Title: Intention to adhere to test, trace, and isolate during the COVID-19 pandemic (the COVID-19 Rapid Survey of Adherence to Interventions and Responses [CORSAIR] study)

Short title: COVID-19: intention to test, trace, and isolate

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Abstract:

Objectives: (i) To investigate factors associated with intention to self-isolate, request a test, and share details of close contacts when required. (ii) To determine whether associations were stronger during periods when less stringent national restrictions were in place.

Design: Series of cross-sectional nationally representative surveys. We selected waves where different national restrictions were in place in England (first lockdown, summer release, second lockdown, third lockdown).

Methods: We investigated whether psychological factors and increased out-of-home activity in the last week were associated with intention to self-isolate and request a test if you were to develop COVID-19 symptoms, and intention to share details of contacts if you were to test positive. We also investigated whether the strength of associations differed by timepoint in the pandemic.

Results: Intention to self-isolate, request a test and share details of contacts were associated with greater perceived risk of COVID-19 to people in the UK, knowing that COVID-19 transmission can be asymptomatic, and agreeing that personal behaviour has an impact on COVID-19 transmission. There were few differences in strength of associations by timepoint suggesting these effects are broadly stable over time.

Conclusions: Psychological factors were associated with intention to adhere to key components of the contact tracing system; there was no evidence for an association with increased out-of-home activity. Messages that increase knowledge that COVID-19 can be transmitted even if someone does not have symptoms and that an individual's actions can contribute to the spread of the virus, may promote engagement with test, trace, and isolate.

Keywords: COVID-19, contact tracing, behaviour, psychological factors, predictors

Data availability statement: The data are owned by the UK's Department of Health and Social Care, so no additional data are available from the authors.

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data. All authors are participants of the UK's Scientific Advisory Group for Emergencies or its subgroups. There are no other financial relationships with any organisations that might have an interest in the submitted work in the previous three years and no other relationships or activities that could appear to have influenced the submitted work.

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What is already known on this topic

- Better engagement with the test, trace, and isolate system in the UK would reduce transmission and the need for other restrictions.
- Socio-demographic factors, such as being male and experiencing economic hardship are associated with non-adherence to key components of the test, trace, and isolate system, including requesting a test when symptomatic.

What this study adds

- Intention to adhere to key components of the test, trace, and isolate system were associated with greater perceived risk of COVID-19 to people in the UK, knowledge that transmission can be asymptomatic, and believing that personal behaviour has an impact on transmission.
- Messages that increase knowledge that COVID-19 can be spread even if a person does not display symptoms, and that an individual's actions can contribute to transmission may promote engagement with the test, trace, and isolate system.
- There was no evidence of an association between greater number of outings in the last week (for work or socially) and intention to adhere to test, trace, and isolate if symptomatic.

Abstract

Objectives: (i) To investigate factors associated with intention to self-isolate, request a test, and share details of close contacts when required. (ii) To determine whether associations were stronger during periods when less stringent national restrictions were in place.

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Conclusions: Psychological factors were associated with intention to adhere to key components of the contact tracing system; there was no evidence for an association with increased out-of-home activity. Messages that increase knowledge that COVID-19 can be transmitted even if someone does not have symptoms and that an individual's actions can contribute to the spread of the virus, may promote engagement with test, trace, and isolate.

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Keywords: COVID-19, contact tracing, behaviour, psychological factors, predictors

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Introduction

In England, people with COVID-19 symptoms were first asked to self-isolate on 12 March 2020.(1) Everyone with symptoms has been eligible for a test since 18 May 2020,(2) and a contact tracing system, NHS Test and Trace, was launched on 28 May 2020. Despite the test, trace, and isolate system being one of the cornerstones of the UK Government's response to the COVID-19 pandemic, engagement with the system has been sub-optimal. Previous research indicates that at the end of January 2021, approximately 22% of those with COVID-19 symptoms in the previous week requested a test to see if they had COVID-19; 52% of those with COVID-19 symptoms in the previous week and who had not had a negative test result reported fully self-isolating.(3) These data do not tell the complete story: qualitative work has suggested that many instances of non-adherence are relatively low risk with people using the context in which they find themselves to make decisions on how to act. For example, not requesting a test when there is a low probability that a symptom is caused by COVID-19 (4) or leaving home during self-isolation for outdoor exercise but avoiding contact with other people.(5) Nevertheless, data suggest that many people still report an active intention not to adhere to key elements of Government advice.(3) When asked to state what actions they would take if they were to develop symptoms of COVID-19, only 62% reported that they would request a test, 71% reported behaviours that fully adhered to the rules of self-isolation, and 79% reported that they would share details of close contacts with NHS Test and Trace if asked to.

Studies investigating factors associated with adherence to test, trace, and isolate have so far focused on investigating associations with socio-demographic factors, finding that men and people experiencing greater financial hardship are less likely to adhere.(3, 6) However, there is limited research investigating the influence of psychological factors despite their likely importance. The Protection Motivation Theory states that appraisal of a threat (perceived susceptibility and severity) and the coping mechanism (perceived effectiveness of the response and one's ability to carry out that response) influence intention to carry out a health behaviour, which in turn affects actual behaviour.(7) Greater perceived risk of COVID-19 is associated with uptake of protective behaviours.(8) Knowledge about how COVID-19 spreads may also affect people's intention to engage with a contact tracing system. In the context of test, trace and isolate, knowledge of what the symptoms of COVID-19 are among the UK population has previously been shown to be poor.(9, 10) Insufficient knowledge about the purpose of quarantine has hindered public health efforts in previous emerging

infectious disease outbreaks.(11) Motivational components to carry out a behaviour may also be influenced by whether information received about the pandemic is viewed as credible.(12, 13)

People who have left their home more (for work and to meet others socially) have a greater personal risk of catching COVID-19, due to increased contact with others. How this may affect intention to engage with a test, trace, and isolate system, if at all, is unclear. People may be more likely to engage, due to greater perceived risk or a normalisation of engagement (e.g. routine testing through the workplace), or less likely to engage, due to the possibility that a positive result would stop them from being able to attend work or engage in social activities.(11)

Complicating our understanding of the factors determining engagement with test, trace and isolate guidance is the possibility that the relationship between intentions and other psychological factors may change over time. Restrictions in England have changed repeatedly over the course of the pandemic (Box 1) from periods of complete national lockdown to periods in which people were actively incentivised to return to economic activities. Such changes may influence intentions or 'drown out' the influence of other variables. For example, adherence to self-isolation during a period of stringent lockdown may be less a matter of motivation and more a simple reflection of the fact that there are few reasons or opportunities to leave one's home.(11, 14)

Box 1. Timeline of COVID-19 restrictions in England

16 March 2020. People asked to stay at home.

23 March 2020. Lockdown restrictions introduced (could go out only for limited specific reasons; hospitality, non-essential retail and schools closed).

11 May 2020. Restrictions slightly lifted (could go out for exercise as much as want; could mix with one other household outdoors 2m apart).

4 July 2020. Restrictions lifted further (pubs, restaurants re-opened; could mix with one other household indoors; could stay overnight away from home).

3 to 31 August 2020. Eat Out To Help Out – government subsidies to encourage people to return to hospitality venues.

14 September 2020. Rule of six introduced in indoor and outdoor settings.

14 October 2020. Tier system (1 to 3) introduced.

5 November 2020. Second lockdown restrictions introduced (could go out only for limited specific reasons; hospitality and non-essential retail closed; schools remained open).

2 December 2020. Slightly stricter tier system (1 to 3) re-implemented.

19 December 2020. Tier 4 introduced (essentially lockdown restrictions). 5 January 2021. Third lockdown restrictions introduced (could go out only for limited specific reasons; hospitality, non-essential retail and schools closed). 8 March 2021. Schools re-opened.

In this study, we investigated whether psychological factors (worry, perceived risk, beliefs about COVID-19 transmission and personal role, having enough information, perceived credibility of the UK Government) and out-of-home activity were associated with intention to engage with the test, trace, and isolate system (intention to self-isolate, request a test, and share details of close contacts). We also investigated whether the strength of associations differed by timepoint in the pandemic.

Methods

Design

BMG Research has been conducting a series of nationally representative (UK) cross-sectional surveys on behalf of the Department of Health and Social Care throughout the COVID-19 pandemic. We analysed these data as part of the CORSAIR study [the COVID-19 Rapid Survey of Adherence to Interventions and Responses study]).(3) Survey waves were carried out weekly or fortnightly. For this study, we selected waves to capture behaviour during four specific time periods during the pandemic: the first national lockdown (27 to 29 April 2020 [wave 14] and 4 to 6 May 2020 [wave 15]), the summer period with fewest restrictions (20 to 22 July 2020 [wave 25] and 3 to 5 August 2020 [wave 26]), the second national lockdown (16 to 18 November 2020 [wave 33] and 23 to 25 November 2020 [wave 34]), and the third national lockdown (11 to 13 January 2021 [wave 41] and 25 to 27 January 2021 [wave 42]).

Participants

Participants (n≈2,000 per wave) were recruited from two specialist research panel providers, Respondi (n=50,000) and Savanta (n=31,500) and were eligible for the study if they were aged 16 years or over and lived in the UK. Quotas were applied based on age and gender (combined) and Government Office Region, and reflected targets based on data from the Office for National Statistics.(15) After completing the survey, participants were then unable to participate in the subsequent three waves. Participants were reimbursed in points which could be redeemed in cash, gift vouchers or charitable donations (up to £0.70 per survey).

For this study, we selected only participants who lived in England due to differing restrictions across the four UK nations. People who reported symptoms in the last week were excluded (first lockdown, n=203; summer, n=211; second lockdown, n=214; third lockdown, n=205) as they were asked about actual, rather than self-reported behaviour. Therefore, we report on 12,976 responses (first lockdown, n=3225; summer, n=3240; second lockdown, n=3296; third lockdown, n=3215) from 11,853 participants.

Study materials

Outcome measures

Participants who reported that they had not experienced COVID-19 symptoms in the last week (high temperature/fever or a new, continuous cough; loss of sense of taste and loss of sense of smell added on 26 May 2020), were asked to imagine that they developed "symptoms of coronavirus" and asked which actions, if any, they would take. Options included staying at home for seven, ten or fourteen days. From 26 October 2020 (wave 31), these options were replaced with an option to "self-isolate (not leaving the home at all)". For our self-isolation outcome, we coded participants as intending to self-isolate if they selected that they would stay at home for seven, ten, or fourteen days, or that they would self-isolate. Requesting a test to confirm whether you had coronavirus was added to the options of actions on 26 May 2020 (wave 18). For our requesting a test outcome, we coded participants as intending to request a test if they selected the appropriate item.

From 1 June 2020 (wave 19), participants were asked to imagine that they had tested positive for COVID-19 and been prompted by the NHS contact tracing service and asked how likely they would be to share details of people they had been in close contact with (five-point scale from "definitely would" to "definitely would not"). For our intention to share details of close contacts outcome, we recoded intention into a binary variable, grouping together "definitely" and "probably would", and "not sure", "probably" and "definitely would not".

Psychological factors

We asked participants "overall, how worried are you about coronavirus" on a five-point scale from "not at all worried" to "extremely worried". Participants were asked to what extent they thought COVID-19 posed a risk to themselves and others in the UK on a five-point scale from "no risk at all" to "major risk".

To measure beliefs about how COVID-19 spreads, we asked participants to what extent they agreed that someone could spread coronavirus to other people even if they did not have

symptoms yet and that their personal behaviour had an impact on how coronavirus spreads (five-point scale from “strongly disagree” to “strongly agree”).

To investigate having enough information about self-isolation, testing, and contact tracing programmes, participants were asked to what extent they agreed they had enough information from the Government and other public authorities on a five-point scale (“strongly disagree” to “strongly agree”).

We used an adapted form of the Meyer Credibility Index (Cronbach’s α=.83) to measure perceived credibility of information from the Government about COVID-19.(16) Participants were asked to what extent they agreed that information from the Government about COVID-19 could be trusted, was accurate, told the whole story, and was biased or one-sided.

Out-of-home activity

We hypothesised that people going out to work were more likely to be in contact with people from other households both at work and on their way to or from work. We asked participants how many times in the last seven days they had been out to meet up with friends or family they did not live with and to go out to work (answers capped at 30 per activity). We summed these values to create a single variable indicating out-of-home activity (for work and socially) in the last week.

Personal and clinical characteristics

Participants were asked to report their age, gender, employment status, socio-economic grade, highest educational or professional qualification, ethnicity, marital status, how many people lived in their household, and if there was a dependent child in the household. We also asked participants whether they or a household member had a chronic illness. We coded participants as having a chronic illness that made them clinically vulnerable to COVID-19 using guidance from the NHS website.(17) Participants were asked for their full postcode, from which geographical region and indices of multiple deprivation were determined.(18)

We asked participants if they thought they had previously, or currently, had COVID-19 on a five-point scale. We recoded answers into a binary variable: “I’ve definitely had it, and had it confirmed by a test” and “ I think I’ve probably had it”, vs “I don’t know whether I’ve had it or not”, “I think I’ve probably not had it”, and “I’ve definitely not had it”.

Financial hardship was measured by asking participants to what extent in the past seven days they had been struggling to make ends meet, skipping meals they would usually have, and were finding their current living situation difficult (Cronbach’s α=.74).

Ethics

This work was conducted as part of service evaluation of the marketing and communications run by the Department of Health and Social Care, and, following advice from the University Research Ethics Subcommittee, did not require ethical approval.

Power

A sample size of 3,200 allows a 95% confidence interval of plus or minus 2% for the prevalence estimate for a survey item with a prevalence of around 50%.

Analysis

We ran chi-squared analyses to investigate whether outcome variables differed by timepoint in the pandemic.

We used multivariable logistic regression analyses to investigate associations between explanatory variables, socio-demographic variables and outcome variables separately for each timepoint in the pandemic (first lockdown; summer; second lockdown; third lockdown). Intention to request a test and share details of close contacts were only introduced into the survey after the first lockdown, so we were only able to run these analyses for three timepoints. We created a quadratic term for age, to test for a non-linear relationship. Multivariable analyses adjusted for survey wave, region (East Midlands arbitrarily allocated as reference category), gender, age (raw and quadratic term), presence of dependent child in the household, being clinically vulnerable to COVID-19, having a household member with a chronic illness, employment status (working vs not working), socio-economic grade (ABC1 vs C2DE), index of multiple deprivation (quartiles), highest educational or professional qualification (degree or higher vs less than degree), ethnicity (coded into three categories), living alone, marital status (partnered vs not partnered), ever had COVID-19 before (think have not had COVID-19 vs think or had COVID-19 confirmed), and financial hardship.

We then conducted further multivariable logistic regression analyses, for each outcome variable at each timepoint, entering all factors (personal and clinical characteristics, and psychological factors) together.

To investigate whether the strength of associations between psychological variables and outcome variables differed across the pandemic, we used an I^2 statistic to calculate heterogeneity. Where I^2 was large (50% or greater), we considered there to be a difference by

timepoint in the pandemic; where I^2 was small (<50%), we determined there was no difference.(19)

As multiple analyses were run on individual outcomes (n=7), we applied a Bonferroni correction (p<.007).

Results

Results of fully adjusted models are reported narratively. Analyses controlling only for personal and clinical characteristics are presented in the supplementary materials.

Intention to self-isolate

Intention to self-isolate differed by timepoint in the pandemic ($\chi^2(3) = 251.4$, p<.001, n=12,976), with intention decreasing over time (Figure 1). In the first lockdown, 81.3% (95% CI 80.0% to 82.7%, n=2623/3225) of people intended to self-isolate. This decreased to 73.0% (95% CI 71.5% to 74.6%, n=2366/3240) in the summer, 65.9% (95% CI 64.3% to 67.5%, n=2172/3296) in the second lockdown and 66.3% (95% CI 64.6% to 67.9%, n=2130/3215) in the third lockdown.

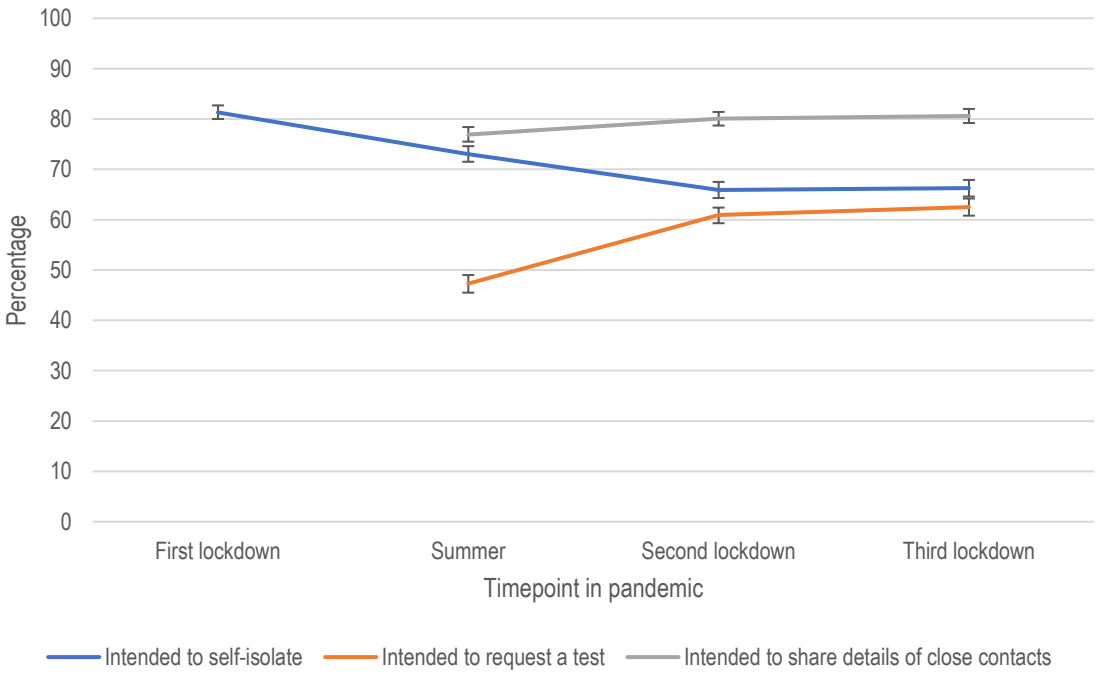
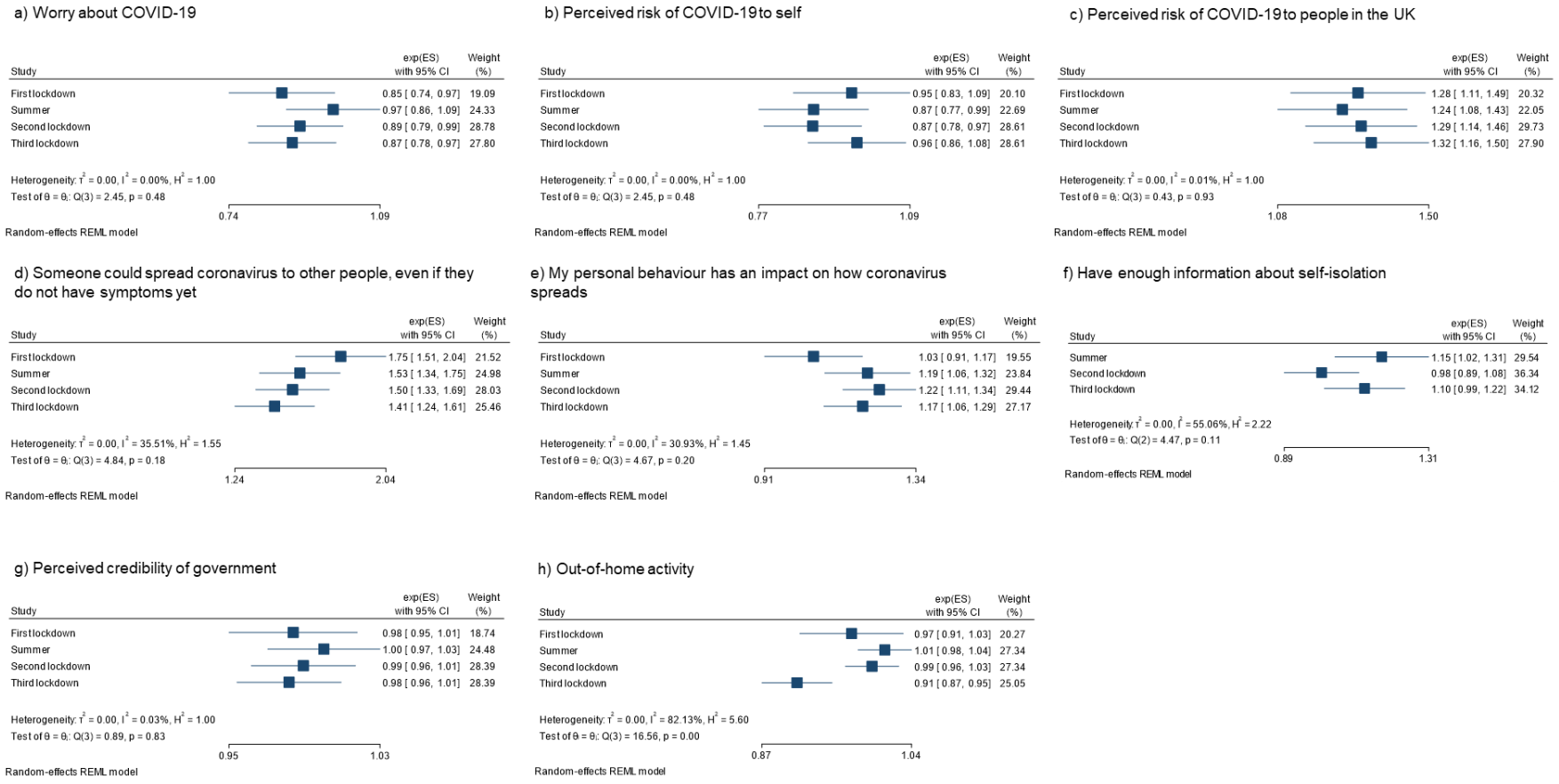


Figure 1. Percentage of people who intended to self-isolate, request a test, and share details of close contacts at different timepoints in the pandemic.

There was evidence for substantial heterogeneity in strength of associations between intention to self-isolate and out-of-home activity (I^2=82.1%) and having enough information about self-isolation during the pandemic (I^2=55.1%; Figure 2). There was minimal evidence for a difference in strength of associations between other psychological factors and intention to self-isolate at different timepoints in the pandemic.

Figure 2. Heterogeneity of strength of associations between psychological factors and intention to self-isolate at different timepoints in the pandemic.



In fully adjusted models, intention to self-isolate was associated with greater perceived risk of COVID-19 to people in the UK, knowing that COVID-19 transmission can be asymptomatic, agreeing that their personal behaviour has an impact on the spread of COVID-19. (Table 1). Going out fewer times for work and socially was also associated with greater intention to self-isolate in the third lockdown. Personal and clinical characteristics associated with intention to self-isolate are reported in the supplementary materials.

Table 1. Fully adjusted model of factors associated with self-isolation, for each timepoint in the pandemic.

Attribute	Level	First lockdown [a] aOR for intending to self-isolate (95% CI) †	*p*	Summer, fewest restrictions [b] aOR for intending to self-isolate (95% CI) ‡	*p*	Second lockdown [c] aOR for intending to self-isolate (95% CI) ‡	*p*	Third lockdown [d] aOR for intending to self-isolate (95% CI) ‡	*p*
Worry about COVID-19	5-point scale (1=not at all worried to 5=extremely worried)	0.85 (0.74 to 0.97)	.02	0.97 (0.86 to 1.09)	.58	0.89 (0.79 to 0.99)	.03	0.87 (0.78 to 0.97)	.02
Perceived risk of COVID-19 to self	5-point scale (1=no risk at all to 5=major risk)	0.95 (0.83 to 1.09)	.46	0.87 (0.77 to 0.99)	.03	0.87 (0.78 to 0.97)	.01	0.96 (0.86 to 1.08)	.51
Perceived risk of COVID-19 to people in the UK	5-point scale (1=no risk at all to 5=major risk)	**1.28 (1.11 to 1.49)**	**.001**	**1.24 (1.08 to 1.43)**	**.003**	**1.29 (1.14 to 1.46)**	**<.001**	**1.32 (1.17 to 1.50)**	**<.001**
Someone could spread coronavirus to other people, even if they do not have symptoms yet	5-point scale (1=strongly disagree to 5=strongly agree)	**1.75 (1.51 to 2.04)**	**<.001**	**1.53 (1.34 to 1.75)**	**<.001**	**1.50 (1.33 to 1.69)**	**<.001**	**1.41 (1.24 to 1.61)**	**<.001**
My personal behaviour has an impact on how coronavirus spreads	5-point scale (1=strongly disagree to 5=strongly agree)	1.03 (0.91 to 1.17)	.59	**1.18 (1.06 to 1.32)**	**.002**	**1.22 (1.11 to 1.34)**	**<.001**	**1.17 (1.06 to 1.29)**	**.001**
Have enough information about self-isolation	5-point scale (1=strongly disagree to 5=strongly agree)	-	-	1.15 (1.01 to 1.31)	.03	0.98 (0.89 to 1.08)	.70	1.10 (0.99 to 1.22)	.08
Perceived credibility of government	Range 4 (lowest credibility) to 20 (highest credibility)	0.98 (0.95 to 1.01)	.29	1.00 (0.97 to 1.03)	.87	0.99 (0.96 to 1.01)	.36	0.98 (0.96 to 1.01)	.13
Out-of-home activity (for work and socially)	Range 0 (no outings) to 50 (most outings)	0.97 (0.91 to 1.03)	.32	1.01 (0.98 to 1.04)	.60	0.99 (0.96 to 1.03)	.70	**0.91 (0.87 to 0.95)**	**<.001**

† All variables entered into regression model together (personal and clinical characteristics, and other psychological factors), excluding perceived adequacy of information about self-isolation.
‡ All variables entered into regression model together (personal and clinical characteristics, and other psychological factors), including perceived adequacy of information about self-isolation.

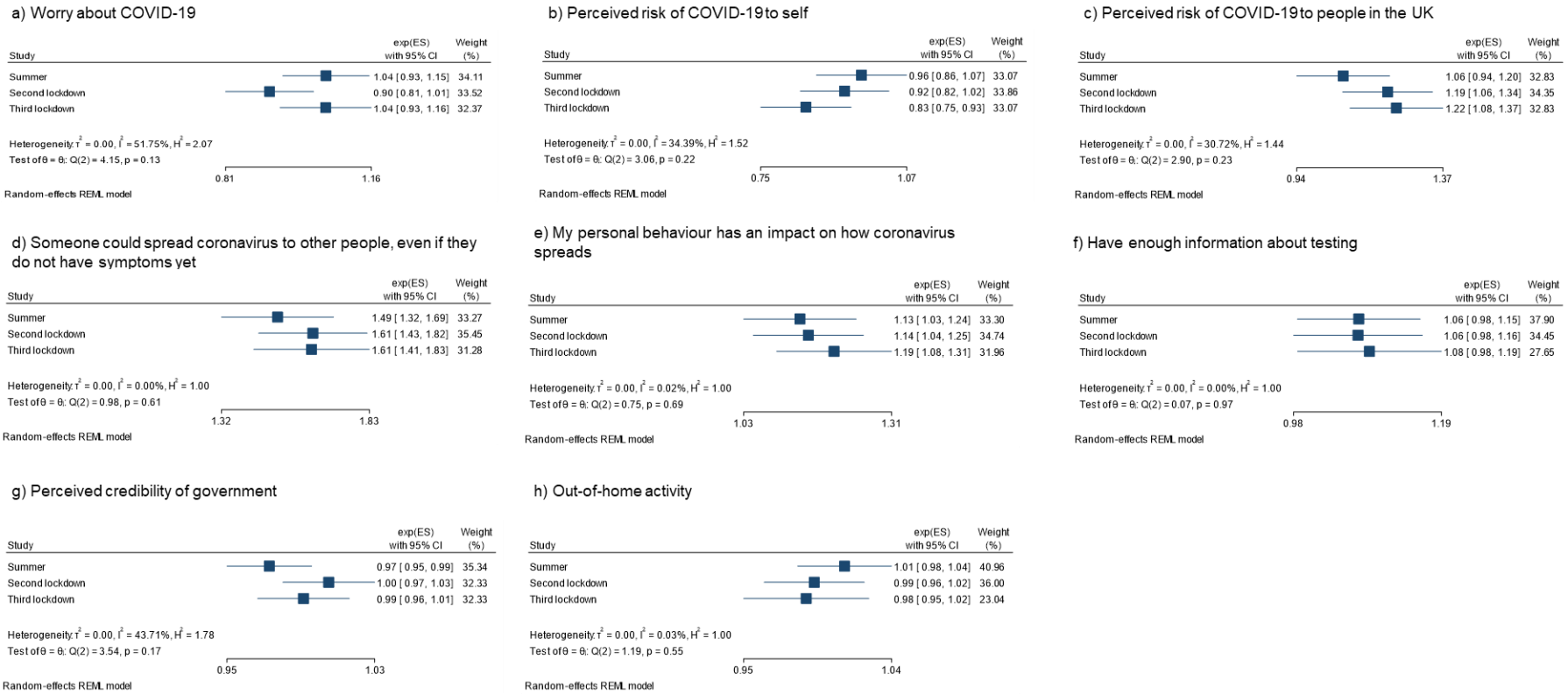
a. Model based on 2694 valid cases (83.5% valid responses).
b. Model based on 2645 valid cases (81.6% valid responses).
c. Model based on 2742 valid cases (83.2% valid responses).
d. Model based on 2704 valid cases (84.1% valid responses).

Intention to request a test

Intention to request a test differed by timepoint in the pandemic ($\chi^2(2) = 185.6$, $p<.001$, n=9571), with intention increasing over time (Figure 1). In the summer, 47.3% (95% CI 45.5% to 49.0%, n=1531/3240) of people intended to request a test if they were to develop symptoms. This increased to 60.9% (95% CI 59.3% to 62.4%, n=2008/3296) in the second lockdown, and 62.5% (95% CI 60.8% to 64.2%, n=2009/3215) in the third lockdown.

There was evidence of substantial heterogeneity in strength of associations between intention to request a test and worry about COVID-19 during the pandemic (I^2=51.8%; Figure 3). There was minimal evidence for a difference in strength of associations between other psychological factors and intention to request a test at different timepoints in the pandemic.

Figure 3. Heterogeneity of strength of associations between psychological factors and intention to request a test at different timepoints in the pandemic.



In fully adjusted models, intention to request a test was associated with greater perceived risk of COVID-19 to oneself and people in the UK, knowing that COVID-19 transmission can be asymptomatic, and agreeing that their personal behaviour has an impact on the spread of COVID-19 (Table 2). Personal and clinical characteristics associated with intention to request a test are reported in the supplementary materials.

Table 2. Fully adjusted model of factors associated with intention to request a test, for each timepoint in the pandemic.

Attribute	Level	Summer, fewest restrictions [a] aOR for intending to request a test (95% CI) †	*p*	Second lockdown [b] aOR for intending to request a test (95% CI) †	*p*	Third lockdown [c] aOR for intending to request a test (95% CI) †	*p*
Worry about COVID-19	5-point scale (1=not at all worried to 5=extremely worried)	1.04 (0.93 to 1.15)	.49	0.90 (0.81 to 1.01)	.07	1.04 (0.93 to 1.16)	.53
Perceived risk of COVID-19 to self	5-point scale (1=no risk at all to 5=major risk)	0.95 (0.86 to 1.06)	.40	0.92 (0.82 to 1.02)	.11	**0.83 (0.75 to 0.93)**	**.001**
Perceived risk of COVID-19 to people in the UK	5-point scale (1=no risk at all to 5=major risk)	1.06 (0.94 to 1.19)	.35	**1.19 (1.06 to 1.34)**	**.004**	**1.22 (1.08 to 1.38)**	**.002**
Someone could spread coronavirus to other people, even if they do not have symptoms yet	5-point scale (1=strongly disagree to 5=strongly agree)	**1.49 (1.32 to 1.69)**	**<.001**	**1.61 (1.43 to 1.82)**	**<.001**	**1.61 (1.41 to 1.83)**	**<.001**
My personal behaviour has an impact on how coronavirus spreads	5-point scale (1=strongly disagree to 5=strongly agree)	1.13 (1.02 to 1.24)	.01	**1.14 (1.04 to 1.25)**	**.004**	**1.19 (1.08 to 1.31)**	**<.001**
Have enough information about testing	5-point scale (1=strongly disagree to 5=strongly agree)	1.06 (0.98 to 1.15)	.13	1.06 (0.98 to 1.16)	.16	1.08 (0.98 to 1.19)	.12
Perceived credibility of government	Range 4 (lowest credibility) to 20 (highest credibility)	0.97 (0.95 to 0.99)	.007	1.00 (0.98 to 1.02)	.97	0.99 (0.96 to 1.01)	.27
Out-of-home activity (for work and socially)	Range 0 (no outings) to 50 (most outings)	1.01 (0.98 to 1.04)	.61	0.99 (0.96 to 1.02)	.50	0.98 (0.95 to 1.02)	.40

† All variables entered into regression model together (personal and clinical characteristics, and other psychological factors).

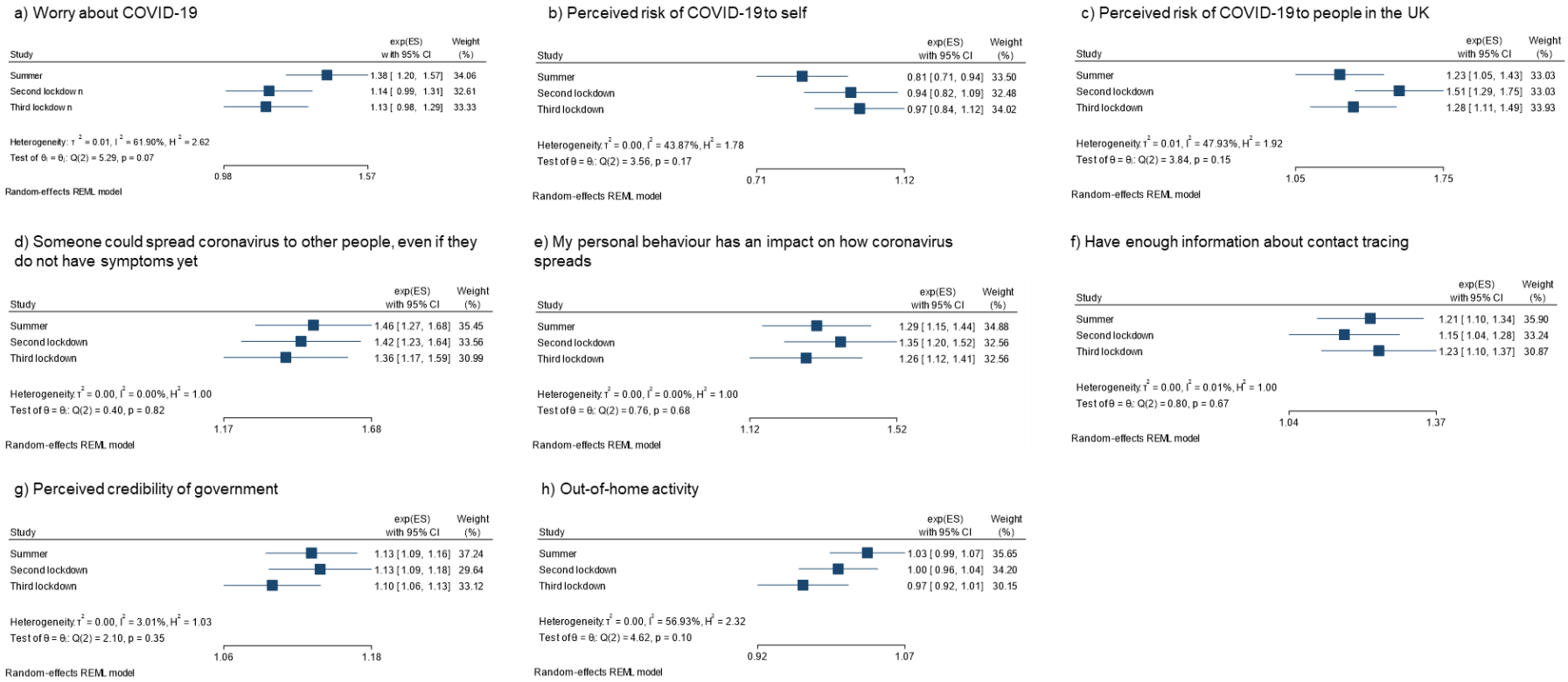
a. Model based on 2646 valid cases (81.7% valid responses).
b. Model based on 2732 valid cases (82.9% valid responses).
c. Model based on 2702 valid cases (84.0% valid responses).

Intention to share details of close contacts

Intention to share details of close contacts differed by timepoint in the pandemic ($\chi^2(2) = 15.3$, $p<.001$, n=9571), with intention slightly increasing over time (Figure 1). In the summer, 76.9% (95% CI 75.5% to 78.4%, n=2493/3240) of people intended to share details of close contacts if they were to be prompted by the NHS contact tracing service. This increased slightly to 80.1% (95% CI 78.7% to 81.4%, n=2639/3296) in the second lockdown, and was 80.6% (95% CI 79.2% to 82.0%, n=2591/3215) in the third lockdown.

There was evidence for substantial heterogeneity in strength of associations between intention to share details of close contacts and worry about COVID-19 (61.9%), and out-of-home activity (I^2=56.9%; Figure 4). There was minimal evidence for a difference in strength of associations between other psychological factors and intention to share details of close contacts at different timepoints in the pandemic.

Figure 4. Heterogeneity of strength of associations between psychological factors and intention to share details of close contacts at different timepoints in the pandemic.



In fully adjusted models, intention to share details of close contacts was associated with greater perceived risk of COVID-19 to oneself and people in the UK, knowing that COVID-19 transmission can be asymptomatic, agreeing that their personal behaviour has an impact on the spread of COVID-19, agreeing that you had enough information about contact tracing, and greater perceived credibility of the UK Government (Table 3). Greater perceived worry about COVID-19 was also associated with intending to share details of close contacts in the summer. Personal and clinical characteristics associated with intention to share details of close contacts are reported in the supplementary materials.

Table 3. Fully adjusted model of factors associated with intention to share details of close contacts, for each timepoint in the pandemic.

Attribute	Level	Summer, fewest restrictions [a] aOR for intending to share details (95% CI) †	*p*	Second lockdown [b] aOR for intending to share details (95% CI) †	*p*	Third lockdown [c] aOR for intending to share details (95% CI) †	*p*
Worry about COVID-19	5-point scale (1=not at all worried to 5=extremely worried)	**1.38 (1.20 to 1.57)**	**<.001**	1.14 (0.99 to 1.31)	.07	1.13 (0.98 to 1.29)	.09
Perceived risk of COVID-19 to self	5-point scale (1=no risk at all to 5=major risk)	**0.81 (0.70 to 0.94)**	**.004**	0.94 (0.82 to 1.09)	.44	0.97 (0.85 to 1.12)	.68
Perceived risk of COVID-19 to people in the UK	5-point scale (1=no risk at all to 5=major risk)	1.22 (1.05 to 1.43)	.009	**1.51 (1.29 to 1.75)**	**<.001**	**1.28 (1.11 to 1.49)**	**.001**
Someone could spread coronavirus to other people, even if they do not have symptoms yet	5-point scale (1=strongly disagree to 5=strongly agree)	**1.46 (1.27 to 1.68)**	**<.001**	**1.42 (1.22 to 1.64)**	**<.001**	**1.36 (1.17 to 1.59)**	**<.001**
My personal behaviour has an impact on how coronavirus spreads	5-point scale (1=strongly disagree to 5=strongly agree)	**1.29 (1.15 to 1.44)**	**<.001**	**1.35 (1.20 to 1.52)**	**<.001**	**1.26 (1.12 to 1.41)**	**<.001**
Have enough information about contact tracing	5-point scale (1=strongly disagree to 5=strongly agree)	**1.21 (1.09 to 1.34)**	**<.001**	1.15 (1.04 to 1.28)	.008	**1.23 (1.11 to 1.37)**	**<.001**
Perceived credibility of government	Range 4 (lowest credibility) to 20 (highest credibility)	**1.13 (1.09 to 1.16)**	**<.001**	**1.13 (1.10 to 1.17)**	**<.001**	**1.10 (1.06 to 1.13)**	**<.001**
Out-of-home activity (for work and socially)	Range 0 (no outings) to 50 (most outings)	1.03 (0.99 to 1.07)	.10	1.00 (0.96 to 1.04)	.91	0.97 (0.92 to 1.01)	.15

† All variables entered into regression model together (personal and clinical characteristics, and other psychological factors).

a. Model based on 2640 valid cases (81.5% valid responses).
b. Model based on 2733 valid cases (82.9% valid responses).
c. Model based on 2695 valid cases (83.8% valid responses).

Discussion

While previous research has investigated the association between socio-demographic factors and adherence to test, trace, and isolate guidance, there has been little research into associations with potentially modifiable psychological factors. We investigated whether a range of psychological factors and out-of-home activity were associated with intention to self-isolate, request a test, and share details of close contacts when required, and whether associations were stronger during periods when less stringent restrictions where in place.

We found few differences in strength of associations by timepoint in the pandemic. While some factors showed evidence of heterogeneity in the strength of associations with outcomes over the pandemic, in practice there was little evidence for associations between outcomes and these factors. The only exceptions were for worry (which was associated with intention to share details of contacts in the summer, but not in the second or third lockdown) and out of home activity (which was associate with lower intention to self-isolate in the third lockdown, but not in any other period). Even in these instances, however, the odds ratios that we found for each period were very similar, suggesting effects are broadly stable over time.

Intention to self-isolate, request a test and share details of close contacts were all associated with greater perceived risk to people in the UK, but not oneself. Given that test, trace and isolate is intended to protect other people when a person is infected with COVID-19, this pattern of results makes sense, though it is notable that perceived risk to others, and not to oneself, has also been reported as a motivation for vaccination in the UK.(20) suggesting that a desire to protect others may be a more fundamental driver of behaviour during the COVID-19 pandemic.

Knowing that COVID-19 transmission can be asymptomatic was also associated with intending to self-isolate, request a test and share details of close contacts. This is in line with theoretical models of the uptake of health behaviour, such as the COM-B model, which posit a role for knowledge (through psychological capability) in determining behaviour.(21) Greater knowledge about transmission and treatment was also associated with uptake of protective behaviours (maintaining distance, wearing a face covering, and hand washing) in another study.(22) For our data, we speculate that greater understanding of the risk of asymptomatic transmission could be associated with a greater belief that SARS-CoV2 is easy to transmit, making test, trace and isolate appear more important.

Agreeing that your personal behaviour has an impact on the spread of COVID-19 was associated with intending to self-isolate, request a test and share details of close contacts. Internal locus of control is associated with health behaviours more generally.(23) Although there is little research investigating locus of control with respect to COVID-19, at least one study has suggested that internal locus of control is associated with intending to engage in various behaviours including handwashing, social distancing, wearing a face covering and staying at home apart from essential reasons.(24) Perceived behavioural control was also the strongest predictor of high uptake of preventive behaviours in a separate study after adjusting for socio-demographic characteristics, perceiving risk, attitudes towards the behaviour, and subjective norms.(25) Potentially, focussing on someone's agency in preventing the spread of infection may be a useful strategy for communications around test, trace and isolate.(26)

Limitations of this study include that we measured intention, rather than actual behaviour. The intention-behaviour gap posits that rates of people carrying out a behaviour are likely to be lower than the rate intending to carry it out.(3, 27) However, our finding that a sizeable minority of respondents report that they do not intend to engage with test, trace or isolate behaviours is an important finding in its own right. Quota sampling was used to generate a sample whose sociodemographic characteristics were broadly representative of the UK population. While we cannot be certain that the views and intended behaviours of people who complete online surveys are representative of the general population, we assume that, that associations between variables follow the same pattern as in the general population.(28) Perceived risk to self could have interacted with vaccination status, but we did not include vaccination status as a variable in analyses. As the COVID-19 vaccination programme was only initiated in England in December 2020, this would only have affected data collected during the third national lockdown. At the time of our data collection, only 6,473,752 first doses and 445,101 second doses of the vaccine had been delivered in England [total population 56 million].(29) Priority groups for vaccination in the UK at that time were people aged 80 years and older, residents in care homes, and health and social care staff.(30, 31) We did not measure all factors that could theoretically have been associated with intention, such as perceived effectiveness and self-efficacy for behaviours. This was due to space limitations in the questionnaire. These could have influenced our results. For example, a service evaluation of NHS Test and Trace in Wales found that adherence to self-isolation was greater in those who had higher confidence in their ability to self-isolate.(32)

Intention to adhere to key components of the test, trace, and isolate system was associated with psychological factors. There were few differences in strength of associations by timepoint in the pandemic. Intention to self-isolate, request a test and share details of contacts were associated with greater perceived risk of COVID-19 to people in the UK, knowing that COVID-19 transmission can be asymptomatic, and agreeing that their personal behaviour has an impact on COVID-19 transmission. Communications should aim to increase knowledge that COVID-19 can be transmitted even if someone does not have symptoms and promote perceived control over transmission; these may encourage adoption of preventive behaviours.

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Supplementary materials. Results of regression analyses controlling only for personal and clinical characteristics.

Intention to self-isolate

Table 1. Factors associated with intention to self-isolate, adjusting for personal and clinical characteristics, for each timepoint in the pandemic.

Attribute	Level	First lockdown				Summer, fewest restrictions				Second lockdown				Third lockdown			
		Did not intend to self-isolate n=602	Intended to self-isolate n=2623	aOR for intending to self-isolate (95% CI) †	*p*	Did not intend to self-isolate n=874	Intended to self-isolate n=2366	aOR for intending to self-isolate (95% CI) †	*p*	Did not intend to self-isolate n=1124	Intended to self-isolate n=2172	aOR for intending to self-isolate (95% CI) †	*p*	Did not intend to self-isolate n=1085	Intended to self-isolate n=2130	aOR for intending to self-isolate (95% CI) †	*p*
Worry about COVID-19	5-point scale (1=not at all worried to 5=extremely worried)	N=598, M=3.6, SD=1.2	N=2619, M=3.6, SD=1.0	1.01 (0.92 to 1.12)	.79	N=863, M=3.3, SD=1.2	N=2358, M=3.4, SD=1.0	**1.13 (1.05 to 1.23)**	**.002**	N=1116, M=3.3, SD=1.2	N=2167, M=3.5, SD=1.0	1.07 (1.00 to 1.16)	.06	N=1080, M=3.6, SD=1.2	N=2129, M=3.7, SD=1.1	1.10 (1.02 to 1.19)	.01
Perceived risk of COVID-19 to self	5-point scale (1=no risk at all to 5=major risk)	N=588, M=3.2, SD=1.2	N=2599, M=3.2, SD=1.1	1.06 (0.97 to 1.17)	.21	N=848, M=3.0, SD=1.2	N=2343, M=3.1, SD=1.1	1.09 (1.01 to 1.19)	.03	N=1087, M=3.1, SD=1.2	N=2155, M=3.2, SD=1.1	1.05 (0.97 to 1.13)	.24	N=1063, M=3.2, SD=1.2	N=2115, M=3.4, SD=1.1	**1.12 (1.04 to 1.21)**	**.004**
Perceived risk of COVID-19 to people in the UK	5-point scale (1=no risk at all to 5=major risk)	N=586, M=3.7, SD=1.0	N=2605, M=3.9, SD=0.9	**1.24 (1.11 to 1.38)**	**<.001**	N=846, M=3.4, SD=1.1	N=2349, M=3.7, SD=0.9	**1.32 (1.19 to 1.45)**	**<.001**	N=1095, M=3.6, SD=1.0	N=2154, M=3.8, SD=0.9	**1.26 (1.16 to 1.37)**	**<.001**	N=1065, M=3.8, SD=1.0	N=2122, M=4.1, SD=0.9	**1.38 (1.26 to 1.50)**	**<.001**
Someone could spread coronavirus to other people, even if they do not have	5-point scale (1=strongly disagree to 5=strongly agree)	N=584, M=4.1, SD=0.9	N=2589, M=4.6, SD=0.7	**1.79 (1.57 to 2.03)**	**<.001**	N=851, M=4.0, SD=0.9	N=2346, M=4.4, SD=0.7	**1.71 (1.53 to 1.92)**	**<.001**	N=1109, M=4.1, SD=0.9	N=2157, M=4.4, SD=0.7	**1.62 (1.46 to 1.80)**	**<.001**	N=1070, M=4.2, SD=0.8	N=2115, M=4.5, SD=0.7	**1.67 (1.49 to 1.86)**	**<.001**

symptoms yet																
My personal behaviour has an impact on how coronavirus spreads	5-point scale (1=strongly disagree to 5=strongly agree)	N=582, M=3.9, SD=1.1	N=2590, M=4.2, SD=1.0	**1.25 (1.14 to 1.38)**	**<.001**	N=852, M=3.7, SD=1.0	N=2342, M=4.1, SD=0.9	**1.39 (1.28 to 1.52)**	**<.001**	N=1108, M=3.7, SD=1.0	N=2153, M=4.1, SD=1.0	**1.37 (1.26 to 1.48)**	**<.001**	N=1072, M=3.9, SD=1.0	N=2120, M=4.2, SD=1.0	**1.32 (1.22 to 1.43)**	**<.001**
Have enough information about self-isolation	5-point scale (1=strongly disagree to 5=strongly agree)	-	-	-	-	N=852, M=3.9, SD=0.9	N=2348, M=4.1, SD=0.8	**1.37 (1.23 to 1.52)**	**<.001**	N=1108, M=3.8, SD=1.0	N=2160, M=4.0, SD=0.9	1.10 (1.01 to 1.20)	.03	N=1064, M=3.9, SD=0.9	N=2121, M=4.1, SD=0.9	**1.23 (1.12 to 1.34)**	**<.001**
Perceived credibility of government	Range 4 (lowest credibility) to 20 (highest credibility)	N=565, M=13.0, SD=3.4	N=2445, M=13.4, SD=3.6	1.00 (0.97 to 1.03)	.94	N=811, M=11.7, SD=3.6	N=2221, M=11.9, SD=3.8	1.01 (0.99 to 1.04)	.23	N=1052, M=11.4, SD=3.6	N=2054, M=11.6, SD=3.8	1.01 (0.99 to 1.03)	.53	N=1010, M=12.1, SD=3.7	N=2027, M=12.4, SD=3.9	1.01 (0.99 to 1.04)	.27
Out-of-home activity (for work and socially)	Range 0 (no outings) to 50 (most outings)	N=602, M=0.9, SD=2.0	N=2623, M=0.6, SD=1.7	0.97 (0.92 to 1.03)	.33	N=874, M=2.4, SD=3.4	N=2366, M=1.9, SD=2.7	1.00 (0.97 to 1.03)	.89	N=1124, M=2.0, SD=3.2	M=2172, M=1.5, SD=2.7	0.99 (0.96 to 1.02)	.37	N=1085, M=1.6, SD=3.0	N=2130, M=1.0, SD=2.0	**0.91 (0.88 to 0.95)**	**<.001**

† Adjusting for survey wave, region, gender, age (raw and quadratic term), dependent child in the household, being clinically vulnerable to COVID-19, having a household member with a chronic illness, employment status, socio-economic grade, index of multiple deprivation, highest educational or professional qualification, ethnicity, living alone, marital status, ever had COVID-19 and financial hardship.

Intention to request a test

Table 2. Factors associated with intention to request a test, adjusting for personal and clinical characteristics, for each timepoint in the pandemic.

Attribute	Level	Summer, fewest restrictions				Second lockdown				Third lockdown			
		Did not intend to request a test n=1709	Intended to request a test n=1531	aOR for intending to request a test (95% CI) †	*p*	Did not intend to request a test n=1288	Intended to request a test n=2008	aOR for intending to request a test (95% CI) †	*p*	Did not intend to request a test n=1206	Intended to request a test n=2009	aOR for intending to request a test (95% CI) †	*p*
Worry about COVID-19	5-point scale (1=not at all worried to 5=extremely worried)	N=1694, M=3.3, SD=1.2	N=1527, M=3.4, SD=1.0	**1.13 (1.05 to 1.21)**	**.001**	N=1278, M=3.4, SD=1.2	N=2005, M=3.5, SD=1.0	1.09 (1.02 to 1.17)	.02	N=1202, M=3.5, SD=1.2	N=2007, M=3.7, SD=1.0	**1.21 (1.12 to 1.30)**	**<.001**
Perceived risk of COVID-19 to self	5-point scale (1=no risk at all to 5=major risk)	N=1675, M=3.0, SD=1.2	N=1516, M=3.1, SD=1.0	**1.11 (1.03 to 1.20)**	**.005**	N=1246, M=3.1, SD=1.2	N=1996, M=3.2, SD=1.1	1.06 (0.98 to 1.14)	.13	N=1181, M=3.3, SD=1.2	N=1997, M=3.4, SD=1.1	1.09 (1.01 to 1.17)	.03
Perceived risk of COVID-19 to people in the UK	5-point scale (1=no risk at all to 5=major risk)	N=1670, M=3.6, SD=1.0	N=1525, M=3.7, SD=0.9	**1.18 (1.08 to 1.28)**	**<.001**	N=1254, M=3.6, SD=1.1	N=1995, M=3.8, SD=0.9	**1.22 (1.12 to 1.32)**	**<.001**	N=1189, M=3.9, SD=1.0	N=1998, M=4.1, SD=0.8	**1.32 (1.21 to 1.44)**	**<.001**
Someone could spread coronavirus to other people, even if they do not have symptoms yet	5-point scale (1=strongly disagree to 5=strongly agree)	N=1681, M=4.2, SD=0.9	N=1516, M=4.5, SD=0.6	**1.59 (1.42 to 1.77)**	**<.001**	N=1268, M=4.1, SD=0.9	N=1998, M=4.5, SD=0.7	**1.73 (1.56 to 1.92)**	**<.001**	N=1192, M=4.2, SD=0.9	N=1993, M=4.6, SD=0.6	**1.82 (1.62 to 2.03)**	**<.001**
My personal behaviour has an impact on how coronavirus spreads	5-point scale (1=strongly disagree to 5=strongly agree)	N=1676, M=3.9, SD=1.0	N=1518, M=4.1, SD=0.9	**1.26 (1.16 to 1.36)**	**<.001**	N=1269, M=3.8, SD=1.1	N=1992, M=4.1, SD=1.0	**1.30 (1.21 to 1.41)**	**<.001**	N=1193, M=3.9, SD=1.0	N=1999, M=4.3, SD=0.9	**1.34 (1.24 to 1.46)**	**<.001**
Have enough information about testing	5-point scale (1=strongly disagree to 5=strongly agree)	N=1681, M=3.5, SD=1.1	N=1519, M=3.5, SD=1.1	1.06 (0.99 to 1.14)	.09	N=1262, M=3.4, SD=1.1	N=1986, M=3.5, SD=1.1	**1.11 (1.03 to 1.19)**	**.005**	N=1172, M=3.6, SD=1.0	N=1998, M=3.8, SD=1.0	**1.14 (1.05 to 1.24)**	**.001**
Perceived credibility of government	Range 4 (lowest credibility) to 20 (highest credibility)	N=1584, M=12.0, SD=3.7	N=1448, M=11.7, SD=3.8	0.98 (0.96 to 1.00)	.12	N=1211, M=11.3, SD=3.8	N=1895, M=11.7, SD=3.7	1.02 (1.00 to 1.04)	.08	N=1129, M=12.0, SD=3.8	N=1908, M=12.5, SD=3.8	1.02 (1.00 to 1.04)	.04
Out-of-home activity (for work and socially)	Range 0 (no outings) to 50 (most outings)	N=1709, M=2.2, SD=3.2	N=1531, M=2.0, SD=2.6	1.00 (0.98 to 1.03)	.77	N=1288, M=1.8, SD=3.5	N=2008, M=1.6, SD=2.5	0.98 (0.95 to 1.01)	.16	N=1206, M=1.3, SD=2.7	M=2009, M=1.2, SD=2.2	0.97 (0.94 to 1.01)	.15

† Adjusting for survey wave, region, gender, age (raw and quadratic term), dependent child in the household, being clinically vulnerable to COVID-19, having a household member with a chronic illness, employment status, socio-economic grade, index of multiple deprivation, highest educational or professional qualification, ethnicity, living alone, marital status, ever had COVID-19 and financial hardship.

Intention to share details of close contacts

Table 3. Factors associated with intention to share details of close contacts, adjusting for personal and clinical characteristics, for each timepoint in the pandemic.

Attribute	Level	Summer, fewest restrictions				Second lockdown				Third lockdown			
		Did not intend to share details n=747	Intended to share details n=2493	aOR for intending to share details (95% CI) †	*p*	Did not intend to share details n=657	Intended to share details n=2639	aOR for intending to share details (95% CI) †	*p*	Did not intend to share details n=624	Intended to share details n=2591	aOR for intending to share details (95% CI) †	*p*
Worry about COVID-19	5-point scale (1=not at all worried to 5=extremely worried)	N=737, M=3.0, SD=1.2	N=2484, M=3.5, SD=1.0	**1.50 (1.38 to 1.64)**	**<.001**	N=646, M=2.9, SD=1.2	N=2637, M=3.5, SD=1.0	**1.75 (1.60 to 1.92)**	**<.001**	N=620, M=3.2, SD=1.3	N=2589, M=3.8, SD=1.0	**1.56 (1.43 to 1.71)**	**<.001**
Perceived risk of COVID-19 to self	5-point scale (1=no risk at all to 5=major risk)	N=722, M=2.8, SD=1.2	N=2469, M=3.2, SD=1.1	**1.26 (1.15 to 1.38)**	**<.001**	N=628, M=2.8, SD=1.1	N=2614, M=3.3, SD=1.1	**1.60 (1.45 to 1.77)**	**<.001**	N=609, M=3.0, SD=1.2	N=2569, M=3.4, SD=1.1	**1.44 (1.31 to 1.58)**	**<.001**
Perceived risk of COVID-19 to people in the UK	5-point scale (1=no risk at all to 5=major risk)	N=717, M=3.3, SD=1.0	N=2478, M=3.7, SD=0.9	**1.50 (1.36 to 1.66)**	**<.001**	N=633, M=3.3, SD=1.1	N=2616, M=3.8, SD=0.9	**2.01 (1.81 to 2.23)**	**<.001**	N=608, M=3.6, SD=1.1	N=2579, M=4.1, SD=0.8	**1.75 (1.58 to 1.95)**	**<.001**
Someone could spread coronavirus to other people, even if they do not have symptoms yet	5-point scale (1=strongly disagree to 5=strongly agree)	N=722, M=4.0, SD=0.9	N=2475, M=4.4, SD=0.7	**1.80 (1.60 to 2.02)**	**<.001**	N=643, M=3.9, SD=0.9	N=2623, M=4.4, SD=0.7	**1.90 (1.69 to 2.13)**	**<.001**	N=612, M=4.0, SD=1.0	N=2573, M=4.5, SD=0.7	**1.93 (1.71 to 2.19)**	**<.001**
My personal behaviour has an impact on how coronavirus spreads	5-point scale (1=strongly disagree to 5=strongly agree)	N=724, M=3.6, SD=1.1	N=2470, M=4.1, SD=0.9	**1.59 (1.45 to 1.74)**	**<.001**	N=635, M=3.5, SD=1.0	N=2626, M=4.1, SD=1.0	**1.73 (1.58 to 1.89)**	**<.001**	N=613, M=3.7, SD=1.1	N=2579, M=4.2, SD=0.9	**1.62 (1.48 to 1.78)**	**<.001**
Have enough information about contact tracing	5-point scale (1=strongly disagree to 5=strongly agree)	N=723, M=3.1, SD=1.1	N=2464, M=3.5, SD=1.1	**1.41 (1.30 to 1.53)**	**<.001**	N=640, M=3.0, SD=1.2	N=2605, M=3.5, SD=1.1	**1.44 (1.32 to 1.56)**	**<.001**	N=603, M=3.0, SD=1.1	N=2567, M=3.5, SD=1.1	**1.47 (1.35 to 1.60)**	**<.001**
Perceived credibility of government	Range 4 (lowest credibility) to 20 (highest credibility)	N=690, M=10.5, SD=3.5	N=2342, M=12.2, SD=3.7	**1.15 (1.12 to 1.18)**	**<.001**	N=605, M=9.7, SD=3.6	N=2501, M=12.0, SD=3.6	**1.19 (1.16 to 1.22)**	**<.001**	N=577, M=10.5, SD=3.8	N=2460, M=12.7, SD=3.7	**1.17 (1.13 to 1.20)**	**<.001**
Out-of-home activity (for work and socially)	Range 0 (no outings) to 50 (most outings)	N=747, M=2.3, SD=3.3	N=2493, M=2.0, SD=2.8	1.01 (0.98 to 1.05)	.38	M=657, M=2.0, SD=2.9	N=2639, M=1.6, SD=2.9	0.98 (0.95 to 1.01)	.16	N=624, M=1.5, SD=3.1	N=2591, M=1.2, SD=2.2	0.95 (0.92 to 0.99)	.02

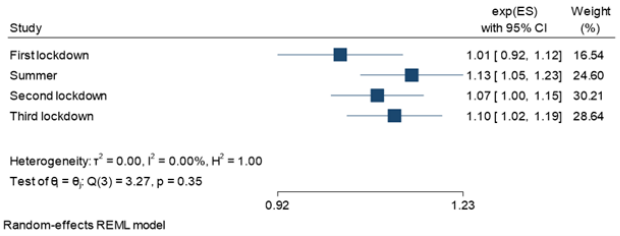
† Adjusting for survey wave, region, gender, age (raw and quadratic term), dependent child in the household, being clinically vulnerable to COVID-19, having a household member with a chronic illness, employment status, socio-economic grade, index of multiple deprivation, highest educational or professional qualification, ethnicity, living alone, marital status, ever had COVID-19 and financial hardship.

Supplementary materials. Results of heterogeneity analyses controlling only for personal and clinical characteristics.

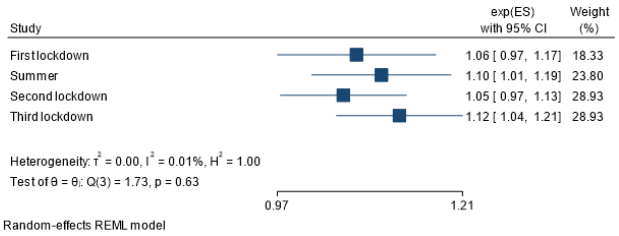
Intention to self-isolate

Figure 1. Heterogeneity of strength of associations between psychological factors and intention to self-isolate at different timepoints in the pandemic, when controlling for personal and clinical characteristics.

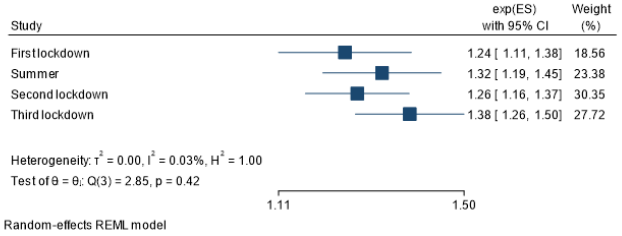
a) Worry about COVID-19



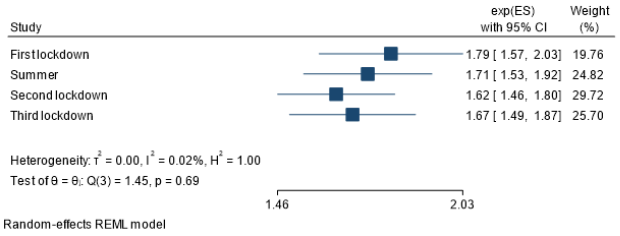
b) Perceived risk of COVID-19to self



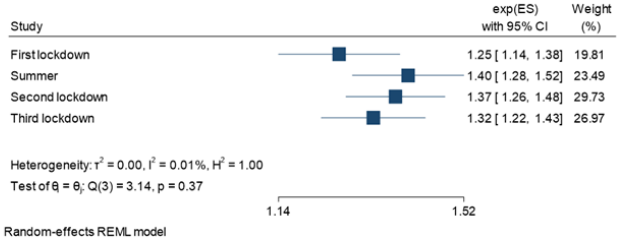
c) Perceived risk of COVID-19to people in the UK



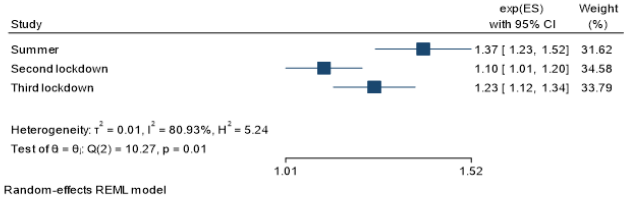
d) Someone could spread coronavirus to other people, even if they do not have symptoms yet



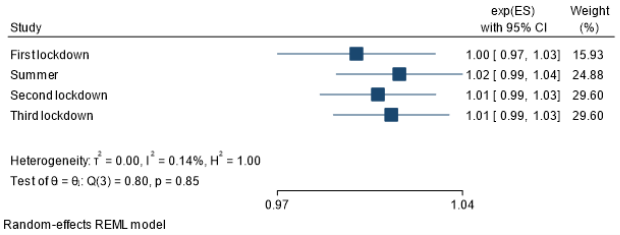
e) My personal behaviour has an impact on how coronavirus spreads



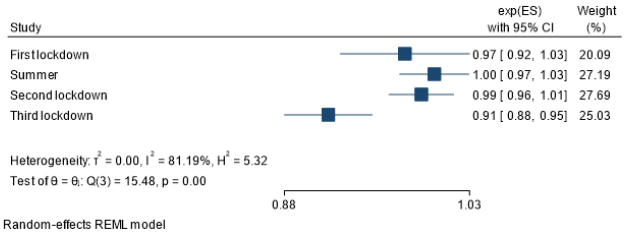
f) Have enough information about self-isolation



g) Perceived credibility of government

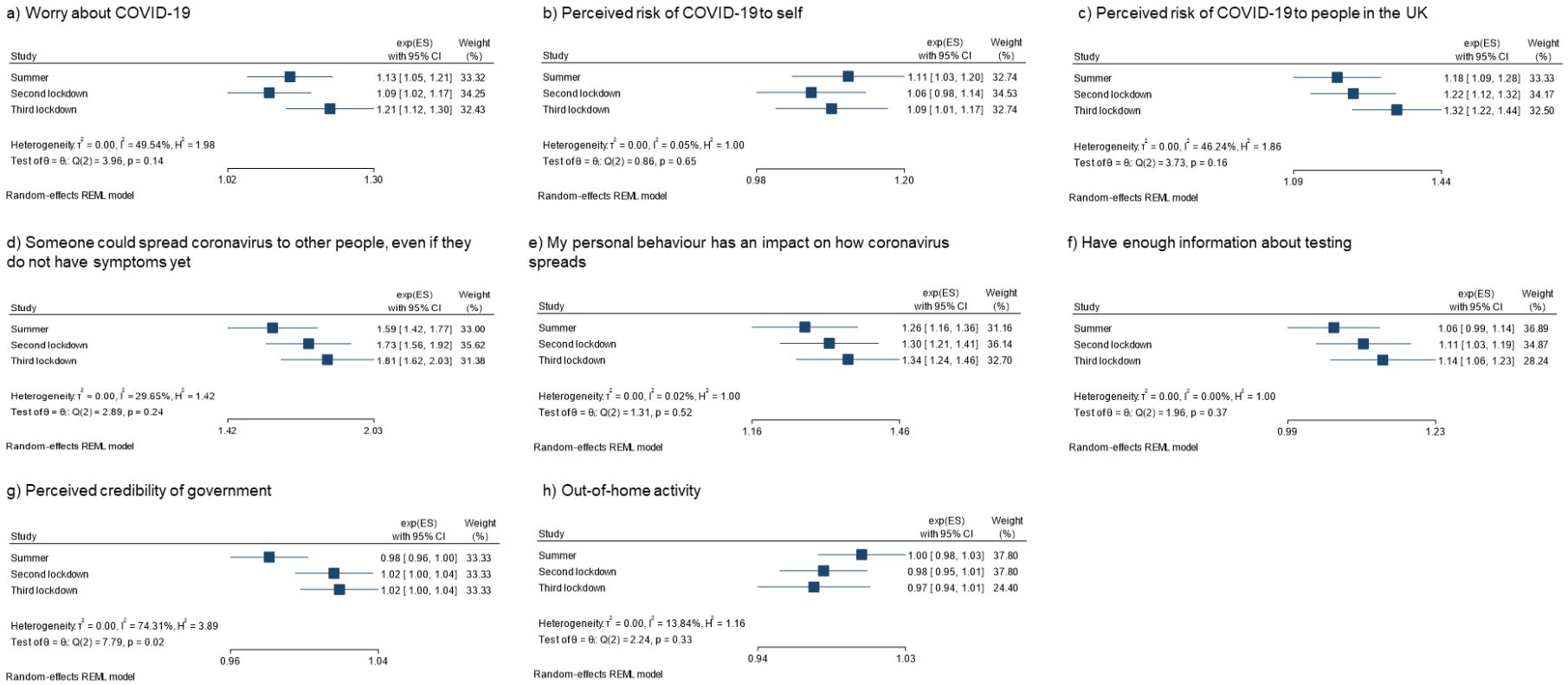


h) Out-of-home activity



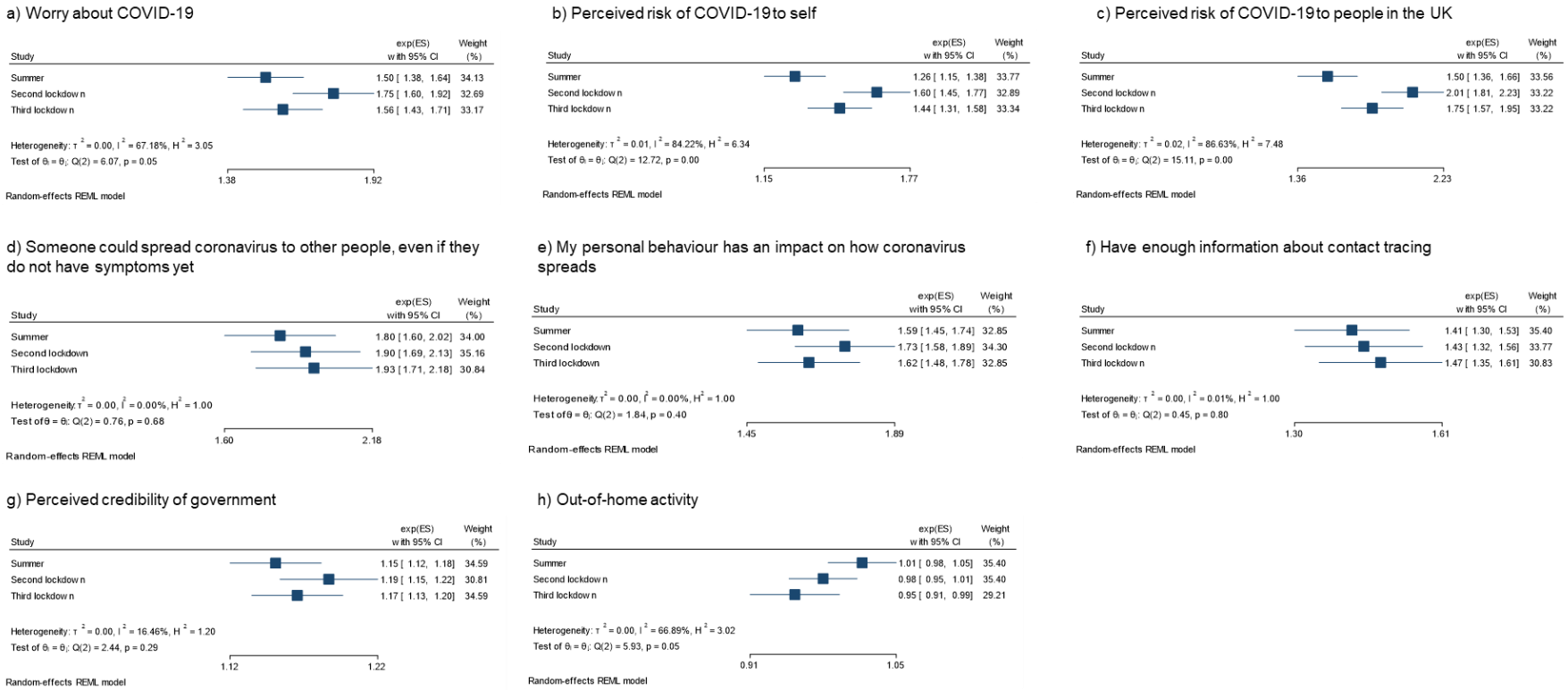
Intention to request a test

Figure 2. Heterogeneity of strength of associations between psychological factors and intention to request a test at different timepoints in the pandemic, when controlling for personal and clinical characteristics.



Intention to share details of close contacts

Figure 3. Heterogeneity of strength of associations between psychological factors and intention to share details of close contacts at different timepoints in the pandemic, when controlling for personal and clinical characteristics.



Supplementary materials. Associations between personal and clinical characteristics and outcomes in fully adjusted regression models.

Intention to self-isolate

Table 1. Personal and clinical characteristics associated with intention to self-isolate in fully adjusted regression models, for each timepoint in the pandemic.

Attribute	Level	First lockdown [a] aOR for intending to self-isolate (95% CI) †	*p*	Summer, fewest restrictions [b] aOR for intending to self-isolate (95% CI) ‡	*p*	Second lockdown [c] aOR for intending to self-isolate (95% CI) ‡	*p*	Third lockdown [d] aOR for intending to self-isolate (95% CI) ‡	*p*
Survey wave	Wave 1 in timepoint	Ref	-	Ref	-	Ref	-	Ref	-
	Wave 2 in timepoint	0.96 (0.78 to 1.19)	.73	1.28 (1.06 to 1.54)	.01	1.02 (0.86 to 1.20)	.84	1.02 (0.86 to 1.21)	.83
Region	East Midlands	Ref	-	Ref	-	Ref	-	Ref	-
	East of England	0.76 (0.46 to 1.24)	.27	0.72 (0.46 to 1.12)	.14	1.06 (0.74 to 1.53)	.74	1.04 (0.71 to 1.52)	.84
	London	0.68 (0.43 to 1.10)	.12	0.68 (0.45 to 1.05)	.08	0.86 (0.60 to 1.23)	.40	0.68 (0.46 to 0.99)	.05
	North East	0.70 (0.39 to 1.25)	.22	0.87 (0.50 to 1.51)	.61	0.79 (0.52 to 1.21)	.28	0.90 (0.56 to 1.44)	.67
	North West	0.86 (0.53 to 1.40)	.55	0.76 (0.49 to 1.18)	.22	0.97 (0.68 to 1.39)	.87	0.95 (0.65 to 1.38)	.79
	South East	0.61 (0.39 to 0.97)	.04	0.83 (0.54 to 1.26)	.38	1.47 (1.03 to 2.10)	.03	1.27 (0.88 to 1.83)	.20
	South West	0.68 (0.42 to 1.11)	.13	0.73 (0.46 to 1.15)	.18	0.94 (0.64 to 1.37)	.74	0.82 (0.56 to 1.20)	.30
	West Midlands	0.67 (0.42 to 1.09)	.11	0.77 (0.49 to 1.2)	.25	0.76 (0.52 to 1.11)	.16	0.79 (0.54 to 1.17)	.24
	Yorkshire and The Humber	1.22 (0.72 to 2.05)	.46	0.77 (0.49 to 1.21)	.26	0.85 (0.58 to 1.24)	.39	1.09 (0.74 to 1.61)	.66
	Overall	$\chi^2(8)=13.6$	.09	$\chi^2(8)=4.0$	.85	$\chi^2(8)=19.5$	.01	$\chi^2(8)=18.5$	.02
Gender	Male	Ref	-	Ref	-	Ref	-	Ref	-
	Female	**1.47 (1.18 to 1.82)**	**.001**	1.31 (1.08 to 1.58)	.007	1.24 (1.04 to 1.47)	.02	1.20 (1.00 to 1.43)	.04
Age (per decade)	Raw age	1.00 (0.92 to 1.09)	.98	1.01 (0.93 to 1.08)	.88	0.97 (0.90 to 1.04)	.33	0.99 (0.92 to 1.06)	.68
Age: quadratic (age-mean)^2	-	1.0001 (0.9997 to 1.0005)	.59	1.0003 (0.9999 to 1.0006)	.15	1 (0.9997 to 1.0003)	1.00	**0.9995 (0.9992 to 0.9998)**	**.001**
Dependent child in household	None	Ref	-	Ref	-	Ref	-	Ref	-
	Child present	0.73 (0.56 to 0.94)	.02	0.97 (0.78 to 1.22)	.81	0.90 (0.73 to 1.11)	.34	**0.73 (0.59 to 0.91)**	**.004**
Clinically vulnerable to COVID-19	No	Ref	-	Ref	-	Ref	-	Ref	-
	Yes	1.12 (0.84 to 1.51)	.44	1.26 (0.96 to 1.66)	.09	**1.40 (1.10 to 1.77)**	**.006**	1.30 (1.02 to 1.67)	.03
Household member has chronic illness	No	Ref	-	Ref	-	Ref	-	Ref	-
	Yes	1.19 (0.88 to 1.60)	.26	1.03 (0.80 to 1.34)	.80	1.39 (1.09 to 1.77)	.008	1.20 (0.94 to 1.54)	.14
Employment status	Not working	Ref	-	Ref	-	Ref	-	Ref	-
	Working	0.99 (0.76 to 1.29)	.93	0.83 (0.66 to 1.04)	.11	0.80 (0.65 to 0.99)	.04	0.90 (0.72 to 1.12)	.35
Socio-economic grade‡	ABC1	Ref	-	Ref	-	Ref	-	Ref	-
	C2DE	0.96 (0.75 to 1.22)	.72	0.76 (0.62 to 0.95)	.01	0.81 (0.67 to 0.98)	.03	1.00 (0.81 to 1.23)	.99
Index of multiple deprivation	1st (least) to 4th quartile (most deprived)	0.96 (0.87 to 1.06)	.44	0.98 (0.89 to 1.07)	.65	0.94 (0.87 to 1.02)	.16	0.95 (0.87 to 1.03)	.20
Highest educational or professional qualification	Less than degree	Ref	-	Ref	-	Ref	-	Ref	-
	Degree or higher	0.98 (0.78 to 1.24)	.88	1.04 (0.84 to 1.28)	0.72	1.07 (0.88 to 1.29)	.50	0.89 (0.74 to 1.08)	.25

Ethnicity	White British	Ref	-	Ref	-	Ref	-	Ref	-
	White other	0.71 (0.47 to 1.07)	.10	0.85 (0.59 to 1.24)	.41	0.83 (0.58 to 1.18)	.29	1.04 (0.72 to 1.50)	.84
	Black and minority ethnicity	1.14 (0.77 to 1.70)	.51	0.96 (0.69 to 1.35)	.83	0.86 (0.63 to 1.17)	.34	1.28 (0.92 to 1.78)	.14
	Overall	$\chi^2(2)=3.5$	.17	$\chi^2(2)=0.7$	.71	$\chi^2(2)=1.7$	.42	$\chi^2(2)=2.2$	.34
Living alone	Not living alone	Ref	-	Ref	-	Ref	-	Ref	-
	Living alone	0.96 (0.68 to 1.36)	.83	0.92 (0.68 to 1.25)	.60	1.38 (1.04 to 1.85)	.03	0.72 (0.54 to 0.96)	.03
Marital status	Not partnered	Ref	-	Ref	-	Ref	-	Ref	-
	Partnered	1.11 (0.84 to 1.45)	.46	1.24 (0.98 to 1.57)	.07	1.23 (0.98 to 1.54)	.08	0.79 (0.63 to 1.00)	.05
Ever had COVID-19	Think not	Ref	-	Ref	-	Ref	-	Ref	-
	Think yes	0.79 (0.56 to 1.12)	.18	0.79 (0.60 to 1.04)	.09	0.80 (0.62 to 1.02)	.08	0.93 (0.73 to 1.19)	.57
Financial hardship	Range 3 (least) to 15 (most)	**0.87 (0.83 to 0.91)**	**<.001**	**0.91 (0.88 to 0.94)**	**<.001**	0.96 (0.93 to 0.99)	.02	0.96 (0.93 to 1.00)	.03

† All variables entered into regression model together (personal and clinical characteristics), excluding perceived adequacy of information about self-isolation.
‡ All variables entered into regression model together (personal and clinical characteristics), including perceived adequacy of information about self-isolation.

a. Model based on 2694 valid cases (83.5% valid responses).
b. Model based on 2645 valid cases (81.6% valid responses).
c. Model based on 2742 valid cases (83.2% valid responses).
d. Model based on 2704 valid cases (84.1% valid responses).

Intention to request a test

Table 2. Personal and clinical characteristics associated with intention to request a test in fully adjusted regression models, for each timepoint in the pandemic.

Attribute	Level	Summer, fewest restrictions [a] aOR for intending to request a test (95% CI) †	*p*	Second lockdown [b] aOR for intending to request a test (95% CI) †	*p*	Third lockdown [c] aOR for intending to request a test (95% CI) †	*p*
Survey wave	Wave 1 in timepoint	Ref	-	Ref	-	Ref	-
	Wave 2 in timepoint	1.15 (0.98 to 1.35)	.10	1.00 (0.85 to 1.18)	.97	1.08 (0.92 to 1.28)	.36
Region	East Midlands	Ref	-	Ref	-	Ref	-
	East of England	1.22 (0.85 to 1.75)	.27	0.95 (0.67 to 1.36)	.80	1.08 (0.74 to 1.56)	.70
	London	0.94 (0.66 to 1.33)	.72	0.67 (0.47 to 0.95)	.02	0.82 (0.57 to 1.20)	.31
	North East	1.51 (0.96 to 2.36)	.07	0.85 (0.56 to 1.30)	.46	0.79 (0.50 to 1.25)	.32
	North West	1.07 (0.76 to 1.52)	.69	0.99 (0.70 to 1.42)	.97	0.94 (0.65 to 1.36)	.74
	South East	1.30 (0.92 to 1.82)	.13	1.09 (0.77 to 1.53)	.62	1.04 (0.73 to 1.47)	.84
	South West	0.98 (0.68 to 1.42)	.92	0.85 (0.59 to 1.23)	.39	1.15 (0.78 to 1.68)	.48
	West Midlands	0.87 (0.61 to 1.25)	.46	0.98 (0.67 to 1.42)	.91	0.91 (0.62 to 1.33)	.62
	Yorkshire and The Humber	1.11 (0.77 to 1.59)	.58	0.92 (0.64 to 1.34)	.67	0.79 (0.54 to 1.14)	.21
	Overall	$\chi^2(8)=12.6$	.13	$\chi^2(8)=12.0$	.15	$\chi^2(8)=8.3$	.40
Gender	Male	Ref	-	Ref	-	Ref	-
	Female	**1.50 (1.27 to 1.77)**	**<.001**	**1.40 (1.18 to 1.65)**	**<.001**	**1.55 (1.31 to 1.84)**	**<.001**
Age (per decade)	Raw age	1.00 (0.94 to 1.06)	.95	0.92 (0.86 to 0.99)	.02	0.93 (0.87 to 1.00)	.04
Age: quadratic (age-mean)^2	-	1.0002 (0.9999 to 1.0005)	.30	0.9999 (0.9996 to 1.0003)	.74	0.9998 (0.9995 to 1.0001)	.12
Dependent child in household	None	Ref	-	Ref	-	Ref	-
	Child present	0.99 (0.81 to 1.21)	.92	1.06 (0.87 to 1.31)	.55	0.98 (0.80 to 1.21)	.87
Clinically vulnerable to COVID-19	No	Ref	-	Ref	-	Ref	-
	Yes	1.22 (0.98 to 1.53)	.08	0.97 (0.78 to 1.21)	.78	1.19 (0.95 to 1.50)	.14
Household member has chronic illness	No	Ref	-	Ref	-	Ref	-
	Yes	0.98 (0.79 to 1.22)	.86	1.08 (0.85 to 1.36)	.54	1.23 (0.97 to 1.56)	.09
Employment status	Not working	Ref	-	Ref	-	Ref	-
	Working	0.95 (0.79 to 1.16)	.64	0.97 (0.79 to 1.19)	.77	1.18 (0.95 to 1.45)	.13
Socio-economic grade‡	ABC1	Ref	-	Ref	-	Ref	-
	C2DE	0.87 (0.72 to 1.05)	.15	0.88 (0.72 to 1.06)	.18	0.89 (0.73 to 1.09)	.25
Index of multiple deprivation	1st (least) to 4th quartile (most deprived)	0.95 (0.88 to 1.02)	.16	0.90 (0.83 to 0.97)	.008	0.92 (0.85 to 1.00)	.05
Highest educational or professional qualification	Less than degree	Ref	-	Ref	-	Ref	-
	Degree or higher	**1.35 (1.13 to 1.62)**	**.001**	0.91 (0.76 to 1.10)	.34	0.84 (0.70 to 1.02)	.07
Ethnicity	White British	Ref	-	Ref	-	Ref	-
	White other	0.68 (0.48 to 0.95)	.03	0.68 (0.48 to 0.96)	.03	0.83 (0.58 to 1.19)	.32
	Black and minority ethnicity	0.70 (0.52 to 0.96)	.03	0.76 (0.56 to 1.04)	.09	0.68 (0.50 to 0.94)	.02
	Overall	$\chi^2(2)=8.5$	.01	$\chi^2(2)=6.7$	.04	$\chi^2(2)=6.0$	.05
Living alone	Not living alone	Ref	-	Ref	-	Ref	-

	Living alone	1.13 (0.86 to 1.48)	.40	0.93 (0.70 to 1.23)	.59	0.81 (0.61 to 1.08)	.15
Marital status	Not partnered	Ref	-	Ref	-	Ref	-
	Partnered	1.14 (0.93 to 1.40)	.22	1.10 (0.88 to 1.38)	.40	1.01 (0.81 to 1.27)	.91
Ever had COVID-19	Think not	Ref	-	Ref	-	Ref	-
	Think yes	0.88 (0.69 to 1.14)	.34	0.87 (0.68 to 1.12)	.28	0.98 (0.76 to 1.25)	.86
Financial hardship	Range 3 (least) to 15 (most)	**0.94 (0.91 to 0.97)**	**<.001**	**0.94 (0.91 to 0.97)**	**<.001**	**0.93 (0.90 to 0.96)**	**<.001**

† All variables entered into regression model together (personal and clinical characteristics, and other psychological factors).

a. Model based on 2646 valid cases (81.7% valid responses).
b. Model based on 2732 valid cases (82.9% valid responses).
c. Model based on 2702 valid cases (84.0% valid responses).

Intention to share details of close contacts

Table 3. Personal and clinical characteristics associated with intention to share details of close contacts in fully adjusted regression models, for each timepoint in the pandemic.

Attribute	Level	Summer, fewest restrictions [a] aOR for intending to share details (95% CI) †	*p*	Second lockdown [b] aOR for intending to share details (95% CI) †	*p*	Third lockdown [c] aOR for intending to share details (95% CI) †	*p*
Survey wave	Wave 1 in timepoint	Ref	-	Ref	-	Ref	-
	Wave 2 in timepoint	1.15 (0.94 to 1.42)	.18	1.29 (1.04 to 1.60)	.02	1.2 (0.97 to 1.49)	.10
Region	East Midlands	Ref	-	Ref	-	Ref	-
	East of England	1.09 (0.67 to 1.76)	.74	0.86 (0.55 to 1.36)	.53	0.89 (0.55 to 1.45)	.65
	London	0.85 (0.54 to 1.35)	.50	0.97 (0.62 to 1.53)	.90	0.78 (0.48 to 1.27)	.32
	North East	1.52 (0.80 to 2.89)	.20	1.32 (0.75 to 2.34)	.34	1.02 (0.56 to 1.87)	.95
	North West	1.05 (0.66 to 1.68)	.82	1.36 (0.85 to 2.18)	.20	1.19 (0.73 to 1.94)	.49
	South East	0.88 (0.56 to 1.38)	.58	1.57 (0.99 to 2.49)	.05	1.09 (0.68 to 1.74)	.73
	South West	1.17 (0.70 to 1.97)	.54	1.12 (0.68 to 1.83)	.65	1.13 (0.68 to 1.90)	.63
	West Midlands	0.73 (0.45 to 1.16)	.18	0.74 (0.46 to 1.18)	.21	0.85 (0.51 to 1.41)	.53
	Yorkshire and The Humber	0.89 (0.55 to 1.43)	.63	1.15 (0.70 to 1.89)	.57	0.78 (0.48 to 1.26)	.31
	Overall	$\chi^2(8)=9.8$	.28	$\chi^2(8)=16.9$	.03	$\chi^2(8)=7.7$	.46
Gender	Male	Ref	-	Ref	-	Ref	-
	Female	**1.43 (1.16 to 1.77)**	**.001**	1.17 (0.94 to 1.47)	.16	0.97 (0.78 to 1.21)	.78
Age (per decade)	Raw age	**1.23 (1.13 to 1.34)**	**<.001**	**1.16 (1.06 to 1.28)**	**.002**	1.08 (0.99 to 1.18)	.09
Age: quadratic (age-mean)^2	-	**1.0007 (1.0003 to 1.0012)**	**.001**	**1.001 (1.0006 to 1.0015)**	**<.001**	**1.0006 (1.0002 to 1.0010)**	**.003**
Dependent child in household	None	Ref	-	Ref	-	Ref	-
	Child present	0.98 (0.77 to 1.25)	.86	1.44 (1.10 to 1.88)	.008	1.10 (0.84 to 1.42)	.49
Clinically vulnerable to COVID-19	No	Ref	-	Ref	-	Ref	-
	Yes	1.34 (0.98 to 1.83)	.07	1.22 (0.89 to 1.69)	.22	1.29 (0.94 to 1.78)	.12
Household member has chronic illness	No	Ref	-	Ref	-	Ref	-
	Yes	1.07 (0.80 to 1.43)	.66	1.09 (0.80 to 1.49)	.59	1.57 (1.13 to 2.18)	.008
Employment status	Not working	Ref	-	Ref	-	Ref	-
	Working	0.86 (0.67 to 1.11)	.24	1.20 (0.92 to 1.57)	.17	1.43 (1.10 to 1.86)	.008
Socio-economic grade‡	ABC1	Ref	-	Ref	-	Ref	-
	C2DE	0.88 (0.69 to 1.12)	.29	0.79 (0.62 to 1.01)	.06	1.05 (0.82 to 1.36)	.69
Index of multiple deprivation	1st (least) to 4th quartile (most deprived)	0.96 (0.87 to 1.06)	.44	1.01 (0.91 to 1.13)	.82	0.89 (0.80 to 0.99)	.03
Highest educational or professional qualification	Less than degree	Ref	-	Ref	-	Ref	-
	Degree or higher	**1.47 (1.17 to 1.86)**	**.001**	1.03 (0.81 to 1.32)	.79	1.07 (0.84 to 1.37)	.59
Ethnicity	White British	Ref	-	Ref	-	Ref	-
	White other	0.69 (0.47 to 1.02)	.06	0.97 (0.62 to 1.51)	.90	**2.10 (1.25 to 3.53)**	**.005**
	Black and minority ethnicity	0.75 (0.52 to 1.08)	.12	0.60 (0.42 to 0.88)	.008	0.85 (0.58 to 1.24)	.40
	Overall	$\chi^2(2)=4.9$	.08	$\chi^2(2)=7.1$	.03	$\chi^2(2)=9.5$	.009
Living alone	Not living alone	Ref	-	Ref	-	Ref	-
	Living alone	0.95 (0.68 to 1.33)	.75	1.00 (0.69 to 1.44)	1.00	1.18 (0.83 to 1.68)	.36

Marital status	Not partnered	Ref	-	Ref	-	Ref	-
	Partnered	1.34 (1.04 to 1.73)	.02	0.97 (0.72 to 1.30)	.84	1.15 (0.87 to 1.51)	.33
Ever had COVID-19	Think not	Ref	-	Ref	-	Ref	-
	Think yes	0.97 (0.72 to 1.31)	.86	1.04 (0.75 to 1.43)	.81	0.96 (0.71 to 1.30)	.80
Financial hardship	Range 3 (least) to 15 (most)	1.02 (0.97 to 1.06)	.48	0.97 (0.93 to 1.01)	.13	0.96 (0.92 to 1.01)	.09

† All variables entered into regression model together (personal and clinical characteristics, and other psychological factors).

a. Model based on 2640 valid cases (81.5% valid responses).
b. Model based on 2733 valid cases (82.9% valid responses).
c. Model based on 2695 valid cases (83.8% valid responses