed (part-time)	12 (0.5)
<i>Had COVID-19</i>	
Yes	98 (3.9)
No	2165 (86.6)
Maybe	238 (9.5)
<i>High risk for severe COVID-19 course</i>	
Not high risk	1681 (67.2)
High risk	658 (26.3)
Very high risk	162 (6.5)

on an 11-point scale from 0% (certainly not) to 100% (certain) scale. Higher scores indicate a greater degree of conspiracy mentality. Cronbach's α in the current study was 0.88.

Coronavirus conspiracy explanations

We asked participants to rate the extent to which they agreed with 48 conspiracy statements. Each item is rated on a five-point scale: do not agree (1), agree a little (2), agree moderately (3), agree a lot (4), agree completely (5). A higher score indicates greater endorsement of a statement. The list of statements comprised: scepticism about the government's response ($n = 3$) (e.g. 'I'm sceptical about the official explanation about the cause of the virus'), general conspiracy views on the cause of the virus ($n = 3$) (e.g. 'The virus is a hoax'), general conspiracy views about the spread of the virus ($n = 7$) (e.g. 'The spread of the virus is a deliberate attempt to reduce the size of the global population'), general conspiracy views about the reasons for lockdown ($n = 5$) (e.g. 'The real reason for the lockdown is to impose mass surveillance'), and then specific conspiracy beliefs ($n = 30$) (e.g. 'The elite have created the virus in order to establish a one-world government'). The statements were generated from searching the internet in the preceding weeks of the lockdown, looking at both mainstream and alternative sites, which produced an initial list of 99 conspiracy statements. The selection of items tried to balance out possibly opposing political and religious views on causes and motivations. We also assessed agreement with four official explanations (e.g. 'The virus is most likely to have originated from bats').

Following of UK government coronavirus guidance

Participants were asked to rate how often they followed six key aspects of government guidance on a five-point scale (not at all, occasionally, some of the time, most of the time, all of the

time). Higher scores indicate greater levels of following the guidance. Participants were also asked to rate on the same scale two general items assessing how much they follow the guidance now and how much they will in the future.

Future medical tests and treatment

Participants were asked to rate on a five-point scale (definitely, probably, possibly, probably not, definitely not) how likely it was that they would accept diagnostic tests and vaccination for coronavirus, and whether they would wear a facemask outside if advised. Higher scores indicate lower potential engagement.

Sharing coronavirus information

Participants were asked two questions concerning the degree to which they shared with other information or opinions about the coronavirus. Each was rated on a five-point scale (not at all, occasionally, some of the time, most of the time, all of the time). Higher scores indicate greater sharing.

Vaccine conspiracy beliefs scale (Shapiro, Holding, Perez, Amsel, & Rosberger, 2016)

This seven-item questionnaire asks participants how much they agree on a seven-point scale (strongly disagree, disagree, somewhat disagree, neutral, somewhat agree, agree, strongly agree) with vaccine conspiracy statements (e.g. 'Vaccine safety data is often fabricated'). Higher scores indicate greater endorsement of vaccine conspiracy statements. Cronbach's α in the current study was 0.95.

Climate change conspiracy belief (Bolsen & Druckman, 2018)

Participants were asked to rate on a seven-point scale (strongly disagree, disagree, somewhat disagree, neither agree nor disagree, somewhat agree, agree) how much they agreed with the statement 'The idea that climate change is primarily due to human activities is a hoax or a conspiracy'. Higher scores indicate greater belief in the conspiracy.

Trust barometer (Edelman, 2020)

Items were constructed, based on the barometer, to assess levels of trust in a number of institutions and professions. Each item is rated on a five-point scale (1 never trust, 2 rarely trust, 3 sometimes trust, 4 often trust, 5 always trust).

Revised Green et al. paranoid thoughts scale – part B (R-GPTS) (Freeman et al., 2019)

This 10-item questionnaire assesses persecutory ideation over the past fortnight. Each item (e.g. 'Certain individuals have had it in for me') is rated on a 0 (not at all) to 4 (totally) scale. Higher scores indicate higher levels of paranoia. Cronbach's α in the current study was 0.97.

Warwick–Edinburgh mental well-being scale (WEMWBS) (Tennant et al., 2007)

The WEMWBS is a 14-item scale assessing psychological well-being over the past fortnight. Each item (e.g. 'I've been feeling optimistic about the future') is rated on a 1 (none of the time) to 5 (all of the time) scale. Higher scores indicate a greater level of well-being. Cronbach's α in the current study was 0.93.

Positive experiences of the pandemic

At the end of the survey participants were asked to rate on a five-point scale (do not agree, agree a little, agree moderately, agree a

Table 2. Endorsement of general and specific coronavirus conspiracy beliefs and official explanations

Statements	Do not agree		Agree a little		Agree moderately		Agree a lot		Agree completely	
	<i>n</i>	% 95% CI	<i>n</i>	% 95% CI	<i>n</i>	% 95% CI	<i>n</i>	% 95% CI	<i>n</i>	% 95% CI
<i>Scepticism</i>										
The government is misleading the public about the cause of the virus.	1024	40.9 39.0–42.9	496	19.8 18.2–21.4	506	20.2 18.7–21.6	264	10.6 9.4–11.8	211	8.4 7.4–9.6
I'm sceptical about the official explanation about the cause of the virus.	642	25.7 24.1–27.4	624	25.0 23.3–26.6	528	21.1 19.6–22.7	399	16.0 14.4–17.4	308	12.3 11.1–13.6
I don't trust the information about the virus from scientific experts.	1091	43.6 41.7–45.7	505	20.2 18.6–21.7	470	18.8 17.2–20.3	259	10.4 9.2–11.5	176	7.0 6.1–8.2
<i>Conspiracy cause of the virus</i>										
The virus is a hoax.	1977	79.0 77.5–80.7	179	7.2 6.2–8.1	202	8.1 7.0–9.1	88	3.5 2.8–4.2	55	2.2 1.6–2.7
The virus is manmade.	944	37.7 35.9–39.7	596	23.8 22.2–25.6	416	16.6 15.1–18.2	312	12.5 11.2–13.8	233	9.3 8.2–10.5
The virus is produced by powerful organisations (e.g. government, military).	1278	51.1 49.2–53.1	471	18.8 17.2–20.5	348	13.9 12.6–15.3	242	9.7 8.6–11.0	162	6.5 5.5–7.5
<i>The spread of the virus is a deliberate attempt</i>										
To reduce the size of the global population.	1441	57.6 55.7–59.5	398	15.9 14.5–17.4	310	12.4 11.1–13.8	192	7.7 6.7–8.7	160	6.4 5.4–7.4
By governments to gain political control.	1460	58.4 56.6–60.4	360	14.4 13.0–15.9	305	12.2 10.9–13.6	237	9.5 8.3–10.6	139	5.6 4.7–6.5
By a group of powerful people to make money.	1528	61.1 59.3–63.0	337	13.5 12.2–14.9	279	11.2 9.9–12.4	222	8.9 7.8–10.0	135	5.4 4.5–6.4
By a group of powerful people to gain control.	1457	58.3 56.4–60.1	384	15.4 13.9–16.8	279	11.2 9.8–12.3	231	9.2 8.1–10.4	150	6.0 5.1–7.0
By one nation to destabilise another.	1336	53.4 51.6–55.4	476	19.0 17.4–20.6	302	12.1 10.8–13.4	229	9.2 8.0–10.2	158	6.3 5.3–7.3
By global companies to take control.	1610	64.4 62.5–66.2	329	13.2 11.8–14.5	260	10.4 9.2–11.6	176	7.0 6.0–8.0	126	5.0 4.2–5.8
By activists to stop climate change.	1866	74.6 73.1–76.3	211	8.4 7.3–9.5	201	8.0 7.0–9.1	138	5.5 4.6–6.4	85	3.4 2.7–4.1
<i>Conspiracy reasons for lockdown</i>										
Stop immigration.	1897	75.8 74.2–77.5	220	8.8 7.6–9.9	200	8.0 6.9–9.1	109	4.4 3.6–5.2	75	3.0 2.4–3.7
Control every aspect of our lives.	1527	61.1 59.1–62.9	378	15.1 13.8–16.6	250	10.0 8.9–11.1	212	8.5 7.4–9.6	134	5.4 4.5–6.2
Impose mass surveillance.	1557	62.3 60.5–64.1	351	14.0 12.6–15.4	261	10.4 9.2–11.7	203	8.1 7.0–9.2	129	5.2 4.3–6.0

(Continued)

Table 2. (Continued.)

Statements	Do not agree		Agree a little		Agree moderately		Agree a lot		Agree completely	
	<i>n</i>	% 95% CI	<i>n</i>	% 95% CI	<i>n</i>	% 95% CI	<i>n</i>	% 95% CI	<i>n</i>	% 95% CI
Destabilise the nation for political gain.	1686	67.4 65.7–69.3	273	10.9 9.6–12.2	246	9.8 8.7–11.0	184	7.4 6.4–8.4	112	4.5 3.7–5.3
Destabilise the economy for financial gain.	1671	66.8 65.0–68.7	291	11.6 10.4–13.0	241	9.6 8.4–10.8	189	7.6 6.5–8.6	109	4.4 3.6–5.2
<i>Specific conspiracy beliefs</i>										
Coronavirus is a bioweapon developed by China to destroy the West.	1366	54.6 52.7–56.5	505	20.2 18.6–21.7	292	11.7 10.5–13.1	201	8.0 7.0–9.2	137	5.5 4.6–6.4
The virus is a biological weapon manufactured by the United States.	1792	71.7 69.9–73.3	267	10.7 9.5–11.9	229	9.2 8.0–10.3	136	5.4 4.6–6.3	77	3.1 2.4–3.8
The virus is a scaremongering tactic to prevent Brexit.	1942	77.6 76.2–79.2	173	6.9 5.9–7.9	196	7.8 6.8–8.9	132	5.3 4.5–6.2	58	2.3 1.7–2.9
Coronavirus is being used by the elite to stop Brexit.	1898	75.9 74.3–77.4	190	7.6 6.6–8.8	208	8.3 7.3–9.3	138	5.5 4.6–6.4	67	2.7 2.1–3.3
The UN and WHO have manufactured the virus to take global control.	1895	75.8 74.1–77.4	217	8.7 7.6–9.7	214	8.6 7.5–9.7	101	4.0 3.3–4.8	74	3.0 2.3–3.7
Jews have created the virus to collapse the economy for financial gain.	2022	80.8 79.3–82.3	133	5.3 4.4–6.2	170	6.8 5.8–7.7	116	4.6 3.8–5.5	60	2.4 1.8–3.0
Muslims are spreading the virus as an attack on Western values.	2004	80.1 78.7–81.6	148	5.9 5.0–6.9	176	7.0 6.0–8.0	114	4.6 3.8–5.4	59	2.4 1.8–3.0
The elite have created the virus in order to establish a one-world government.	1859	74.3 72.6–76.0	207	8.3 7.2–9.4	206	8.2 7.2–9.3	146	5.8 5.0–6.8	83	3.3 2.7–4.0
Bill Gates has created the virus in order to reduce the world population.	1976	79.0 77.3–80.5	159	6.4 5.5–7.4	164	6.6 5.6–7.6	127	5.1 4.3–6.0	75	3.0 2.4–3.7
Big Pharma created coronavirus to profit from the vaccines.	1885	75.4 73.7–76.9	194	7.8 6.8–8.8	221	8.8 7.8–9.9	132	5.3 4.4–6.2	69	2.8 2.2–3.5
Coronavirus is being used by the government to implement a police state.	1789	71.5 69.8–73.3	279	11.2 10.0–12.3	215	8.6 7.5–9.7	137	5.5 4.6–6.4	81	3.2 2.6–3.9
Coronavirus is caused by 5 G and is a form of radiation poisoning transmitted through radio waves.	1968	78.7 77.1–80.2	188	7.5 6.5–8.6	188	7.5 6.5–8.6	111	4.4 3.6–5.3	46	1.8 1.4–2.4
Coronavirus is an alien weapon to destroy humanity.	1976	79.0 77.5–80.6	167	6.7 6.1–8.0	176	7.0 6.1–8.0	119	4.8 3.9–5.7	63	2.5 1.69–3.2
The virus is a smokescreen for a global conspiracy that swapped the real world with a simulation.	1956	78.2 76.6–79.8	186	7.4 6.4–8.5	190	7.6 6.6–8.8	111	4.4 3.7–5.3	58	2.3 1.8–2.9
The virus is a front to implement measures to destroy our privacy.	1813	72.5 70.7–74.2	235	9.4 8.3–10.5	205	8.2 7.2–9.3	152	6.1 5.2–7.1	96	3.8 3.0–4.6
Companies are being deliberately put out of business to hide the effects of Brexit.	1880	75.2 73.6–76.8	230	9.2 8.1–10.5	203	8.1 7.1–9.1	118	4.7 3.9–5.5	70	2.8 2.2–3.4

Lockdown is a way to terrify, isolate, and demoralise a society as a whole in order to reshape society to fit specific interests.	1750	70.0 68.3–71.7	313	12.5 11.2–13.8	208	8.3 7.3–9.4	140	5.6 4.6–6.6	90	3.6 2.9–4.4
Coronavirus is a plot by globalists to destroy religion by banning gatherings.	1956	78.2 76.6–79.8	160	6.4 5.4–7.4	189	7.6 6.6–8.6	132	5.3 4.4–6.2	64	2.6 2.0–3.2
The intention of lockdown is to force people to rely on big corporations rather than their local businesses.	1846	73.8 72.1–75.4	242	9.7 8.5–10.9	208	8.3 7.2–9.4	126	5.0 4.2–6.0	79	3.2 2.5–3.8
Lockdown is a plot by environmental activists to control the rest of us.	1951	78.0 76.4–79.6	156	6.2 5.3–7.2	189	7.6 6.6–8.6	136	5.4 4.6–6.4	69	2.8 2.2–3.4
The coronavirus vaccine will contain microchips to control the people.	1898	75.9 74.63–77.6	182	7.3 6.3–8.3	199	8.0 7.0–8.9	135	5.4 4.6–6.3	87	3.5 2.8–4.2
Coronavirus was created to force everyone to get vaccinated.	1857	74.3 72.6–75.9	195	7.8 6.8–9.0	201	8.0 7.0–9.2	154	6.2 5.3–7.1	94	3.8 3.0–4.5
The vaccine will be used to carry out mass sterilisation.	1906	76.2 74.6–77.8	173	6.9 5.9–7.9	192	7.7 6.8–8.8	148	5.9 5.0–6.8	82	3.3 2.6–4.0
The coronavirus is bait to scare the whole globe into accepting a vaccine that will introduce the 'real' deadly virus.	1956	78.2 76.6–79.7	182	7.3 6.3–8.3	173	6.9 6.0–7.9	122	4.9 4.0–5.7	68	2.7 2.1–3.4
The WHO already has a vaccine and are withholding it.	1773	70.9 69.2–72.6	265	10.6 9.4–11.8	233	9.3 8.2–10.5	135	5.4 4.5–6.3	95	3.8 3.1–4.6
Antibody testing is a plot to harvest our DNA.	1852	74.1 72.5–75.8	208	8.3 7.2–9.4	198	7.9 6.9–9.0	159	6.4 5.5–7.3	84	3.4 2.6–4.1
Celebrities are being paid to say they have coronavirus.	1864	74.5 72.8–76.3	213	8.5 7.4–9.6	198	7.9 6.9–9.0	140	5.6 4.7–6.4	86	3.4 2.8–4.2
Politicians (e.g. Boris Johnson) have faked having coronavirus.	1837	73.5 71.7–75.0	230	9.2 8.0–10.3	203	8.1 7.0–9.2	142	5.7 4.8–6.6	89	3.6 2.9–4.3
The mainstream media is deliberately feeding us misinformation about the virus and lockdown.	1394	55.7 53.7–57.7	517	20.7 19.2–22.3	275	11.0 9.8–12.3	183	7.3 6.4–8.3	132	5.3 4.5–6.2
Coronavirus cannot be passed from person to person, you can only get it if someone deliberately infects you with it (e.g. being injected or poisoned).	2012	80.4 78.9–82.0	174	7.0 6.0–8.0	145	5.8 4.9–6.7	112	4.5 3.7–5.3	58	2.3 1.8–3.0
<i>Official explanations</i>										
Social distancing reduces the likelihood of spreading the virus from person to person.	59	2.4 1.8–3.0	250	10.0 8.8–11.2	280	11.2 10.0–12.4	587	23.5 21.9–25.2	1325	53.0 51.1–55.1
The virus is most likely to have originated from bats.	483	19.3 17.7–21.0	478	19.1 17.6–20.7	714	28.5 26.8–30.4	532	21.3 19.7–22.9	294	11.8 10.4–13.0
The virus is most likely to have started at a wet market (marketplace selling fresh meat, fish, produce, and other perishable goods) in China.	338	13.5 12.2–15.0	517	20.7 19.0–22.3	631	25.2 23.4–26.9	622	24.9 23.2–17.2	393	15.7 14.2–17.2
The virus is naturally occurring.	557	22.3 20.6–23.9	587	23.5 21.7–25.2	511	20.4 19.0–22.0	507	20.3 18.7–22.0	339	13.6 12.1–15.0

Table 3. Following of government coronavirus guidance and willingness to accept future diagnostics and vaccination

Statements	Not at all		Occasionally		Some of the time		Most of the time		All of the time	
	<i>n</i>	% 95% CI	<i>n</i>	% 95% CI	<i>n</i>	% 95% CI	<i>n</i>	% 95% CI	<i>n</i>	% 95% CI
Overall following government guidance										
Overall how much do you follow guidance from the government about coronavirus?	11	0.4 0.2–0.7	34	1.4 0.9–1.8	194	7.8 6.7–8.8	984	39.3 37.5–41.2	1278	51.1 49.3–53.1
How much will you follow future guidance from the government about coronavirus?	15	0.6 0.3–0.9	56	2.2 1.7–2.8	253	10.1 8.9–11.4	1005	40.2 38.2–42.1	1172	46.9 44.9–48.8
<i>Following government guidelines</i>	Not at all		Occasionally		Some of the time		Most of the time		All of the time	
Staying home and only leaving your house for essential journeys	69	2.8 2.1–3.4	151	6 5.0–7.0	208	8.3 7.2–9.4	575	23 32.4–24.6	1498	59.9 58.0–61.9
Not meeting with people outside your household even friends and family	98	3.9 3.2–4.6	112	4.5 3.7–5.3	157	6.3 5.4–7.2	425	17 15.5–18.5	1709	68.3 66.6–70.1
No more than one form of exercise a day outside, alone or with members of your household	91	3.6 2.9–4.4	119	4.8 4.0–5.6	234	9.4 8.2–10.5	417	16.7 15.2–18.2	1640	65.6 63.7–67.5
If you do go out staying 2 m apart from other people at all times	46	1.8 1.3–2.4	89	3.6 2.9–4.3	177	7.1 6.2–8.1	544	21.8 20–23.3	1645	65.8 64–67.7
Wash your hands with soap and water often for at least 20 s	36	1.4 1–2	119	4.8 3.9–5.6	254	10.2 8.49–11.3	484	19.4 17.8–21.0	1608	64.3 62.5–66.3
Not going to work unless you absolutely have to	130	5.2 4.3–6.2	77	3.1 2.4–3.7	185	7.4 6.4–8.4	228	9.1 8.0–10.2	1881	75.2 73.5–76.9
Not touching your eyes nose or mouth if your hands are not clean	69	2.8 2.1–3.4	179	7.2 6.1–8.1	471	18.8 17.4–20.5	783	31.3 29.5–33.1	999	39.9 38.0–41.9
Follow medical testing/treatment	Definitely		Probably		Possibly		Probably not		Definitely not	
Take a diagnostic test if offered	1138	45.5 43.6–47.5	634	25.3 23.6–27	482	19.3 17.7–20.9	159	6.4 5.4–7.4	88	3.5 2.8–4.3
Take a COVID, 19 antibody test if offered	1190	47.6 45.7–49.4	598	23.9 22.2–25.6	449	18 16.5–19.6	179	7.2 6.1–8.2	85	3.4 2.7–4.1
Take a COVID, 19 vaccine if offered	1188	47.5 45.5–49.5	552	22.1 20.4–23.7	459	18.4 16.9–20	183	7.3 6.3–8.4	119	4.8 3.9–5.6
Try to stop family and friends from getting the vaccine	274	11.0 9.6–12.2	182	7.3 6.2–8.3	265	10.6 9.3–11.8	467	18.7 17.2–20.4	1313	52.5 50.4–54.3
Download and use a contact tracing app	683	27.3 25.6–29.1	517	20.7 19–22.3	606	24.2 22.5–26.1	339	13.6 12.2–14.9	356	14.2 12.9–15.7
If advised by the government, wear a facemask outside	1065	42.6 40.6–44.6	662	26.5 24.7–28.1	505	20.2 18.6–21.8	164	6.6 5.6–7.5	105	4.2 3.5–5.0

Table 4. Associations of coronavirus conspiracy beliefs with following government guidelines

	Specific coronavirus conspiracy beliefs Pearson's correlation, <i>p</i> value	General coronavirus conspiracy beliefs Pearson's correlation, <i>p</i> value
<i>Overall following government guidance</i>		
Overall, how much do you follow guidance from the government about coronavirus?	-0.32 <i>p</i> < 0.001	-0.27 <i>p</i> < 0.001
How much will you follow future guidance from the government about coronavirus?	-0.34 <i>p</i> < 0.001	-0.31 <i>p</i> < 0.001
<i>Following government guidelines</i>		
Staying home and only leaving your house for essential journeys	-0.44 <i>p</i> < 0.001	-0.35 <i>p</i> < 0.001
Not meeting with people outside your household, even friends and family	-0.39 <i>p</i> < 0.001	-0.32 <i>p</i> < 0.001
No more than one form of exercise a day outside, alone or with members of your household	-0.38 <i>p</i> < 0.001	-0.32 <i>p</i> < 0.001
If you do go out, staying 2 m apart from other people at all times	-0.42 <i>p</i> < 0.001	-0.32 <i>p</i> < 0.001
Wash your hands with soap and water often, for at least 20 s	-0.38 <i>p</i> < 0.001	-0.27 <i>p</i> < 0.001
Not going to work unless you absolutely have to	-0.38 <i>p</i> < 0.001	-0.31 <i>p</i> < 0.001
<i>Follow medical testing/treatment</i>		
Take a diagnostic test if offered	0.33 <i>p</i> < 0.001	0.29 <i>p</i> < 0.001
Take a COVID-19 antibody test if offered	0.36 <i>p</i> < 0.001	0.34 <i>p</i> < 0.001
Accept a COVID-19 vaccine if offered	0.35 <i>p</i> < 0.001	0.37 <i>p</i> < 0.001
Try to stop family and friends from getting the vaccine	-0.47 <i>p</i> < 0.001	-0.42 <i>p</i> < 0.001
Download and use a contact tracing app	0.11 <i>p</i> < 0.001	0.15 <i>p</i> < 0.001
If advised by the government, wear a facemask outside	0.23 <i>p</i> < 0.001	0.21 <i>p</i> < 0.001

lot, agree completely) 17 potential positive aspects of the pandemic (e.g. 'The coronavirus pandemic has brought communities closer together'). Higher scores indicate greater endorsement of positive aspects of the crisis.

Analysis

The first main reporting was descriptive, providing the prevalence of endorsement of items. 95% confidence intervals (CI) for prevalence percentages were estimated using bootstrapping with 1000 samples. Data reduction, using principal components analyses, was carried out separately for the 18 general coronavirus conspiracy theory items and the 30 specific coronavirus conspiracy items. The primary principal component factors (without rotation) that explained 61.3% and 69.4% of the variance respectively, were used to test associations with the other variables. No attempt was made to fit formal measurement models (e.g. via confirmatory factor analysis), since this is unnecessary for the data simplification process (see Freeman et al., 2015). Associations were then tested using Pearson's correlations, *t* tests, ANOVAs, and chi-square tests. There were no missing data. All statistical testing was two-

tailed. The analyses were carried out using SPSS Version 25.0.0.1 (IBM, 2017).

Results

A summary of demographic information about the participant group is provided in Table 1. The group is consistent with the quota sampling targets for age, gender, income, and region.

In Table 2, a summary is provided of the frequency of endorsement of each general and specific coronavirus conspiracy belief. The mean total specific coronavirus conspiracy score was 46.1, *s.d.* = 26.0 (minimum = 30, maximum = 150, 25th percentile = 30, 50th percentile = 32, 75th percentile = 48, 90th percentile = 91), the mean total generic coronavirus conspiracy score was 34.1 (*s.d.* = 17.0) (minimum = 18, maximum = 90, 25th percentile = 20, 50th percentile = 27, 75th percentile = 45, 90th percentile = 60), and the mean total score for the four official explanations was 12.9, *s.d.* = 3.4 (minimum = 4, maximum = 20, 25th percentile = 10, 50th percentile = 13, 75th percentile = 15). Endorsement scores for all specific conspiracy items significantly positively correlated with one another, and similarly all generic conspiracy items

Table 5. Associations of coronavirus conspiracy concerns and general mistrust

	Specific coronavirus conspiracy beliefs Pearson's correlation, <i>p</i> value	General coronavirus conspiracy beliefs Pearson's correlation, <i>p</i> value
Conspiracy mentality	0.16 <i>p</i> < 0.001	0.35 <i>p</i> < 0.001
General vaccination conspiracy beliefs	0.60 <i>p</i> < 0.001	0.65 <i>p</i> < 0.001
Climate change conspiracy belief	0.51 <i>p</i> < 0.001	0.47 <i>p</i> < 0.001
Paranoia	0.72 <i>p</i> < 0.001	0.61 <i>p</i> < 0.001
Trust in UK government	-0.12 <i>p</i> < 0.001	-0.17 <i>p</i> < 0.001
Trust in UK military	-0.16 <i>p</i> < 0.001	-0.17 <i>p</i> < 0.001
Trust in mainstream media	0.13 <i>p</i> < 0.001	0.03 <i>p</i> = 0.179
Trust in doctors	-0.30 <i>p</i> < 0.001	-0.29 <i>p</i> < 0.001
Trust in scientists	-0.20 <i>p</i> < 0.001	-0.25 <i>p</i> < 0.001
Trust in World Health Organisation	-0.17 <i>p</i> < 0.001	-0.24 <i>p</i> < 0.001
Trust in United Nations	-0.08 <i>p</i> < 0.001	-0.17 <i>p</i> < 0.001
Trust in European Union	-0.07 <i>p</i> = 0.001	-0.03 <i>p</i> = 0.127

Table 6. Associations of coronavirus conspiracy concerns and general mistrust

	Specific coronavirus conspiracy beliefs Pearson's correlation, <i>p</i> value	General coronavirus conspiracy beliefs Pearson's correlation, <i>p</i> value
Religious belief	0.32 <i>p</i> < 0.001	0.28 <i>p</i> < 0.001
Political belief	0.14 <i>p</i> < 0.001	0.15 <i>p</i> < 0.001
How much do you share information about coronavirus with others	0.20 <i>p</i> < 0.001	0.20 <i>p</i> < 0.001
How much do you share your own opinions about coronavirus on online sites	0.49 <i>p</i> < 0.001	0.46 <i>p</i> < 0.001
Psychological well-being	-0.02 <i>p</i> = 0.306	-0.06 <i>p</i> = 0.005

significantly positively correlated with one another. The correlation between the specific and generic coronavirus conspiracy principal component scores was high, $r = 0.84$, $p < 0.001$. Specific conspiracy beliefs, $r = -0.101$, $p < 0.001$, and generic conspiracy beliefs, $r = -0.21$, $p < 0.001$, were both negatively associated with the total endorsement score for the official explanations.

There were no significant differences in levels of specific, $t(df = 2451.5) = 1.89$, $p = 0.056$, or general, $t(df = 2466.3) = 0.69$, $p = 0.491$, coronavirus conspiracy beliefs by gender. Younger participants held higher levels of both specific, $r = -0.42$, $p < 0.001$, and general, $r = -0.35$, $p < 0.001$, coronavirus conspiracy beliefs. There were

lower levels of both specific, $df = 407.0$, $t = -9.44$, $p < 0.001$, and general, $df = 426.8$, $t = -8.21$, $p < 0.001$, coronavirus conspiracy concerns in those of white ethnicity ($n = 2160$) compared to individuals of other ethnicities ($n = 341$). There were no significant associations of specific, $r = 0.02$, $p = 0.25$, or general, -0.02 , $p = 0.418$, coronavirus conspiracy concerns with household income. General conspiracy, $r = -0.06$, $p = 0.002$, but not specific, $r = -0.01$, $p = 0.526$, coronavirus conspiracy concerns, were associated with lower levels of education. Specific and general coronavirus conspiracy beliefs were significantly higher in those who thought it not worth voting in a general election ($n = 195$) compared with individuals who

Table 7. Positive experiences of the coronavirus pandemic

	Do not agree		Agree a little		Agree moderately		Agree a lot		Agree completely	
	<i>n</i>	% 95% CI	<i>n</i>	% 95% CI	<i>n</i>	% 95% CI	<i>n</i>	% 95% CI	<i>n</i>	% 95% CI
The coronavirus pandemic has brought communities closer together.	214	8.6 7.5–9.8	621	24.8 23.1–26.6	756	30.2 28.2–32.1	603	24.1 22.5–25.8	307	12.3 11.0–13.6
The pandemic has generally brought out the best in people.	232	9.3 8.3–10.5	570	22.8 21.2–24.4	731	29.2 27.5–31.0	691	27.6 25.9–29.3	277	11.1 9.8–12.4
The pandemic has made people more appreciative of the NHS and its workforce.	67	2.7 2.0–3.3	221	8.8 7.7–9.9	394	15.8 14.3–17.2	676	27.0 25.4–28.7	1143	45.7 43.7–47.5
Since the pandemic, people have become more appreciative of essential workers (e.g. delivery drivers, shop staff).	74	3.0 2.3–3.6	247	9.9 8.8–11.0	503	20.1 18.6–21.8	817	32.7 30.9–34.5	860	34.4 32.6–36.2
People have become more thoughtful of their relationship with the planet.	276	11.0 9.9–12.4	522	20.9 19.2–22.5	757	30.3 28.5–32.0	592	23.7 22.0–25.4	354	14.2 12.8–15.5
I feel more connected to neighbours and people in my local area.	546	21.8 20.4–23.5	618	24.7 23.0–26.5	722	28.9 27.0–30.5	431	17.2 15.8–18.7	184	7.4 6.4–8.4
I have felt more connected to family and friends.	394	15.8 14.4–17.2	469	18.8 17.3–20.4	662	26.5 24.7–28.2	614	24.6 22.8–26.3	362	14.5 13.2–15.8
I learned a great deal about how wonderful people are.	340	13.6 12.2–14.9	569	22.8 21.2–24.4	734	29.3 27.6–31.1	594	23.8 22.2–25.4	264	10.6 9.4–11.8
I have been more able to engage with activities and hobbies that I enjoy.	484	19.4 17.8–21.0	501	20.0 18.5–21.6	727	29.1 27.3–30.7	517	20.7 19.2–22.4	272	10.9 9.7–12.2
I have been able to do more regular exercise.	740	29.6 27.8–31.3	482	19.3 17.8–20.8	606	24.2 22.4–25.9	403	16.1 14.8–17.6	270	10.8 9.6–12.1
I have had more time to reflect on what matters to me.	291	11.6 10.4–12.8	534	21.4 19.7–23.0	671	26.8 25.0–28.5	648	25.9 24.2–27.7	357	14.3 12.9–15.7
I have appreciated taking time for myself.	308	12.3 11.1–13.6	476	19.0 17.6–20.6	706	28.2 26.5–30.0	612	24.5 22.8–26.1	399	16.0 14.6–17.4
I discovered that I'm stronger than I thought I was.	451	18.0 16.5–19.6	473	18.9 17.4–20.4	730	29.2 27.3–30.9	524	21.0 19.3–22.6	323	12.9 11.6–14.2
I have a greater appreciation for the value of my own life.	295	11.8 10.5–13.0	408	16.3 14.8–17.8	662	26.5 24.8–28.1	655	26.2 24.6–27.7	481	19.2 17.8–20.8
I established a new path for my life.	891	35.6 33.7–37.5	462	18.5 17.0–20.1	632	25.3 23.4–27.0	317	12.7 11.4–14.0	199	8.0 7.0–9.0
I have a better understanding of spiritual matters.	1142	45.7 43.8–47.6	366	14.6 13.2–16.1	503	20.1 18.5–21.7	288	11.5 10.2–12.8	202	8.1 7.0–9.2
I have a stronger religious faith.	1364	54.5 52.7–56.6	301	12.0 10.8–13.4	422	16.9 15.4–18.4	235	9.4 8.2–10.6	179	7.2 6.2–8.2

thought you should only vote if you care who wins ($n = 512$), with the latter scoring significantly higher for coronavirus conspiracy beliefs than individuals who consider it everyone's duty to vote ($n = 1794$). Individuals ($n = 1825$) who obtained most of their information about coronavirus from the BBC had lower levels of specific, $df = 934.8$, $t = 11.91$, $p < 0.001$, and general, $df = 1058.2$, $t = 12.09$, $p < 0.001$ coronavirus beliefs compared with those who did not ($n = 676$). Whereas individuals ($n = 453$) who obtained most of their information about coronavirus from friends had higher levels of specific, $df = 602.6$, $t = -5.77$, $p < 0.001$, and general, $df = 618.61$, $t = -6.24$, $p < 0.001$ coronavirus beliefs compared with those who did not ($n = 2048$). Similarly, individuals ($n = 808$) who obtained most of their information about coronavirus from social media had higher levels of specific, $df = 1263.6$, $t = -12.27$, $p < 0.001$, and general, $df = 1345.61$, $t = -12.73$, $p < 0.001$ coronavirus beliefs compared with those who did not ($n = 1693$). Individuals ($n = 382$) who obtained most of their information about coronavirus from YouTube had higher levels of specific, $df = 470.73$, $t = -10.39$, $p < 0.001$, and general, $df = 494.11$, $t = -11.06$, $p < 0.001$ coronavirus beliefs compared with those who did not ($n = 2119$).

The degree to which participants adhere to government coronavirus guidance and willingness to accept future diagnostics and vaccination is summarised in Table 3. Generally, rates of adhering to the guidelines were high, though approximately 20% adhered to a lower extent.

Endorsement of specific or generic coronavirus conspiracy beliefs is significantly associated with less self-reported adherence to each government recommendation (Table 4). Conspiracy beliefs were also associated with less likelihood to accept future diagnostic tests or a vaccination. As illustrations of these associations, respondents who endorsed to any degree that 'Coronavirus is a bioweapon developed by China to destroy the West' were much more likely to also not adhere (defined as less than most of the time) to the guidance to stay at home, odds ratio (OR) 4.57, 95% CI 3.62–5.79, and endorsing to any degree that 'Jews have created the virus to collapse the economy for financial gain' was highly associated with not adhering to the guidance to stay at home, OR 14.34, 95% CI 11.26–18.25. Respondents were more likely to report that they would not accept a COVID-19 vaccine (possibly not, definitely not) if they endorsed the bioweapon belief, OR 2.11, 95% CI 1.65–2.70, or the belief about Jewish people, OR 2.70, 95% CI 2.08–3.50.

Coronavirus conspiracy concerns were associated with all other forms of mistrust, notably paranoia, general vaccination conspiracy beliefs and climate change conspiracy belief (Table 5).

Holding specific or general coronavirus conspiracy beliefs was associated with higher levels of religiosity, slightly more right wing political orientation, and being more likely to share information and opinions about coronavirus (Table 6). Although there is a small association of coronavirus conspiracy beliefs with degree of right wing views, there was also evidence for a quadratic relationship, with those who rated themselves as at the extreme ends of either left or right holding higher levels of conspiracy thinking. A hierarchical regression showed that both the linear political item, $B = -0.28$, standard error = 0.05, $t = -5.92$, $p < 0.001$, and a quadratic term (the political item squared), $B = 0.064$, standard error = 0.01, $t = 8.63$, $p < 0.001$ were significant predictors of specific coronavirus conspiracy scores. A similar finding was found for holding general coronavirus conspiracy beliefs. There was little indication of an association of coronavirus conspiracy beliefs with psychological well-being.

The endorsement of positive experiences from the pandemic is summarised in Table 7. These show that at a personal and local level there have been positive aspects appraised by most people. Higher levels of specific coronavirus conspiracy beliefs, $r = 0.20$, $p < 0.001$, and general coronavirus conspiracy beliefs, $r = 0.21$, $p < 0.001$, were associated with higher levels of endorsement of the positive statements.

Discussion

The results are illuminating but dispiriting: a substantial minority of the population endorses unequivocally false ideas about the pandemic. Only half the population showed little evidence of conspiracy thinking. The idea that the current crisis may be especially fertile ground for conspiracy beliefs may well be correct. The coronavirus conspiracy ideas ascribe malevolent intent to individuals, groups, and organisations based on what are likely to be long-standing prejudices. For instance, almost half of participants endorsed to some degree the idea that 'Coronavirus is a bioweapon developed by China to destroy the West' and around one-fifth endorsed to some degree that 'Jews have created the virus to collapse the economy for financial gain'. The conspiracy beliefs were connected to a number of markers of excessive mistrust: paranoia, endorsement of other conspiracy beliefs, mistrust in institutions and experts, and a conspiracy mentality. Conspiracy beliefs are likely to be both indexes and drivers of societal corrosion. They matter in this context because they may well have reduced compliance with government social distancing guidelines, thereby contributing to the spread of the disease. One consequence of this national crisis may be to reveal fully the harmful effects of mistrust and misinformation.

A public health information crisis may be observable. Misinformation and misguided – often malign – views look to be highly prevalent. Fringe beliefs may now be mainstream. A previously defining element that the beliefs are typically only held by a minority may require revision. The numerous different conspiracy statements, often contradictory in detail, were all significantly associated. The detailed content of the statements may matter less than the respondents' tendency to believe that institutions, officials, and experts may be deliberately misleading. This is consistent with previous research that shows mutually incompatible conspiracy beliefs can be endorsed (Wood *et al.*, 2012) and with the noticeably high associations in this study of coronavirus conspiracy beliefs with paranoia (i.e. the idea that others intend harm to the individual) and conspiracy beliefs concerning vaccination and climate change. Healthy scepticism may have tipped over into a breakdown of trust. There may also be a simple attraction of discussing, holding, and sharing conspiracy theories, especially in youth. Interestingly, those holding conspiracy beliefs could also see greater personal benefits arising from the crisis. There were indications that the coronavirus conspiracy beliefs are more likely to be held by those who perceive themselves as marginalised, but these relationships do not appear as strong as in previous studies (e.g. Freeman & Bentall, 2017). This weakening may reflect a cross-over of distrust of mainstream accounts into the mainstream itself. Replications of the survey are required to confirm whether the high prevalence of conspiracy beliefs is accurate. Comparative studies across countries could be extremely informative in establishing the social causes.

There are significant limitations to the survey. Foremost, we used a non-probability online quota sampling method. This will have introduced bias into who was approached to take part. Probability sampling, in which members of the population have

an equal chance of participating, produces better estimates. All that we know in this survey is that as a whole the respondents were broadly representative of the adult general population on a number of basic demographic features but not that individual respondents were representative of the general population. The views of those who are not online were not assessed, the level of non-responses to the survey invitation is unknown, and, specifically, it is unknown whether the degree to which conspiracy beliefs are endorsed influenced the decision to take part. The prevalence estimates in this survey need to be treated with caution. It is also unknown whether important coronavirus conspiracy beliefs were overlooked in the item pool or the degree to which self-report of attitudes to coronavirus guidelines is accurate. The cross-sectional nature of the design precludes causal inference. Arguably, the coronavirus concerns could be post hoc rationalisations of not following socially accepted lockdown behaviours. However, we believe it is more likely that conspiracy beliefs drive behaviour or at the very least remove barriers to carrying out unhelpful behaviours. In our view the urgent question now is how can the prevalence and impact of conspiracy beliefs and general mistrust be reduced both in the short and long term?

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Author contributions.

DF was the chief investigator and wrote the paper. All authors contributed to the study design. DF and SL carried out the analyses. All authors commented on the paper.

Conflict of interest. Daniel Freeman has written popular science, self-help, and academic books about paranoia with several publishers for which royalties are received. DF reports grants on the topic of paranoia from National Institute for Health Research, Medical Research Council, and Wellcome Trust. Other authors report no competing interests.

References

- Abalakina-Paap, M., Stephan, W. G., Craig, T., & Gregory, W. L. (1999). Beliefs in conspiracies. *Political Psychology*, *20*, 637–647.
- Attwell, K., Leask, J., Meyer, S.B., Rokkas, P., & Ward, P. (2017). Vaccine rejecting parents' engagement with expert systems that inform vaccination programs. *Journal of Bioethical Inquiry*, *14*, 65–76.
- Bolsen, T., & Druckman, J. N. (2018). Validating conspiracy beliefs and effectively communicating scientific consensus. *Weather, Climate, and Society*, *10*, 453–458.
- Brotherton, R., French, C., & Pickering, A. (2013). Measuring belief in conspiracy theories: The generic conspiracist beliefs scale. *Frontiers in Psychology*, *4*, 279.
- Bruder, M., Haffke, P., Neave, N., Nouripanah, N., & Imhoff, R. (2013). Measuring individual differences in generic beliefs in conspiracy theories across cultures: Conspiracy mentality questionnaire. *Frontiers in Psychology*, *4*, 225.
- Davis, J., Wetherell, G., & Henry, P. J. (2018). Social devaluation of African Americans and race-related conspiracy theories. *European Journal of Social Psychology*, *48*, 999–1010.
- Douglas, K. M., Sutton, R. M., Callan, M. J., Dawtry, R. J., & Harvey, A. J. (2016). Someone is pulling the strings: Hypersensitive agency detection and belief in conspiracy theories. *Thinking & Reasoning*, *22*, 57–77.
- Douglas, K. M., Uscinski, J. E., Sutton, R. M., Cichocka, A., Nefes, T., Ang, C. S., & Deravi, F. (2019). Understanding conspiracy theories. *Advances in Political Psychology*, *40*(Suppl 1), 3–35.
- Edelman (2020) 2020 Edelman trust barometer. London: Edelman. [online] Available at: <https://www.edelman.com/trustbarometer>.
- Federico, C. M., Williams, A. L., & Vitriol, J. A. (2018). The role of system identity threat in conspiracy theory endorsement. *European Journal of Social Psychology*, *48*, 927–938.
- Freeman, D., & Bentall, R. (2017). The concomitants of conspiracy concerns. *Social Psychiatry and Psychiatric Epidemiology*, *52*, 595–604.
- Freeman, D., Dunn, G., Murray, R., Evans, N., Lister, R., Antley, A., ... Morrison, P. (2015). How cannabis causes paranoia: Using the intravenous administration of Δ^9 -tetrahydrocannabinol (THC) to identify key cognitive mechanisms leading to paranoia. *Schizophrenia Bulletin*, *41*, 391–399.
- Freeman, D., Loe, B.S., Kingdon, D., Startup, H., Molodynski, A., Rosebrock, L., ... Bird, J.C. (2019). The revised Green et al., paranoid thoughts scale (R-GPTS): Psychometric properties, severity ranges, and clinical cut-offs. *Psychological Medicine*, 1–10. doi:10.1017/S0033291719003155.
- Goertzel, T. (1994). Belief in conspiracy theories. *Political Psychology*, *15*, 731–742.
- Goreis, A., & Voracek, M. (2019). A systematic review and meta-analysis of psychological research on conspiracy beliefs: Field characteristics, measurement instruments, and associations with personality traits. *Frontiers in Psychology*, *10*, 205.
- IBM (2017). *SPSS Statistics version 25*. Release 25.0.0.1. Armonk, NY: IBM Corporation.
- Imhoff, R., & Bruder, M. (2014). Speaking (un-)truth to power: Conspiracy mentality as a generalized political attitude. *European Journal of Personality*, *28*, 25–43.
- Jolley, D., & Douglas, K. (2014). The effects of anti-vaccine conspiracy theories on vaccination intentions. *PLoS One*, *9*(2): e89177.
- Krouwel, A., Kutiyanski, Y., van Prooijen, J. W., Martinsson, J., & Markstedt, E. (2017). Does extreme political ideology predict conspiracy beliefs, economic evaluations and political trust? Evidence from Sweden. *Journal of Social and Political Psychology*, *5*(2), 435–462.
- Luthy, K.E., Beckstrand, R.L., Callister, L.C., & Cahoon, S. (2012). Reasons parents exempt children from receiving immunizations. *Journal of School Nursing*, *28*, 153–160.
- Shapiro, G.K., Holding, A., Perez, S., Amsel, R., & Rosberger, Z. (2016). Validation of the vaccine conspiracy beliefs scale. *Papillomavirus Research*, *2*, 167–172.
- Sunstein, C., & Vermeule, A. (2009). Conspiracy theories. *Journal of Political Philosophy*, *17*, 202–227.
- 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.
- Swami V., Voracek M., Stieger S., Tran U. S., & Furnham A. (2014). Analytic thinking reduces belief in conspiracy theories. *Cognition*, *133*, 572–585.
- Tennant, R., Hiller, L., Fishwick, R., Platt, S., Joseph, S., Weich, S., ... Stewart-Brown, S. L. (2007). The Warwick–Edinburgh mental well-being scale (WEMWBS): Development and UK validation. *Health and Quality of Life Outcomes*, *5*, 63.
- van Prooijen, J.-W., & Jostmann, N. B. (2013). Belief in conspiracy theories: The influence of uncertainty and perceived morality. *European Journal of Social Psychology*, *43*(1), 109–115.
- van Prooijen, J.-W., Krouwel, A. P. M., & Pollet, T. (2015). Political extremism predicts belief in conspiracy theories. *Social Psychological and Personality Science*, *6*, 570–578.
- Wood, M. J., Douglas, K. M., & Sutton, R. M. (2012). Dead and alive: Beliefs in contradictory conspiracy theories. *Social Psychological and Personality Science*, *3*, 767–773.