**Web Appendix for**

# Which Beliefs? Behavior-Predictive Beliefs are Inconsistent with Information-Based Beliefs: Evidence from COVID-19

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# A Data

## A.1 Full Survey Questions and Data Coding

**Self-reported behavior questions (module F).** Health-protective behaviors elicited in module F, which are only briefly described in Table 1, include: 9 private-domain behaviors of increasing the hand-washing frequency relative to a pre-epidemic habit (by at least 5, 10 or 15 more times per day) (F1–F3); cleaning or sanitizing incoming mail and deliveries (F4); cleaning or sanitizing groceries (F5); cleaning or sanitizing furniture or frequently touched items (F6); avoiding touching own face (F7); stopping breath when passing near others (F8); coughing into elbow rather than palm (F9); and 3 public-domain behaviors of avoiding contact with people from a high-risk group (F10); avoiding meeting family and friends (F11); avoiding public spaces, gatherings and crowds (F12).

5 responses do not have answers to all 9 private-behavior questions, and 6 responses do not have answers to all 12 questions. These responses are excluded from behavior-relevant analyses.

**Demographic Questions.** The demographic questions in the end of the survey include: number of people in household (analyzed using 4 categories: 1/2/3/4 and above); number of people above 18 (same categories); gender (male/female/other); Hispanic origin (yes/no); race (White/Black/Asian/Native/other); age (6 categories: 18 (inclusive)–30 (not inclusive)/30–40/40–50/50–60/60–70/70 and above); education (10 categories); marital status (6); employment status (6); economic attitudes (7-point scale from very liberal to very conservative); social attitudes (same 7-point scale); political self-identification (Republican/Democrat/Independent/other/none); combined household income (8 brackets for $0–$200,000; or above $200,000); medical insurance coverage (bad/fair/good); have been infected with COVID-19 (yes/no/prefer not to answer); someone from immediate family has been infected (same options).

Some responses seem to have mistakes or typos in reported birth years. We correct negative reported birth years to be positive; after this correction, birth years indicating an age below 18 or above 120 are marked as missing values (122 birth-year responses; 0.9 percent of the main sample). In other responses, not all demographic questions are answered. On total, 345 responses (2.5 percent of the main sample) have at least one missing value to a demographic question. Such missing values are treated as a separate category.

In some of the appendix analyses, demographics are coded binarily to investigate and present their effects in an easier fashion. The variables are coded binarily using the category(ies) in parentheses and its (their) negation: gender (Female); Hispanic origin (yes); race (not White); age (40 and above); education (less than 4-year college); marital status (not married); employment status (not working); economic attitudes (non-liberal); social attitudes (non-liberal); political self-identification (Republican); combined household income (less than 60K); medical insurance coverage (fair or bad); have been infected with COVID-19 (yes); someone from immediate family has been infected (yes). Missing values are pooled together with the negation of these definitions.

**Other questions.** The survey ends with an open question for general feedback. Other open questions were added for limited amounts of days just before the last question, to investigate some findings during the study. Since they were only added in the end of the survey in chunks of one or two questions at a time, we consider their effect on the whole survey as minimal and treat responses with answers to such questions similarly to other responses.

**Screenshots.** The following figures show screenshots of the entire survey.

Figure A.1: First page: IP screening

0% 100%

Warning!

This survey uses a protocol to check that you are responding from inside the U.S. and not using a Virtual Private Server (VPS), Virtual Private Network (VPN), or proxy to hide your country. In order to take this survey, please **turn off your VPS/VPN/proxy** if you are using one and also any ad blocking applications. Failure to do this might prevent you from completing the HIT.

For further information on why we are requesting this, see this post from TurkPrime (https://goo.gl/WD6QD4).

Next →

Figure A.2: Second page: Consent, state of residence and CAPTCHA screening

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Thank you for participating in this survey! The survey asks about coronavirus outcomes. Your participation is voluntary, and is greatly appreciated. We do not anticipate any risks from participating in this survey. We anticipate that your participation in this survey presents no greater risk than everyday use of the internet. We are committed to protecting your privacy. After validating that your response qualifies for payment, your answers will remain anonymous and will take part in an aggregate statistical analysis only. You may withdraw from the survey at any time or skip questions you feel uncomfortable answering.

We anticipate that this survey will take you about 5 minutes to complete.

It is very important that you complete this survey on your own and answer truthfully, as we hope it will help understanding the virus situation better. **Responding without adequate effort may result in your responses being flagged for low quality.**

Additional Information

The main researcher conducting this study is Ori Heffetz, a professor at Cornell University. Please ask any questions you have at oh33@cornell.edu. If you have any questions or concerns regarding your rights as a subject in this study, you may contact the Institutional Review Board (IRB) for Human Participants at 607-255-5138 or access their website at http://www.irb.cornell.edu. You may also report your concerns or complaints anonymously through Ethicspoint online at www.hotline.cornell.edu or by calling toll free at 1-866-293-3077. Ethicspoint is an independent organization that serves as a liaison between the University and the person bringing the complaint so that anonymity can be ensured.

Please enter your MTurk Worker ID:

In which state do you currently reside?

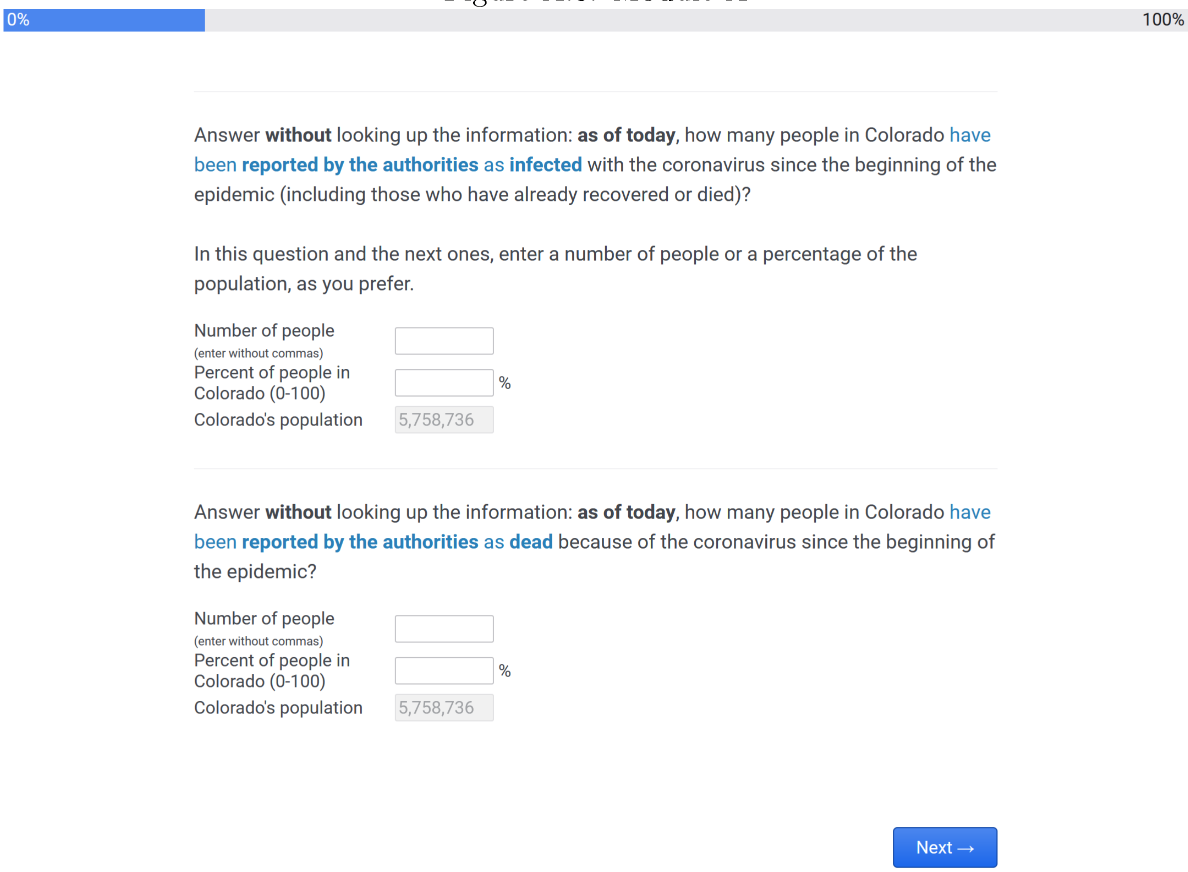
To proceed, verify that you are a human:

I'm not a robot

reCAPTCHA
Privacy - Terms

Next →

Figure A.3: Module A



0% 100%

Answer **without** looking up the information: **as of today**, how many people in Colorado have been **reported by the authorities** as **infected** with the coronavirus since the beginning of the epidemic (including those who have already recovered or died)?

In this question and the next ones, enter a number of people or a percentage of the population, as you prefer.

Number of people
(enter without commas)
Percent of people in Colorado (0-100) %
Colorado's population 5,758,736

Answer **without** looking up the information: **as of today**, how many people in Colorado have been **reported by the authorities** as **dead** because of the coronavirus since the beginning of the epidemic?

Number of people
(enter without commas)
Percent of people in Colorado (0-100) %
Colorado's population 5,758,736

Next →

Figure A.4: Module B

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Give your best estimates: How many people in Colorado will have been **infected** with the coronavirus since the beginning of the epidemic (including those who have already recovered or died)?

(The numbers may differ from the ones reported by the authorities)

**As of today**:

| | |
|---|---|
| Number of people (enter without commas) | |
| Percent of people in Colorado (0-100) | % |
| Colorado's population | 5,758,736 |

**As of a week from now**:

| | |
|---|---|
| Number of people (enter without commas) | |
| Percent of people in Colorado (0-100) | % |
| Colorado's population | 5,758,736 |

**As of a month from now**:

| | |
|---|---|
| Number of people (enter without commas) | |
| Percent of people in Colorado (0-100) | % |
| Colorado's population | 5,758,736 |

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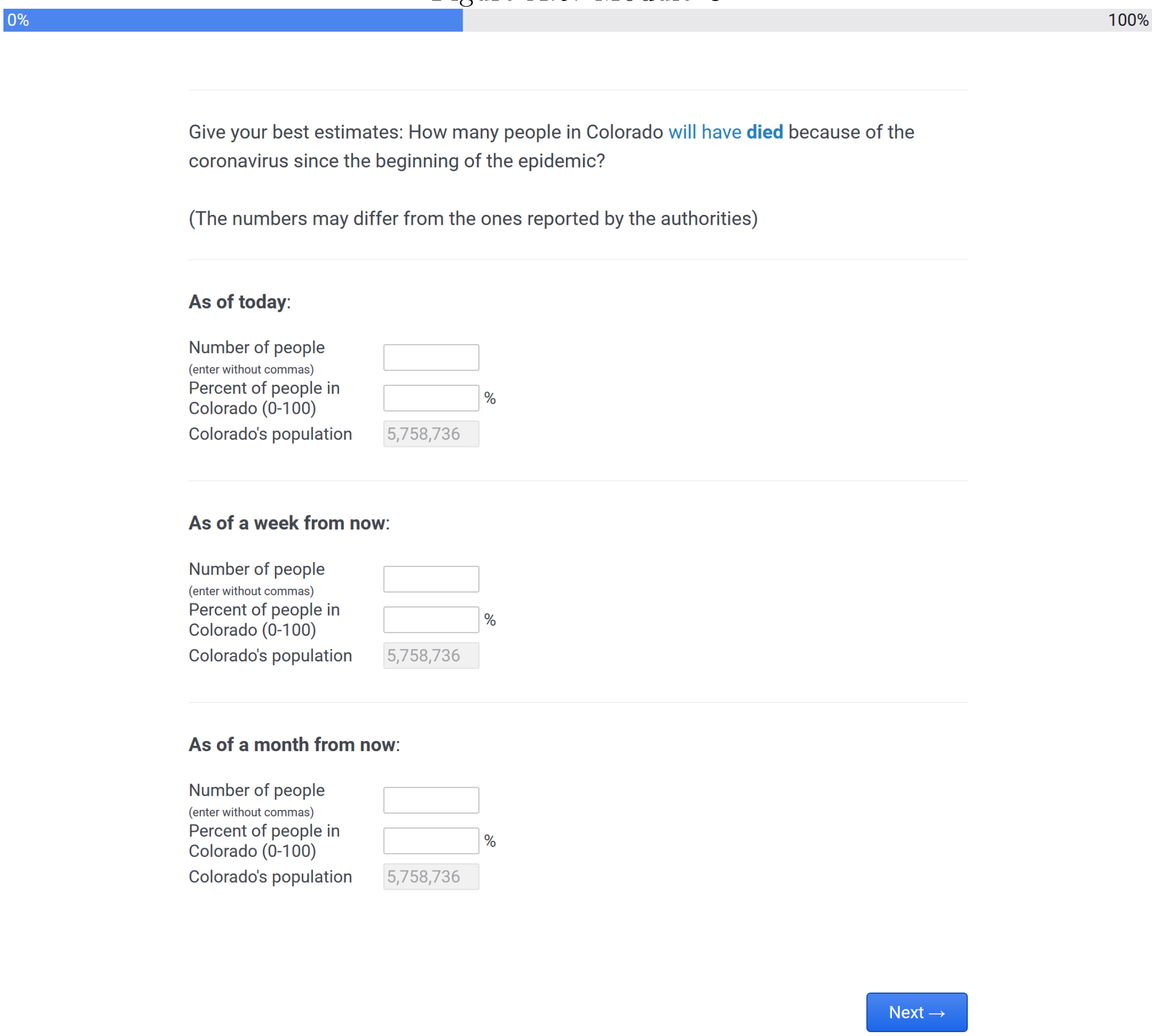
Figure A.5: Module C



0% 100%

Give your best estimates: How many people in Colorado will have **died** because of the coronavirus since the beginning of the epidemic?

(The numbers may differ from the ones reported by the authorities)

**As of today**:

Number of people (enter without commas)

Percent of people in Colorado (0-100) %

Colorado's population 5,758,736

**As of a week from now**:

Number of people (enter without commas)

Percent of people in Colorado (0-100) %

Colorado's population 5,758,736

**As of a month from now**:

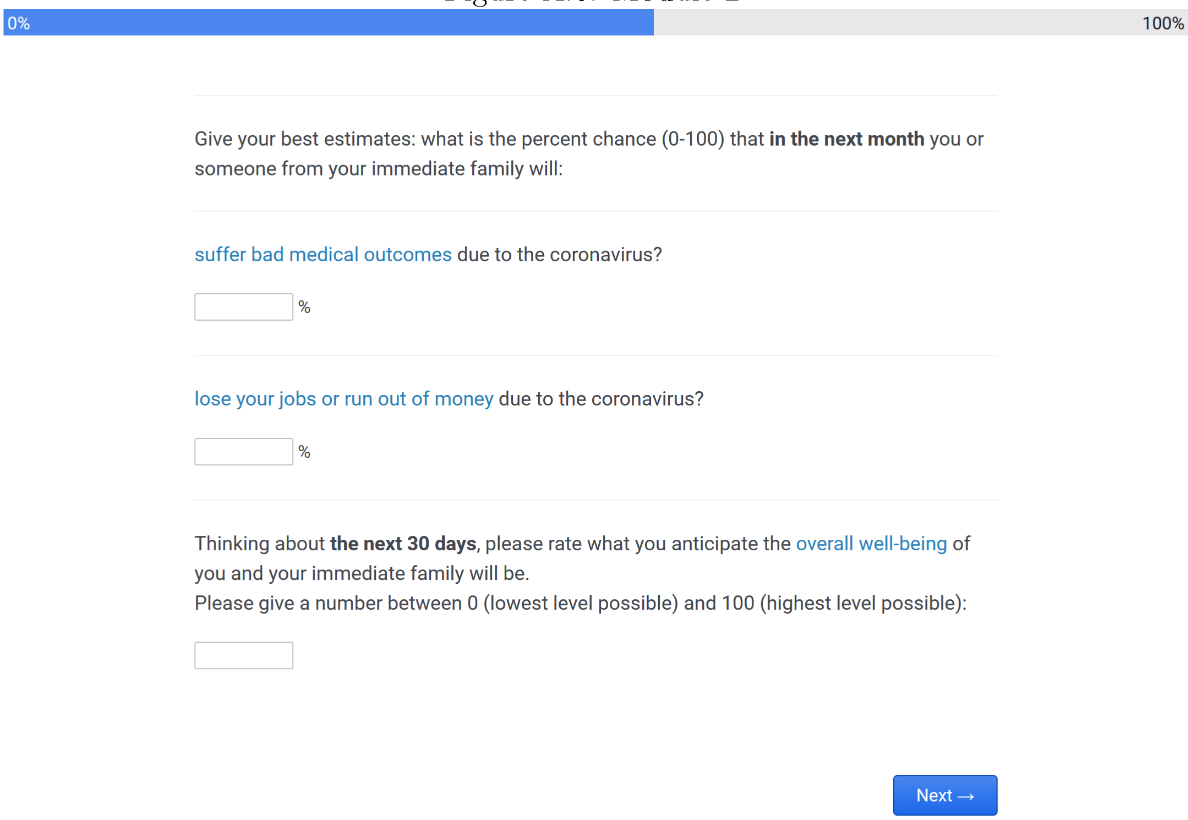
Number of people (enter without commas)

Percent of people in Colorado (0-100) %

Colorado's population 5,758,736

Next →

Figure A.6: Module D



0% 100%

Give your best estimates: what is the percent chance (0-100) that **in the next month** you or someone from your immediate family will:

suffer bad medical outcomes due to the coronavirus?

%

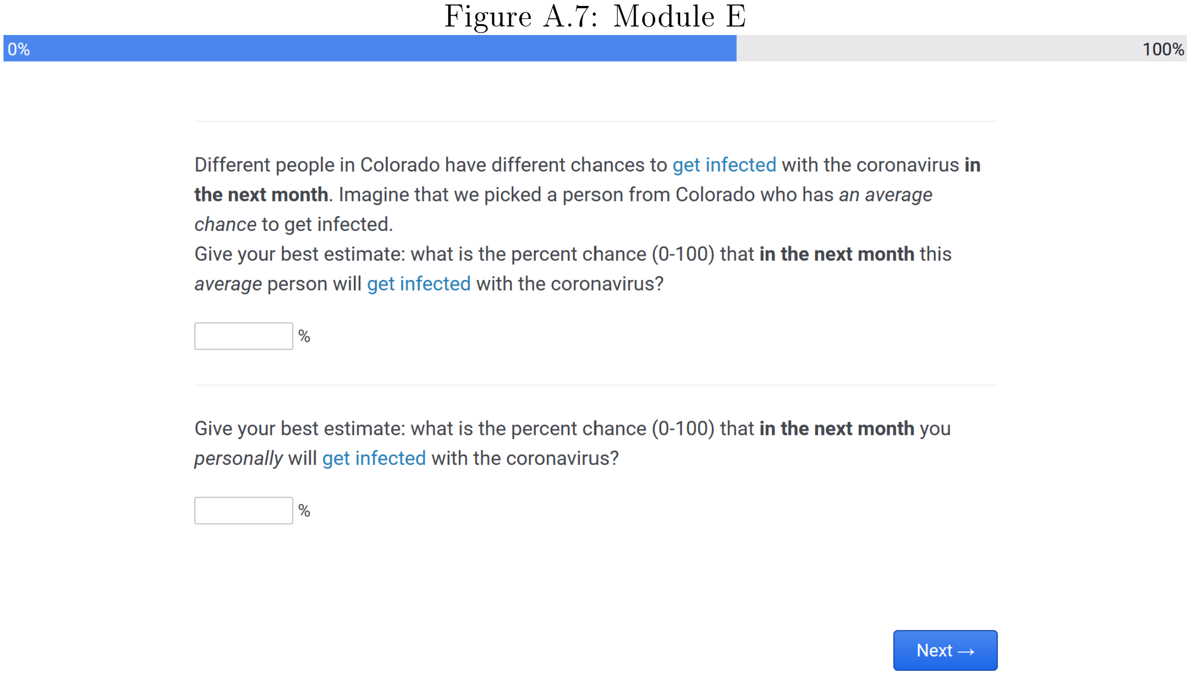
lose your jobs or run out of money due to the coronavirus?

%

Thinking about **the next 30 days**, please rate what you anticipate the overall well-being of you and your immediate family will be.
Please give a number between 0 (lowest level possible) and 100 (highest level possible):

Next →

Figure A.7: Module E



0% 100%

Different people in Colorado have different chances to get infected with the coronavirus **in the next month**. Imagine that we picked a person from Colorado who has *an average chance* to get infected.
Give your best estimate: what is the percent chance (0-100) that **in the next month** this *average* person will get infected with the coronavirus?

%

Give your best estimate: what is the percent chance (0-100) that **in the next month** you *personally* will get infected with the coronavirus?

%

Next →

Figure A.8: Module F

0% 100%

Which of the following have you done **in the last seven days** to keep yourself safe from coronavirus?
Only answer "Yes" for actions that you took or decisions that you made *personally*.

| | No | Yes |
|---|---|---|
| Washed or sanitized your hands at least 5 **more** times per day **than your pre-epidemic habit** | ○ | ○ |
| Washed or sanitized your hands at least 10 **more** times per day **than your pre-epidemic habit** | ○ | ○ |
| Washed or sanitized your hands at least 15 **more** times per day **than your pre-epidemic habit** | ○ | ○ |
| Cleaned or sanitized incoming mail or deliveries | ○ | ○ |
| Cleaned or sanitized groceries | ○ | ○ |
| Cleaned or sanitized furniture or frequently-touched items such as: phone, wallet, keys, doorknobs, or steering wheel | ○ | ○ |
| Avoided touching your face | ○ | ○ |
| Coughed into your elbow rather than your palm | ○ | ○ |
| Stopped your breath when passing near other people | ○ | ○ |
| Avoided contact with people from a high-risk group (such as the elderly) | ○ | ○ |
| Avoided meeting family and friends | ○ | ○ |
| Avoided public spaces, gatherings or crowds | ○ | ○ |

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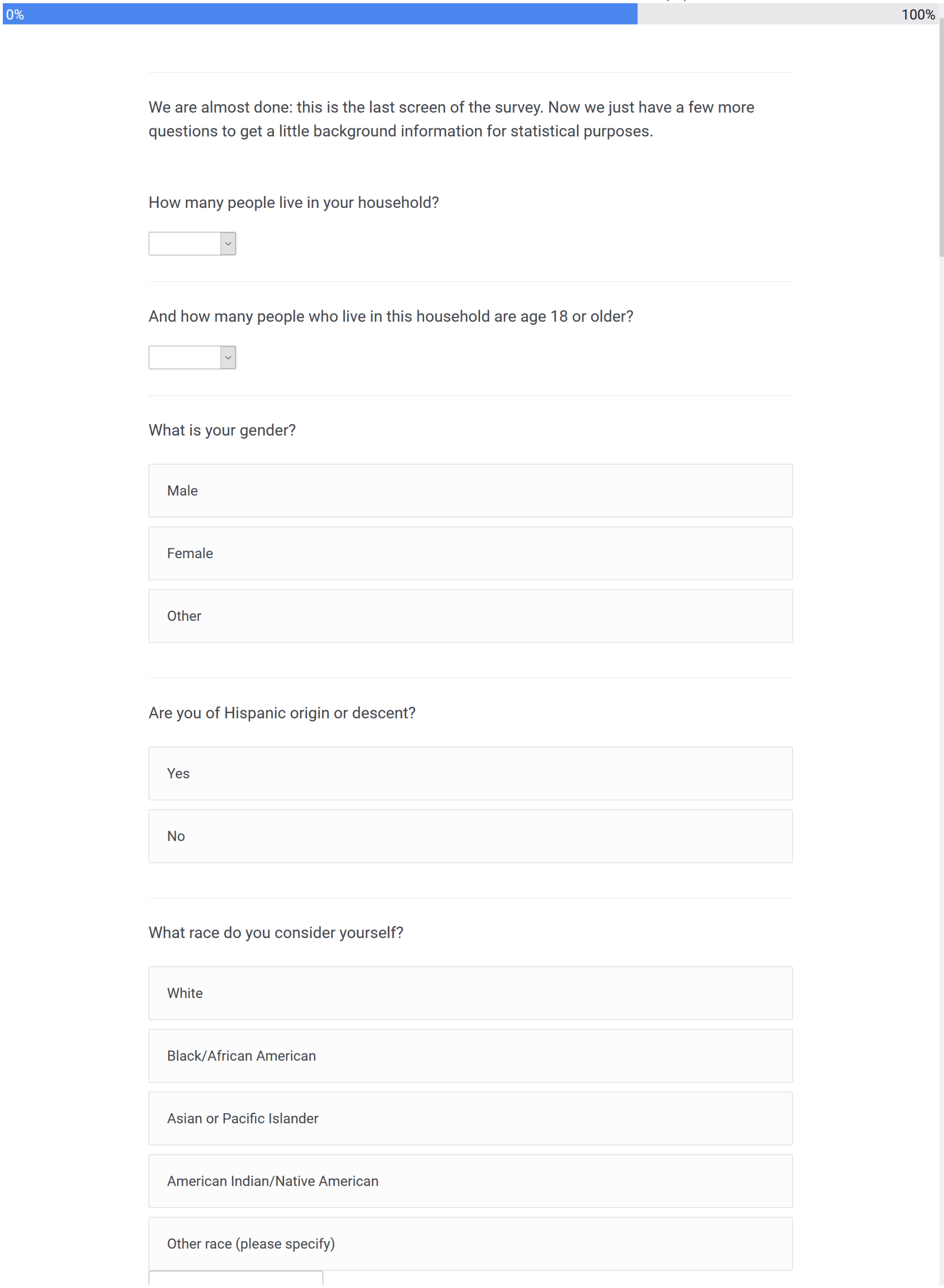
Figure A.9: Demographic questions (1)



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100%

We are almost done: this is the last screen of the survey. Now we just have a few more questions to get a little background information for statistical purposes.

How many people live in your household?

And how many people who live in this household are age 18 or older?

What is your gender?

Male

Female

Other

Are you of Hispanic origin or descent?

Yes

No

What race do you consider yourself?

White

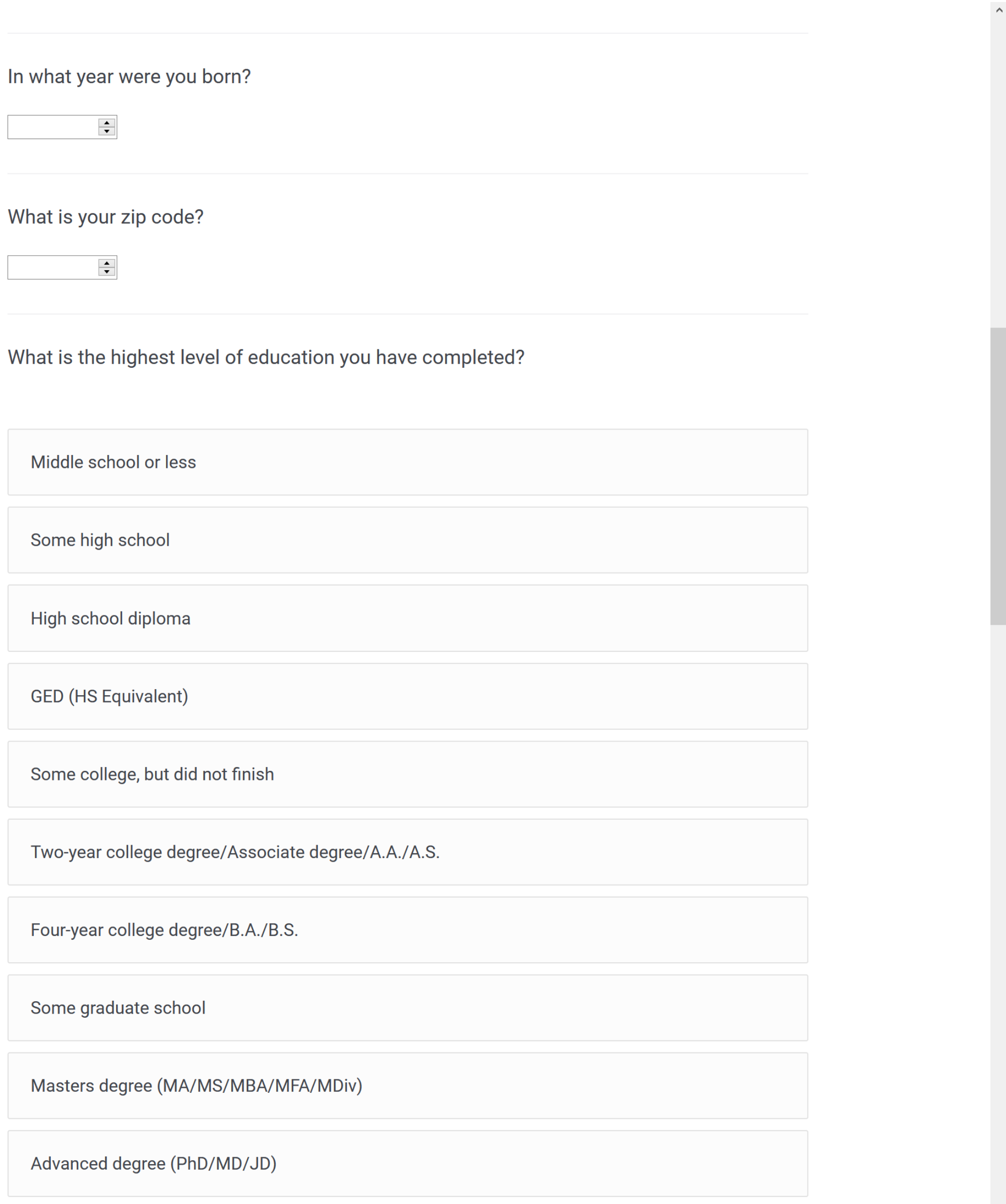
Black/African American

Asian or Pacific Islander

American Indian/Native American

Other race (please specify)

Figure A.10: Demographic questions (2)



In what year were you born?

What is your zip code?

What is the highest level of education you have completed?

- Middle school or less
- Some high school
- High school diploma
- GED (HS Equivalent)
- Some college, but did not finish
- Two-year college degree/Associate degree/A.A./A.S.
- Four-year college degree/B.A./B.S.
- Some graduate school
- Masters degree (MA/MS/MBA/MFA/MDiv)
- Advanced degree (PhD/MD/JD)

Figure A.11: Demographic questions (3)

What is your current marital status?

- Married
- Widowed
- Separated
- Divorced
- Single
- Living with a significant other

Which of the following best describes your main activity or your employment status?

- Working
- Unemployed (looking for work)
- Retired
- Keeping house
- Student
- Other

Figure A.12: Demographic questions (4)

Thinking about *economic issues*, which of the following best describes your attitudes?

- Very liberal
- Liberal
- Slightly liberal
- Moderate
- Slightly conservative
- Conservative
- Very conservative

Thinking about *social issues*, which of the following best describes your attitudes?

- Very liberal
- Liberal
- Slightly liberal
- Moderate
- Slightly conservative
- Conservative
- Very conservative

Figure A.13: Demographic questions (5)

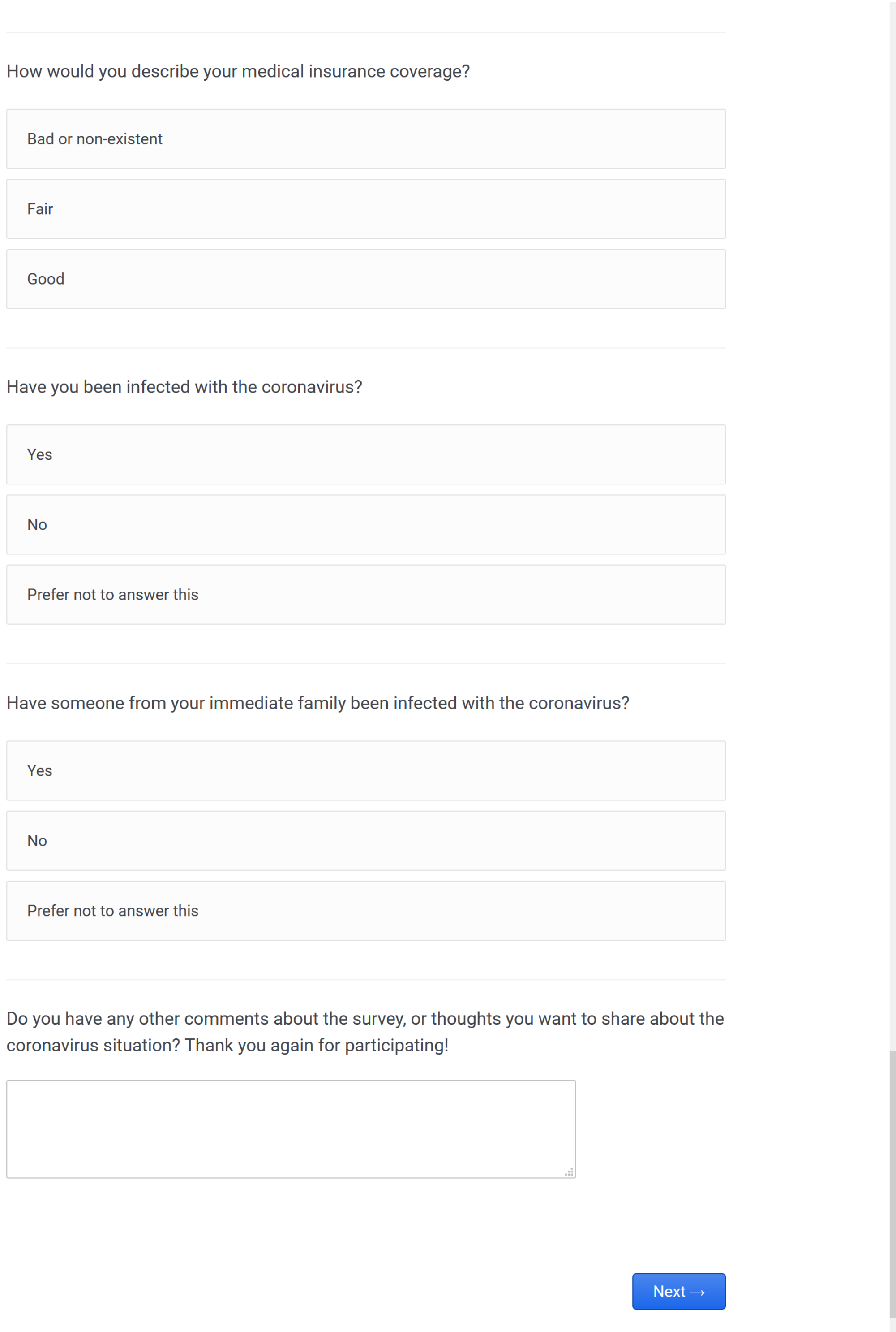
Do you consider yourself a...

- Republican
- Democrat
- Independent
- Other
- None of the above

What is your combined annual household income?

- Less than $20,000
- $20,000 – $39,999
- $40,000 – $59,999
- $60,000 – $79,999
- $80,000 – $99,999
- $100,000 – $119,999
- $120,000 – $149,999
- $150,000 – $199,999
- $200,000 or more

Figure A.14: Demographic questions (6)



How would you describe your medical insurance coverage?

- Bad or non-existent
- Fair
- Good

Have you been infected with the coronavirus?

- Yes
- No
- Prefer not to answer this

Have someone from your immediate family been infected with the coronavirus?

- Yes
- No
- Prefer not to answer this

Do you have any other comments about the survey, or thoughts you want to share about the coronavirus situation? Thank you again for participating!

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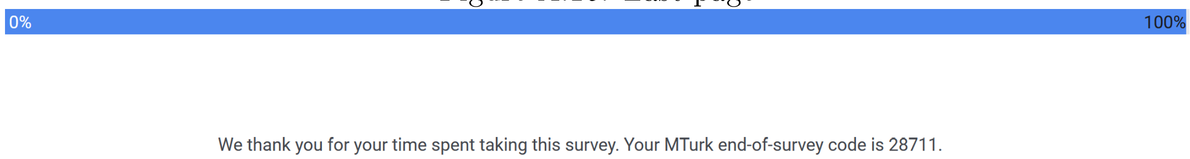
Figure A.15: Last page




## A.2 Complementary Versions of the Survey

We define the baseline version of the survey as the version with the module order A–(B↔C)–D–E–F (or without E and F prior to their addition). 9,586 observations in the full sample belong to the baseline version, and 9,135 in the main sample.

Four complementary versions of the survey differ from the baseline version's module order and MTurk filtering criteria, to test the effects of these factors on our results. The following subsections describe the details. The sample from first complementary version, R1, is treated separately and is not a part of our main full and main samples, while the samples from the other three complementary versions, R2, F-first and F-middle, are pooled with the baseline version's sample to generate our full sample ($N = 13,880$) and main sample ($N = 13,156$).

**Version R1: testing robustness to experience of MTurk workers.** While our main concern in the data collection—which we addressed using several measures—is low-quality MTurk responses, an opposite concern is over sophistication. The exclusion of inexperienced Workers or those with low approval rates generates a sample of highly experienced respondents, which may exhibit diminished effects relative to laypeople in some domains (e.g., Robinson et al. 2019). Specifically, many studies about the public response to COVID-19 were launched during the pandemic, raising the concern that experienced MTurk Workers may have have become COVID experts, with knowledge and attitudes that do not represent laypeople.

To understand our findings' sensitivity to MTurk Workers' experience, we launched another survey version, labeled R1, in parallel to the baseline version for three days between April 27, 2020 and April 29, 2020. The R1 version is identical to the baseline version in any detail except for the MTurk screening criteria, which was set, according to the recommendation in Robinson et al. (2019), to allow only Workers which are located in the US, who have successfully completed *at most 100 HITs* and whose approval rate is *at least 95%* to participate (for the screening criteria of the baseline version and the other three complementary versions, see Appendix A.3). These criteria imply two disjoint sets of respondents in the baseline version and in the R1 survey in the April 27 – April 29 period. 120 slots were opened for this survey version each day, and 309 responses were collected, from whom we keep 296 after full sample exclusion, and 255 after main sample exclusion.

Appendix C.2 investigates the effect of MTurk experience (using an R1 dummy) on some of the main results.

**Version R2: testing robustness to the position of infection-risk perceptions elicitation (module E) in the survey.** Module E, which elicits perceived state-average infection risk, is located close to the end of the survey and, for some respondents (depending on the randomized order of modules B and C) far from the closely related case perceptions questions in module B. This position is a compromise rather than an optimal setting, as the module was added a few weeks after the beginning of the study, and was placed in the end to minimize the addition's effect on the validity of previous results from the other modules.

To test the sensitivity of our findings to module E's position and to questions E1 and E2's order, we launched another survey version denoted R2 in parallel to the baseline version, for five days between May 4, 2020 and May 8, 2020. The R2 version is identical to the baseline version in any detail, except that questions E1 and E2 are now on two separate pages, 4 and 5, right after modules A–C (pages 1–3) and before module D (page 6). The order of E1 and E2 is random. 120 slots were opened for this survey version each day, and 426 responses were collected, from whom we kept 423 after full sample exclusion, and 408 after main sample exclusion.

Appendix D.2 investigates the order effects on the main results.

**Versions F-first and F-middle: testing robustness to the position of health-protective behavior elicitation (module F) in the survey.** A similar concern to the one above regards the position of module F in the survey. Its baseline position as the last module after modules A–E, is also a compromise, due to similar reasons to those mentioned above.

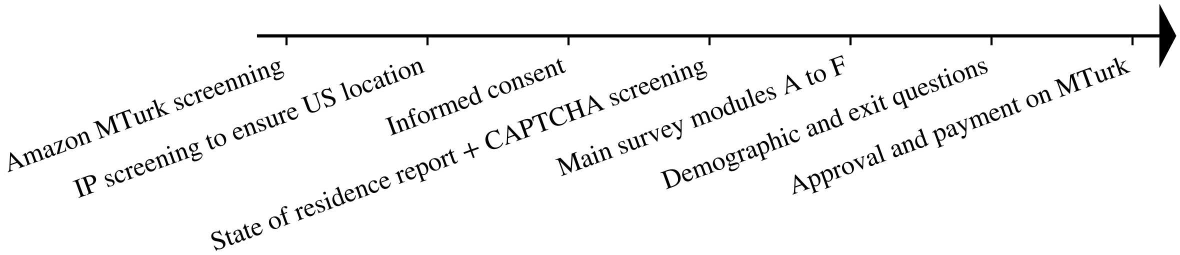
To test the sensitivity of our findings to module F's position, it was randomized for each respondent since June 19, 2020 to be either in the end of the survey (page 6, baseline version), in the middle (page 4, after B, C, and before D; F-middle version) or in the beginning (page 1, before A; F-first version). Versions F-first and F-middle were given the same sampling weight as the baseline version at the cost of reducing its daily sample size, since the validity and robustness of behavior-related results is a central issue. 2,032 observations were collected in the F-first version, and 1,960 in the F-middle version, from whom we kept 1,965 and 1,906 respectively after full sample exclusion, and 1,828 and 1,785 after main sample exclusion.

Table 2 and Appendix D.2 investigate the order effects on the main results.

## A.3 MTurk Task and Screening Details

We use the Amazon MTurk crowd-sourcing platform to construct our sample. The survey timeline from the point of view of an MTurk Worker is shown in Fig. A.16.

Figure A.16: Survey timeline from an MTurk Worker's point of view

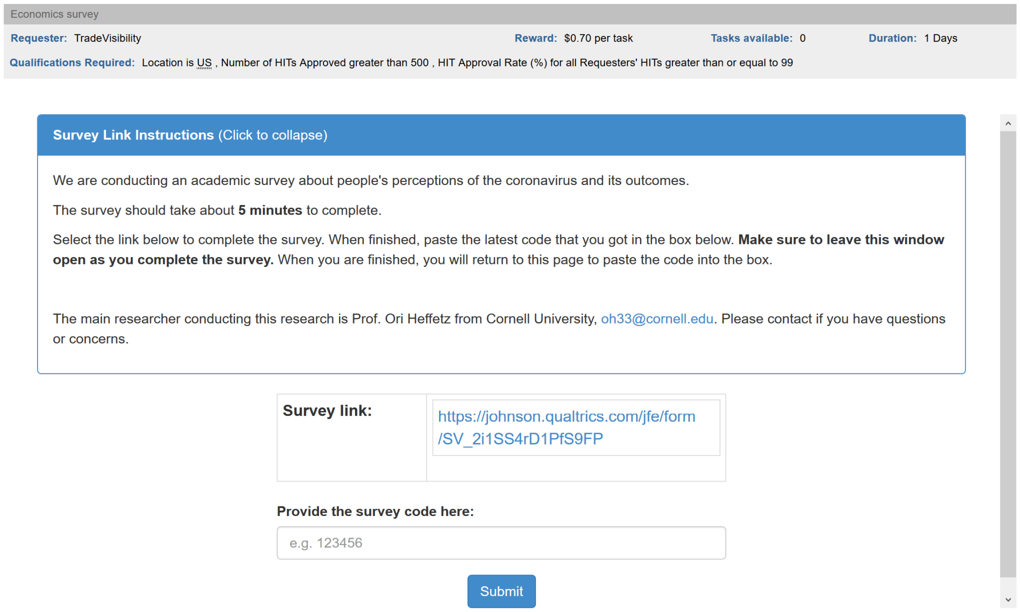


**Slots opened.** We publish an Amazon MTurk Human-Intelligence-Task (HIT) linking to the survey on a daily basis during the sampling period, usually around noon and no later than evening time ET. We typically opened 120 slots per day to collect all observations, except for versions R1 and R2, which were collected using additional slots on specific days (see Appendix A.2). The exceptions to the 120-slots-per-day rule are the first three days of the survey, March 24, 2020 to March 26, in which 100 slots were opened, the dates May 25 to June 1 and August 19 to August 23, in which 140 slots were opened to deal with a decreasing pool of available Workers that have not yet participated, and the dates of June 2 and June 3, in which 300 and 200 slots were opened respectively in order to observe possible discontinuities in results after resetting the sample. Figure A.19 shows the number of responses collected per day in each of the survey versions.

**MTurk screening and task design.** Only Workers located in the US, who have successfully completed at least 500 HITs, and whose approval rate is at least 99% are able to see our task recruitment page. This is a recommended practice by studies investigating response quality problems and fraudulent responses in the MTurk platform (e.g., Kennedy et al. 2018). Workers who enter our recruitment page are informed about the payment, which is \$0.7 per survey response (calculated based on a median response time of 5 minutes and a minimum wage of about \$6 per hour) and about the estimated time for completion, 5 minutes, and are provided with the researchers' contact details. If they choose to complete our survey, they are redirected to the survey page using a link. In the last page of survey they are provided with a code that they are requested to submit within the MTurk platform in order to be eligible for payment. Payment is guaranteed no later than two days after submission. Figure A.17 shows the MTurk recruitement page.

**Screening non-US respondents.** The survey is programmed and hosted on Qualtrics. As recommended by Kennedy et al. (2018) and using the methods they propose, the first page of the survey (see Figure A.1) provides an additional screening of non-US responses,

Figure A.17: MTurk recruitment page




which the MTurk platform may fail to detect, using the API of the website iphub.com. The second page provides an informed consent and a CAPTCHA screening of non-human respondents. Respondents who fail one of these screenings are informed immediately, are not allowed to advance and are not paid.

## A.4 Sample Technical Details

Figures A.18, A.19 show the daily sample size by survey version during the sampling period, and the survey duration.

Figure A.18: Sample size by day and by survey version

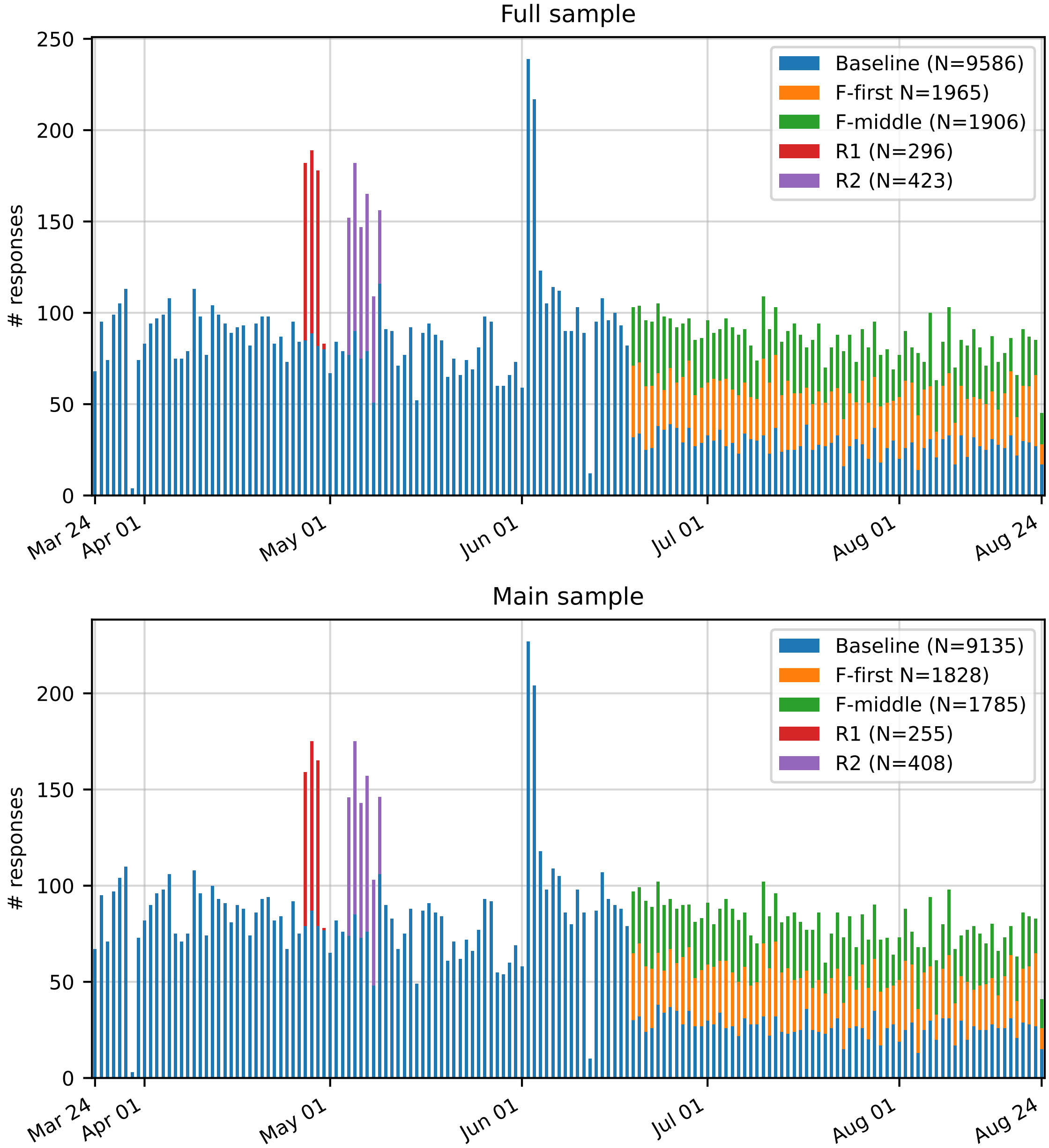


Figure A.19: Distribution of survey completion time and daily median completion times (main sample)

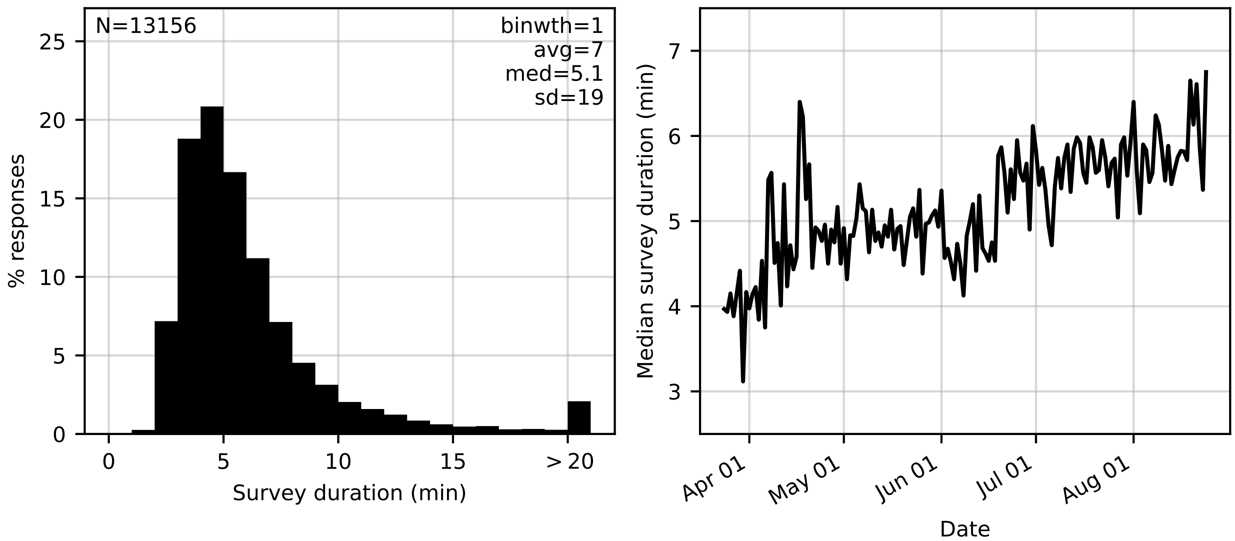
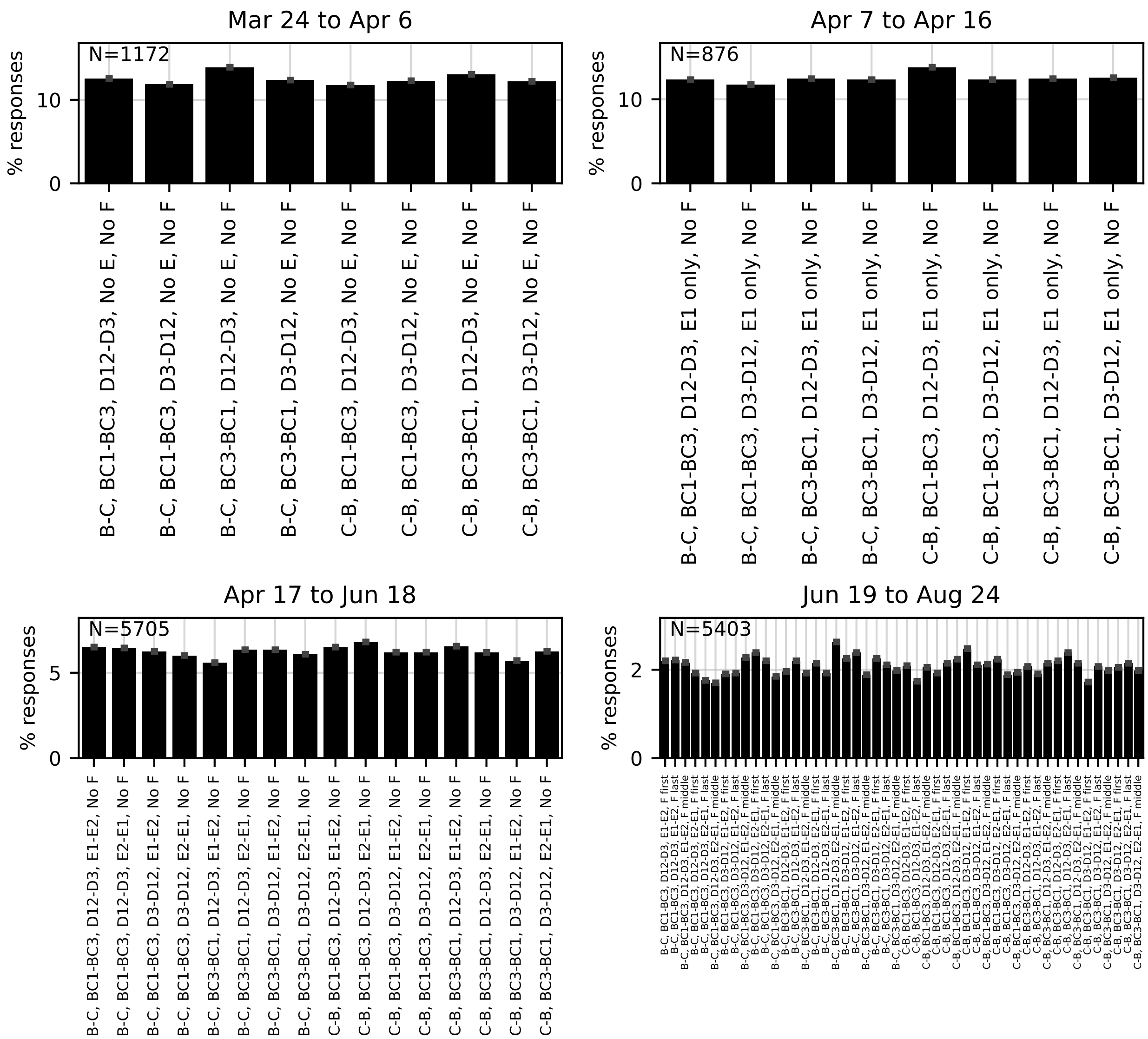



Figure A.20 shows the number of responses randomly allocated to each possible order of the survey and Table A.1 shows that demographics had no statistically-significant relation with any of the randomized orders.

Figure A.20: Distribution of responses randomized into each possible order of the survey (main sample)




**Notes**: Modules E and F were added to the study in the middle of the sampling period, hence the figure is divided to four periods: (1) prior to adding E and F, (2) after adding E1, (3) after adding E2, (4) after adding F.

Table A.1: Demographic variables relation with survey order

| | C–B | BC3–BC1 | D3–D12 | E2–E1 or E1 only | F first/middle |
|---|---|---|---|---|---|
| At least 3 people in household | 0.01 | 0.02* | −0.00 | 0.01 | 0.02 |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.03) |
| At least 3 people above 18 in household | −0.01 | −0.02 | 0.02 | 0.01 | −0.01 |
| | (0.01) | (0.01) | (0.01) | (0.02) | (0.03) |
| Female | 0.01 | 0.00 | −0.02 | 0.01 | −0.03 |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.02) |
| Hispanic | 0.01 | 0.00 | −0.01 | −0.02 | 0.02 |
| | (0.02) | (0.02) | (0.02) | (0.02) | (0.03) |
| Age at least 40 | −0.00 | 0.01 | 0.01 | −0.01 | −0.04 |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.02) |
| Not white | −0.02 | 0.01 | 0.01 | −0.01 | −0.05 |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.03) |
| Education less than 4-year college | 0.01 | 0.01 | 0.01 | 0.00 | −0.00 |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.03) |
| Not married | −0.00 | 0.01 | −0.00 | −0.01 | −0.05 |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.02) |
| Not working | 0.00 | −0.01 | 0.03* | −0.00 | 0.01 |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.02) |
| Non liberal economic attitudes | 0.03* | −0.04*** | −0.01 | 0.01 | −0.06 |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.03) |
| Non liberal social attitudes | −0.00 | 0.02 | 0.00 | −0.00 | 0.02 |
| | (0.01) | (0.01) | (0.01) | (0.02) | (0.03) |
| Republican | −0.03** | 0.01 | −0.00 | −0.00 | 0.01 |
| | (0.01) | (0.02) | (0.02) | (0.02) | (0.03) |
| Not Democrat or Republican | −0.02* | 0.01 | −0.00 | −0.00 | 0.03 |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.03) |
| Combined annual less than 60K | −0.00 | −0.00 | −0.01 | −0.00 | −0.00 |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.03) |
| Fair or bad economic insurance | 0.00 | 0.01 | 0.00 | −0.01 | 0.03 |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.02) |
| Have been infected | −0.03 | −0.04 | 0.03 | −0.06 | −0.04 |
| | (0.03) | (0.03) | (0.03) | (0.03) | (0.07) |
| Family member has been infected | 0.00 | 0.01 | −0.01 | 0.02 | 0.04 |
| | (0.02) | (0.02) | (0.02) | (0.02) | (0.04) |
| Obs | 13156 | 13156 | 13156 | 11108 | 5403 |
| $R^2$ | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**Notes**: OLS regressions. Dependent variables: survey-order dummies. Independent variables: demographic characteristics coded binarily. In parentheses: Driscoll-Kraay standard errors using Bartlett's kernel and a bandwidth of 4 days.
$^{*}p < 0.05$ $^{**}p < 0.01$ $^{***}p < 0.005$

## A.5 Second Survey

We incorporated versions of our three core questions about case perceptions, risk perceptions and protective behaviors in a survey conducted between February 8, 2021 and March 10, 2021, primarily aimed to study US residents' use of COVID-19 stimulus checks from the government (Feldman and Heffetz 2021). The last three pages of that survey, shown with random order, each include one of our three questions, as shown in the screenshots below. Questions are quoted in footnote 20 in the paper.

The survey was conducted by Qualtrics, who screened their respondents population based on age, region, gender, income, race and Hispanic-origin quotas to generate a sample that matches US adult population on these demographics. 1,530 observations were collected, which do not require further data exclusion.

9 responses do not have answers to all 3 private-behavior questions and also to all 4 questions. These responses are excluded from behavior-relevant analyses.

**Screenshots.** The following figures show screenshots of the survey.

Figure A.21: First page: intro page of last section

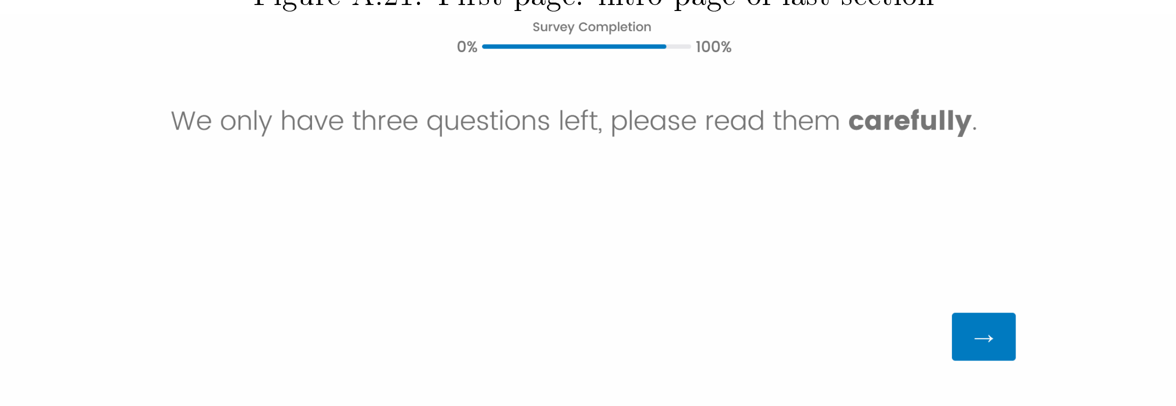
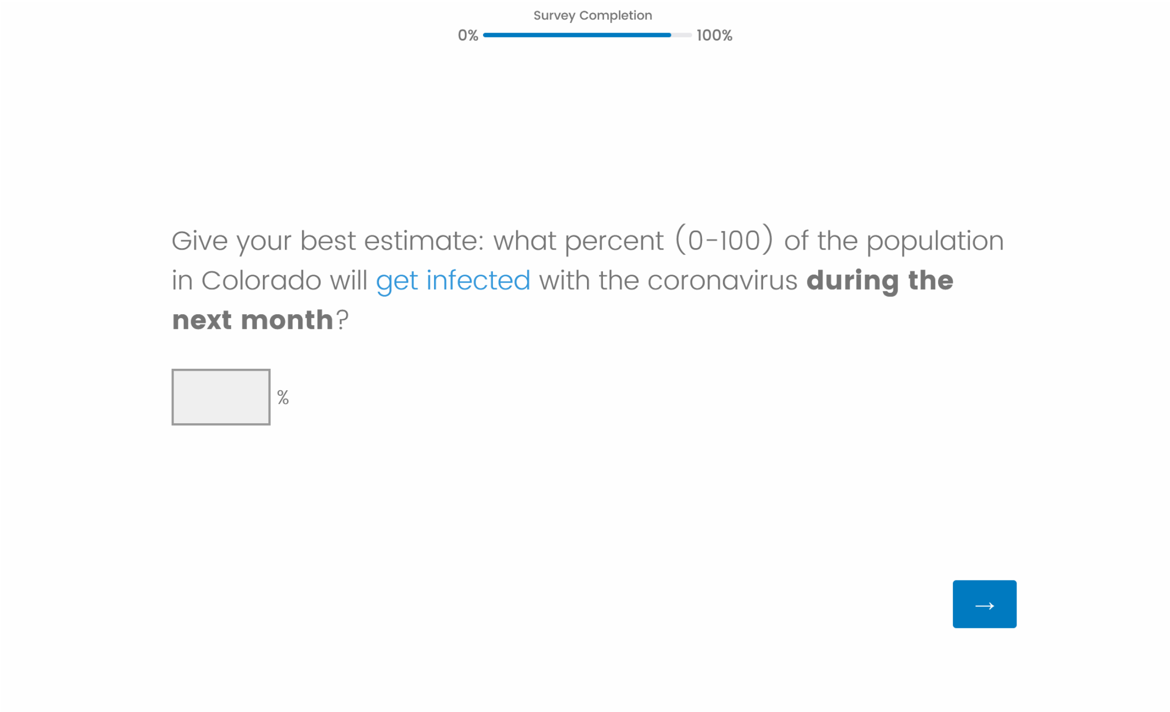


Figure A.22: Modified case perceptions question


Survey Completion

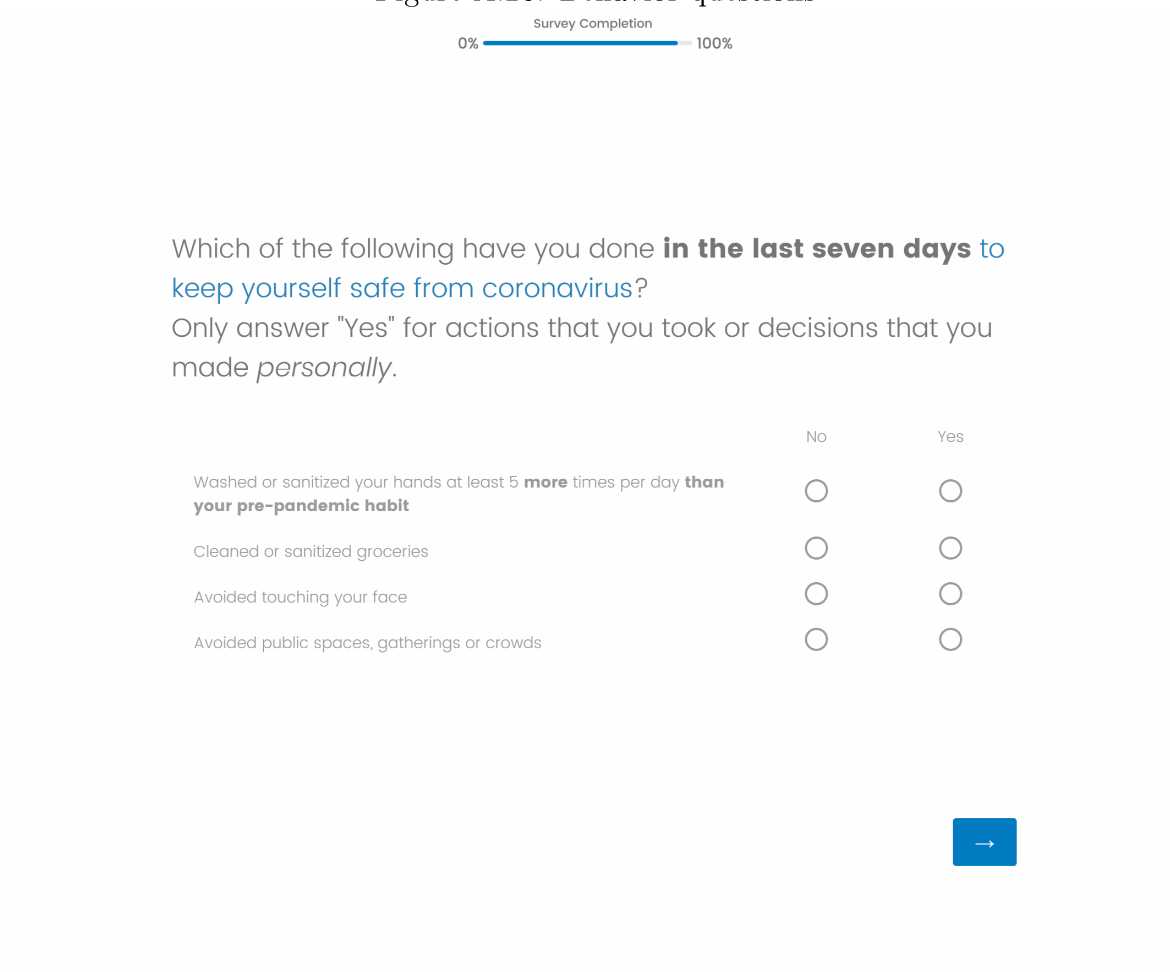
0% 100%

Give your best estimate: what percent (0-100) of the population in Colorado will get infected with the coronavirus **during the next month**?

%

→

Figure A.23: Behavior questions



Survey Completion

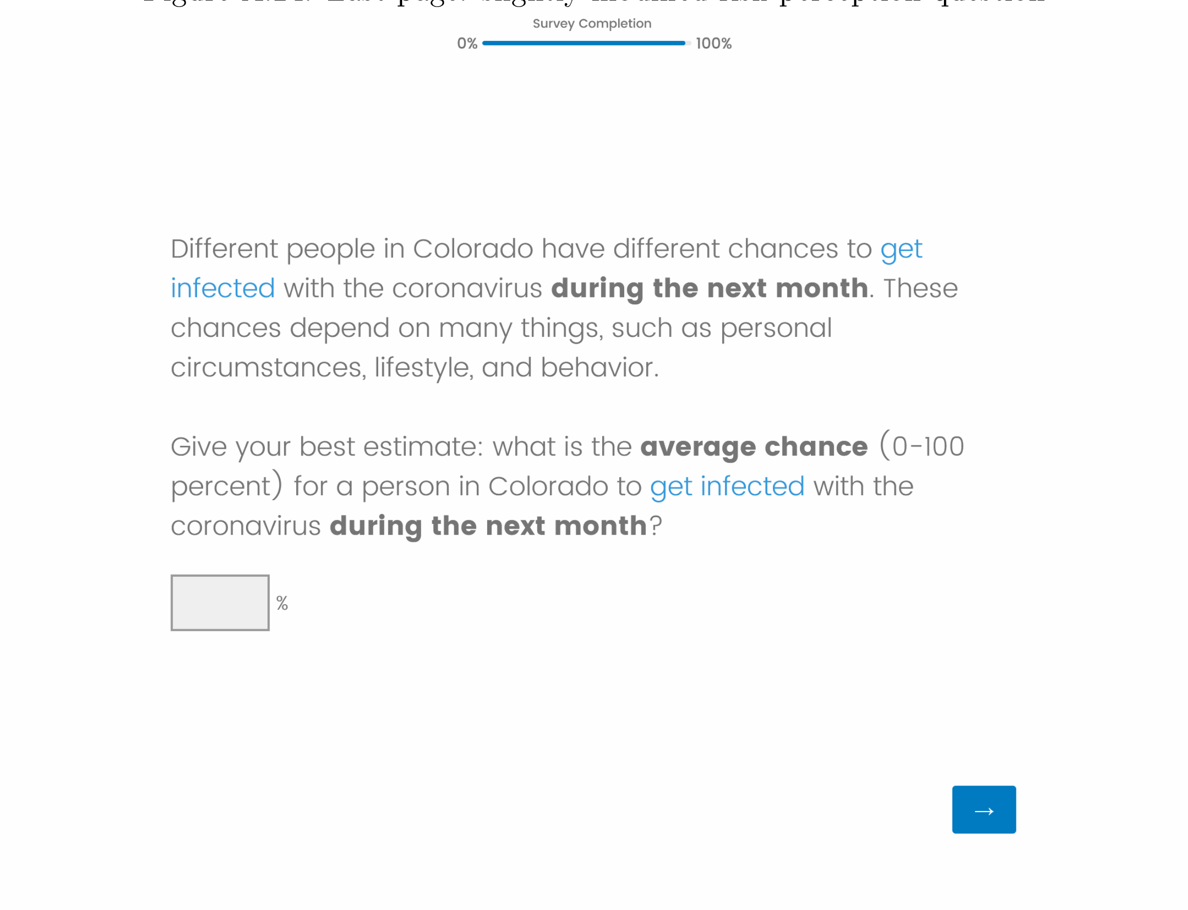
0% 100%

Which of the following have you done **in the last seven days** to keep yourself safe from coronavirus?
Only answer "Yes" for actions that you took or decisions that you made *personally*.

| | No | Yes |
|---|---|---|
| Washed or sanitized your hands at least 5 **more** times per day **than your pre-pandemic habit** | ○ | ○ |
| Cleaned or sanitized groceries | ○ | ○ |
| Avoided touching your face | ○ | ○ |
| Avoided public spaces, gatherings or crowds | ○ | ○ |

→

Figure A.24: Last page: slightly modified risk-perception question




# B Descriptive Statistics

Figures B.1, B.2 show the distribution of demographic characteristics and US-state of residence in the main sample.

Figure B.1: Demographic characteristics of the main sample

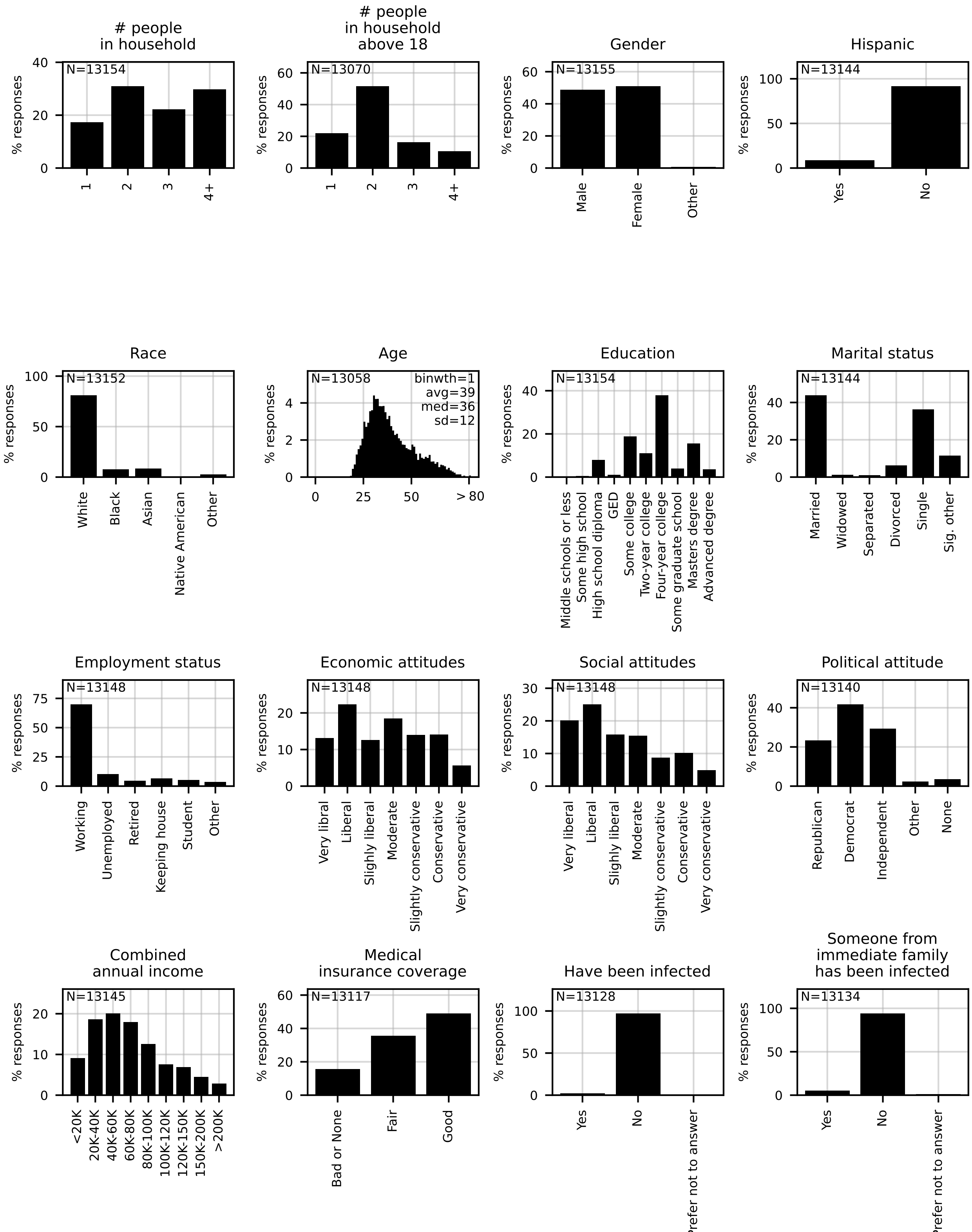
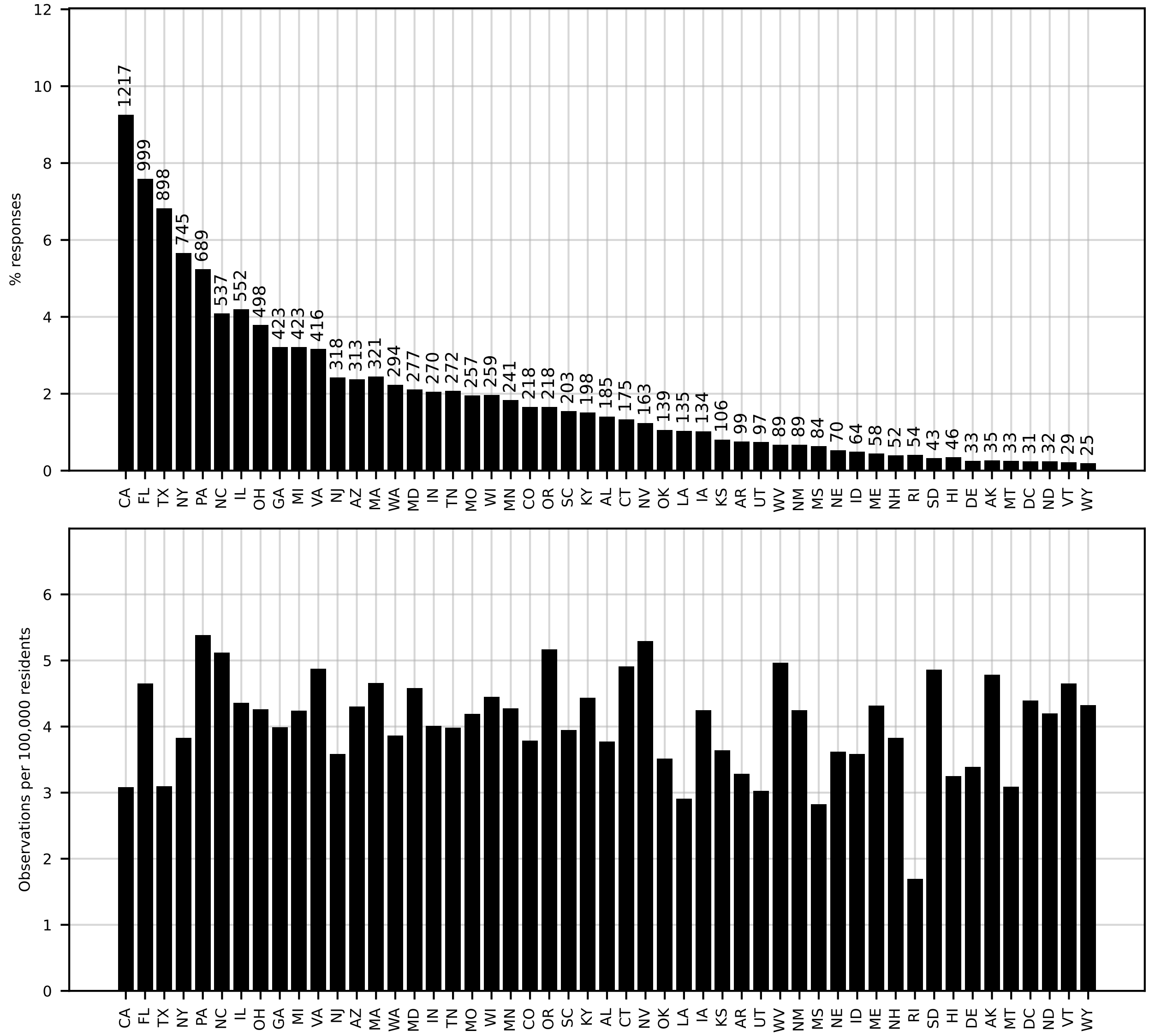


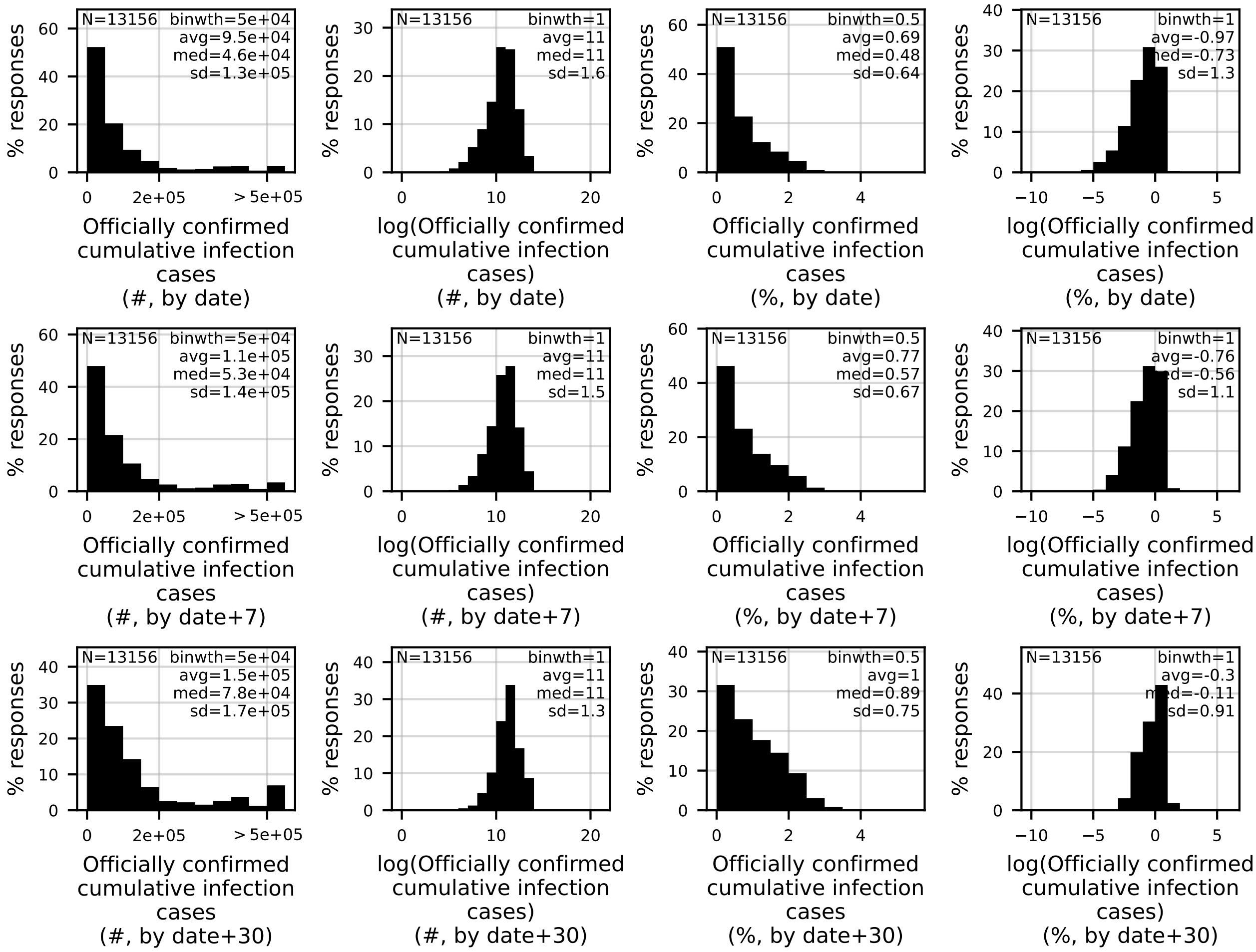
Figure B.2: US-state of residence distribution in the main sample




**Notes**: Numbers above bars: absolute numbers of responses from each state.

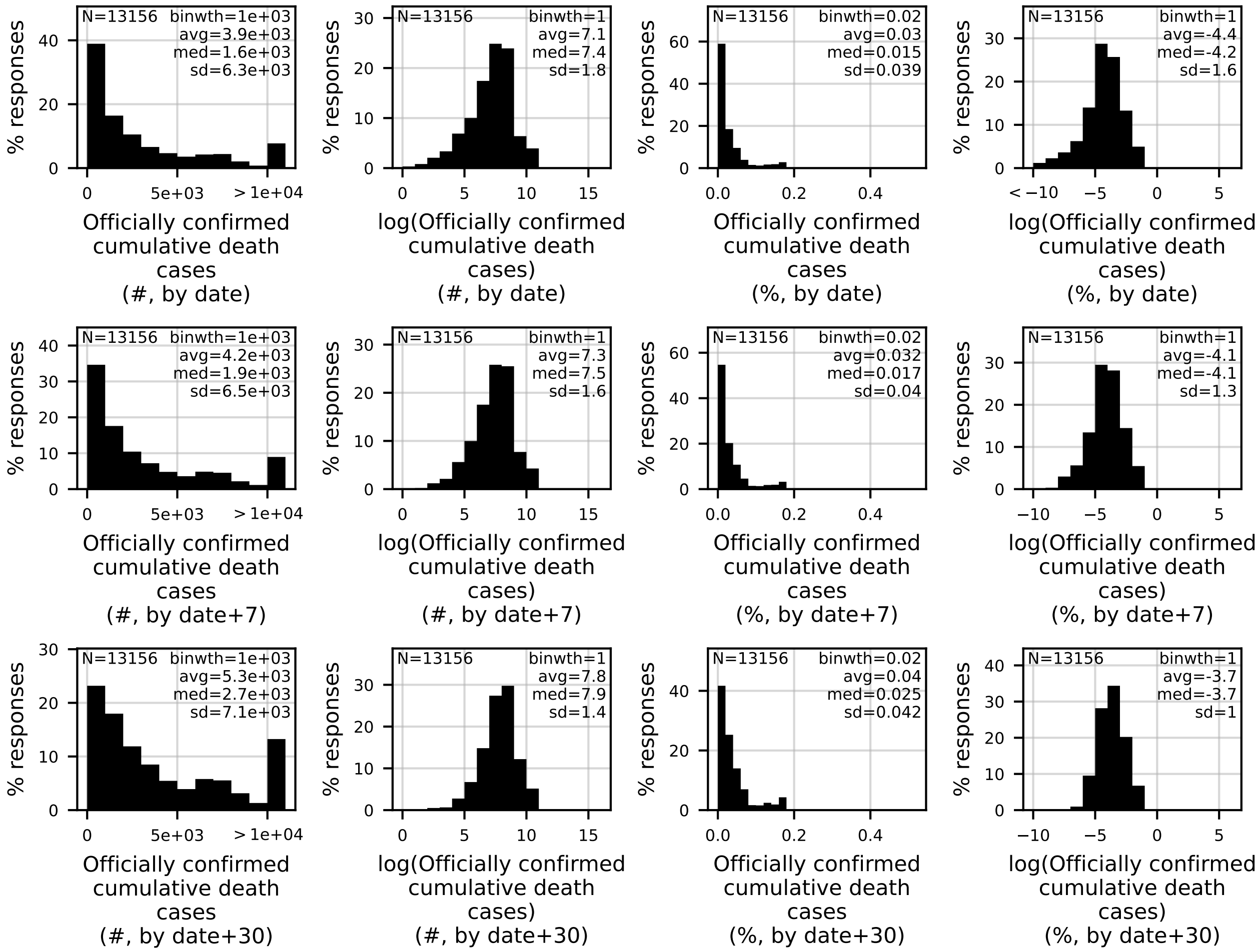
Figures B.3 and B.4 show the distribution of official infection and death counts matched to our survey responses, representing the states and dates sampled in our survey. Figures B.5, B.6, B.7, B.8 show the response distributions to all survey questions. We show these distributions with and without the logarithmic transformation, to emphasize its importance in jointly analyzing values with different orders of magnitude.

Figure B.3: Distribution of officially confirmed cumulative infection cases (main sample)



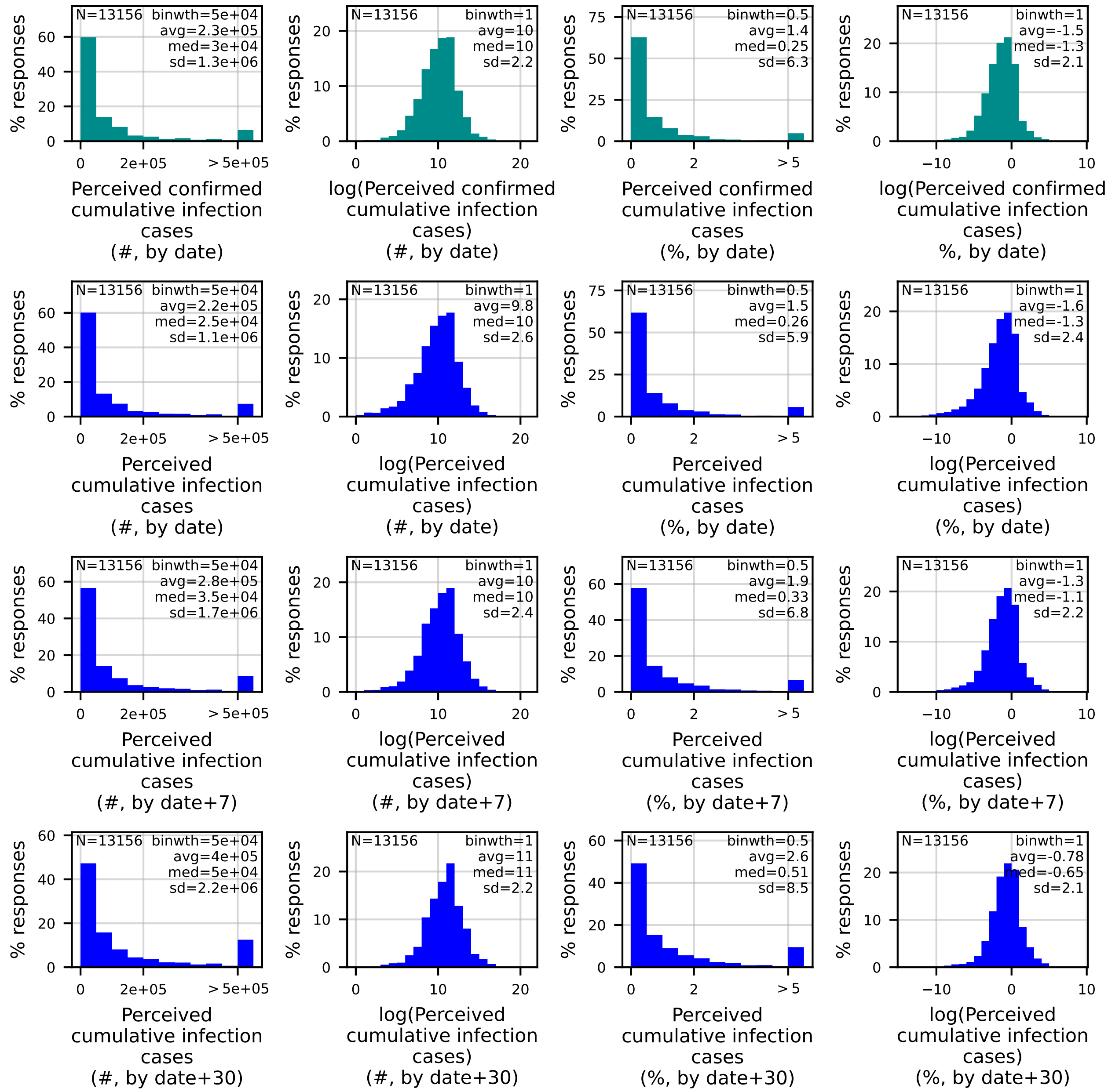

**Notes**: Both the absolute number of infections (#) and the percent it consists of the state's population (%) are shown. Each distribution is shown without and with a logarithmic transformation, which was applied on data prior to analysis.

Figure B.4: Distribution of officially confirmed cumulative death cases (main sample)



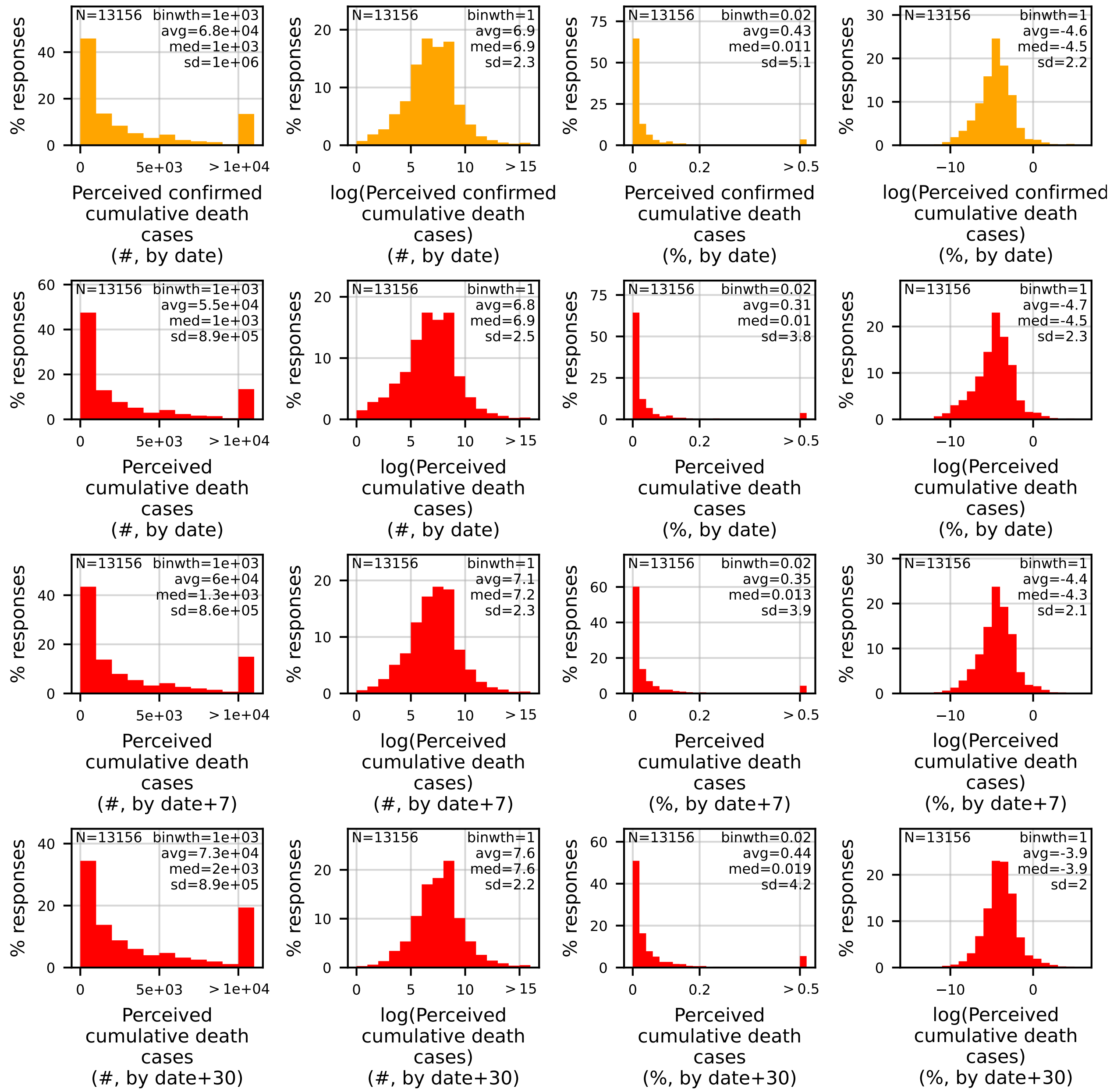

**Notes**: Both the absolute number of deaths (#) and the percent it consists of the state's population (%) are shown. Each distribution is shown without and with a logarithmic transformation, which was applied on data prior to analysis.

Figure B.5: Distribution of responses to infection case perception questions (modules A, B; main sample)



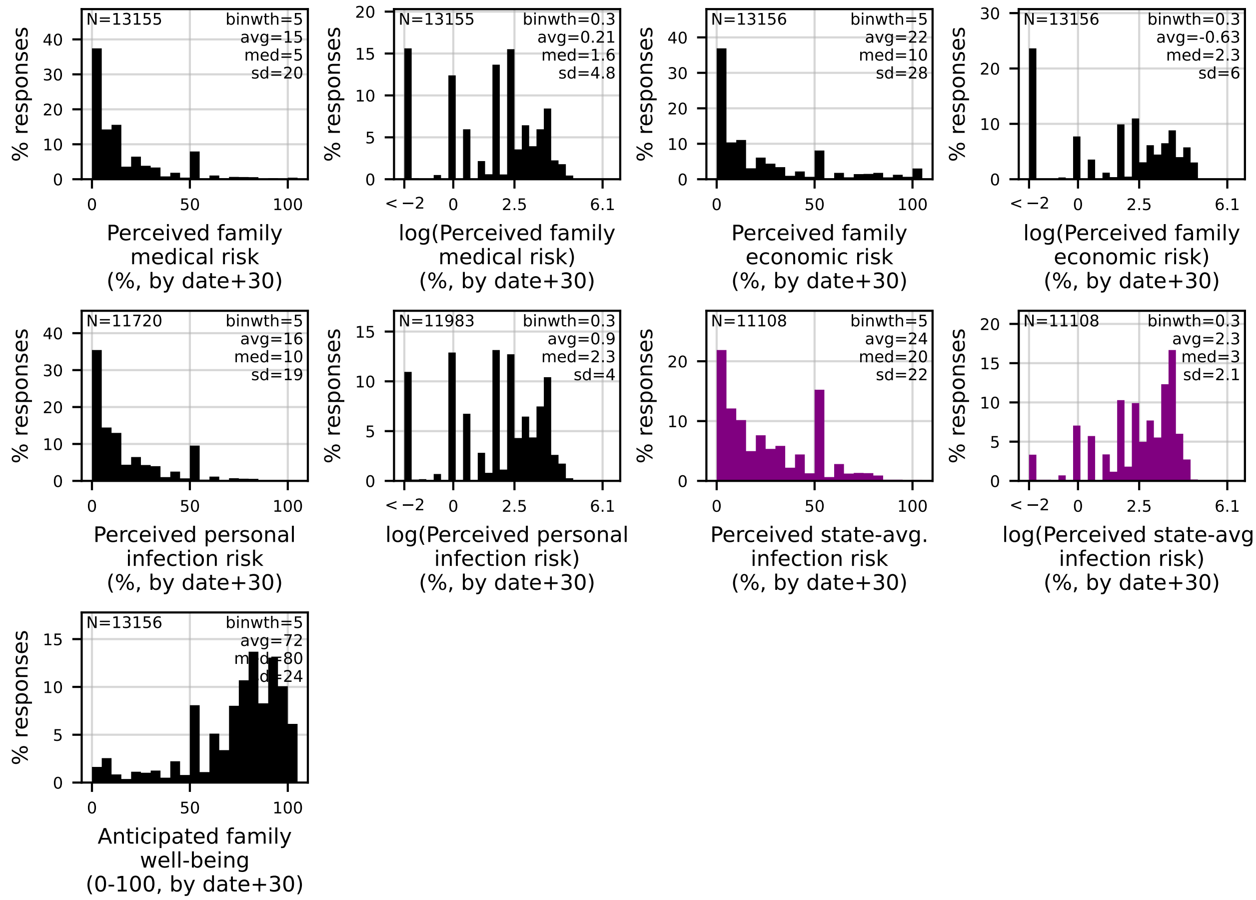

**Notes**: Each row presents one of four questions, and shows both the absolute number of infections (#) elicited and the percent it consists of the state's population (%). Each distribution is shown without and with a logarithmic transformation, which was applied on data prior to analysis.

Figure B.6: Distribution of responses to death case perception questions (modules A, C; main sample)



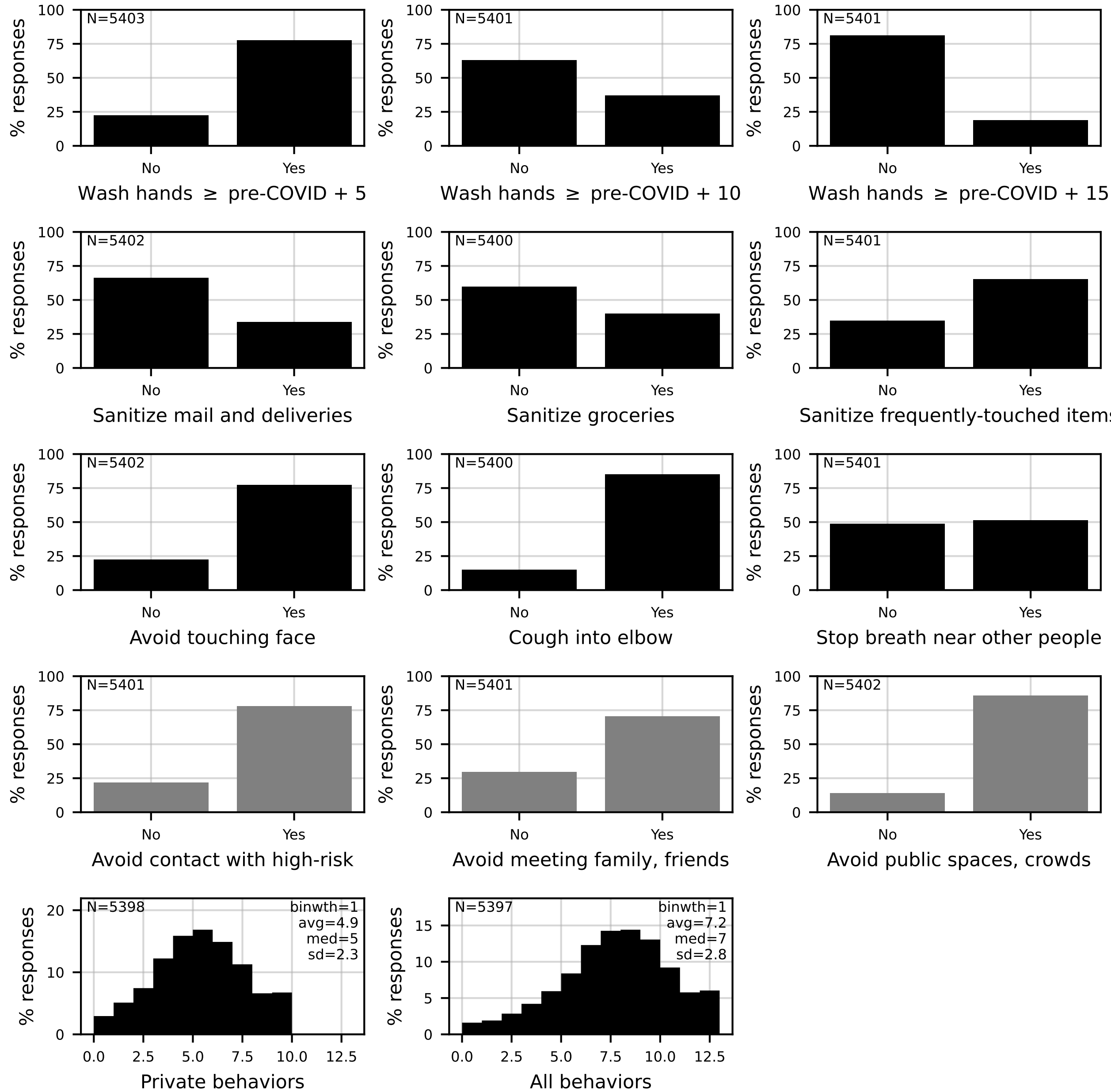

**Notes**: Each row presents one of four questions, and shows both the absolute number of infections (#) elicited and the percent it consists of the state's population (%). Each distribution is shown without and with a logarithmic transformation, which was applied on data prior to analysis.

Figure B.7: Distribution of responses to risk perception questions and to anticipated family well being (modules D, E; main sample)




**Notes**: Perceptions are reported as percent chances (%). Each distribution of perceptions is shown without and with a logarithmic transformation, which was applied on data prior to analysis.

Figure B.8: Distribution of responses to health-protective behavior questions (module F; main sample)



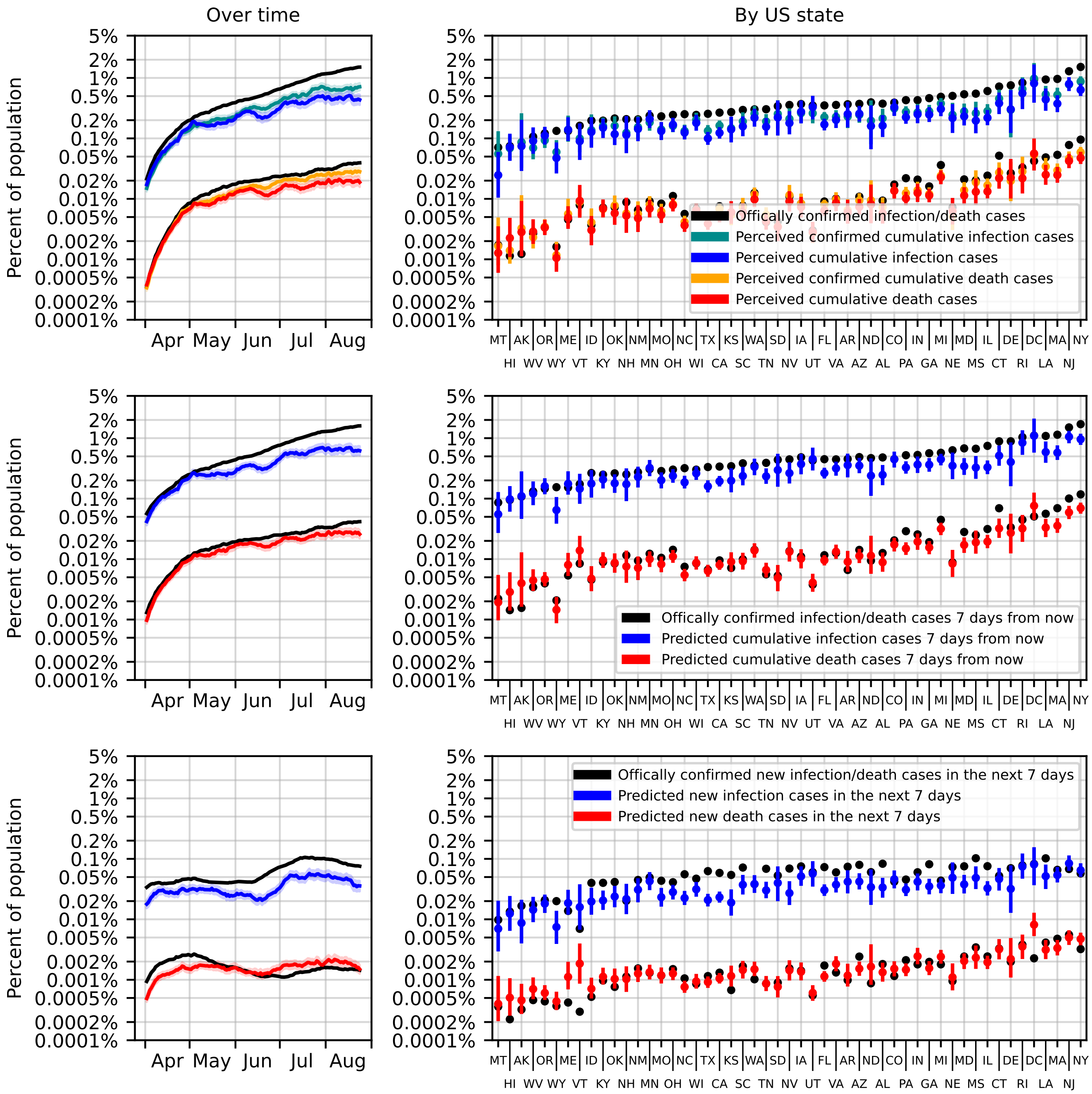

**Notes**: Upper four rows: 9 private behaviors (black) and 3 public behaviors (gray). Bottom row: distribution of the sum of Yes answers, both when considering only 9 private behaviors and when considering all 12 behaviors.

# C Detailed Results

## C.1 Case Perceptions vs. Official Reports

Figures C.1, C.2, C.3 show that the first main finding of a moderate under-estimation of case perceptions extends to all elicited perceptions about infection and death cases. The under-estimation of death cases is smaller than that of infection cases. The sample used for this analysis excludes 653 further responses from the main sample, in which negative growth of either infection or death cases in the next 7 days or the next 30 days was predicted. It also excludes further 40 responses for which growth in *official* death counts is negative due to ex-post classification of deaths as unrelated to COVID-19 (Section 1.2 explains why we did not apply such corrections backwards in time). This sample has $N = 12,463$.

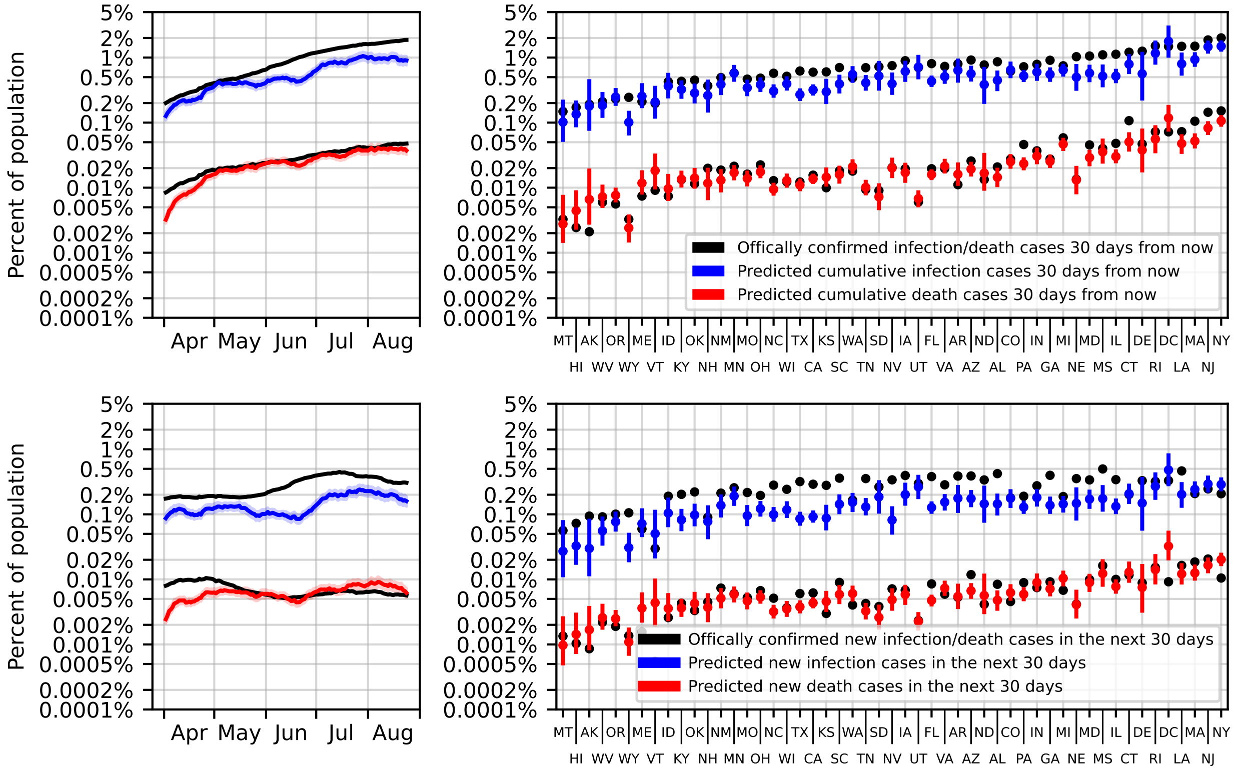
Figure C.1: Perceptions about infection and death cases vs. officially confirmed cases




**Notes**: Upper panel: current cumulative cases (confirmed and actual). Middle panel: cumulative cases as of 7 days from now. Lower panel: new cases in the next 7 days. The sample used for this analysis excludes observations with a predicted negative growth of either infection or death cases in the next 7 days or the next 30 days, and has $N = 12,463$.

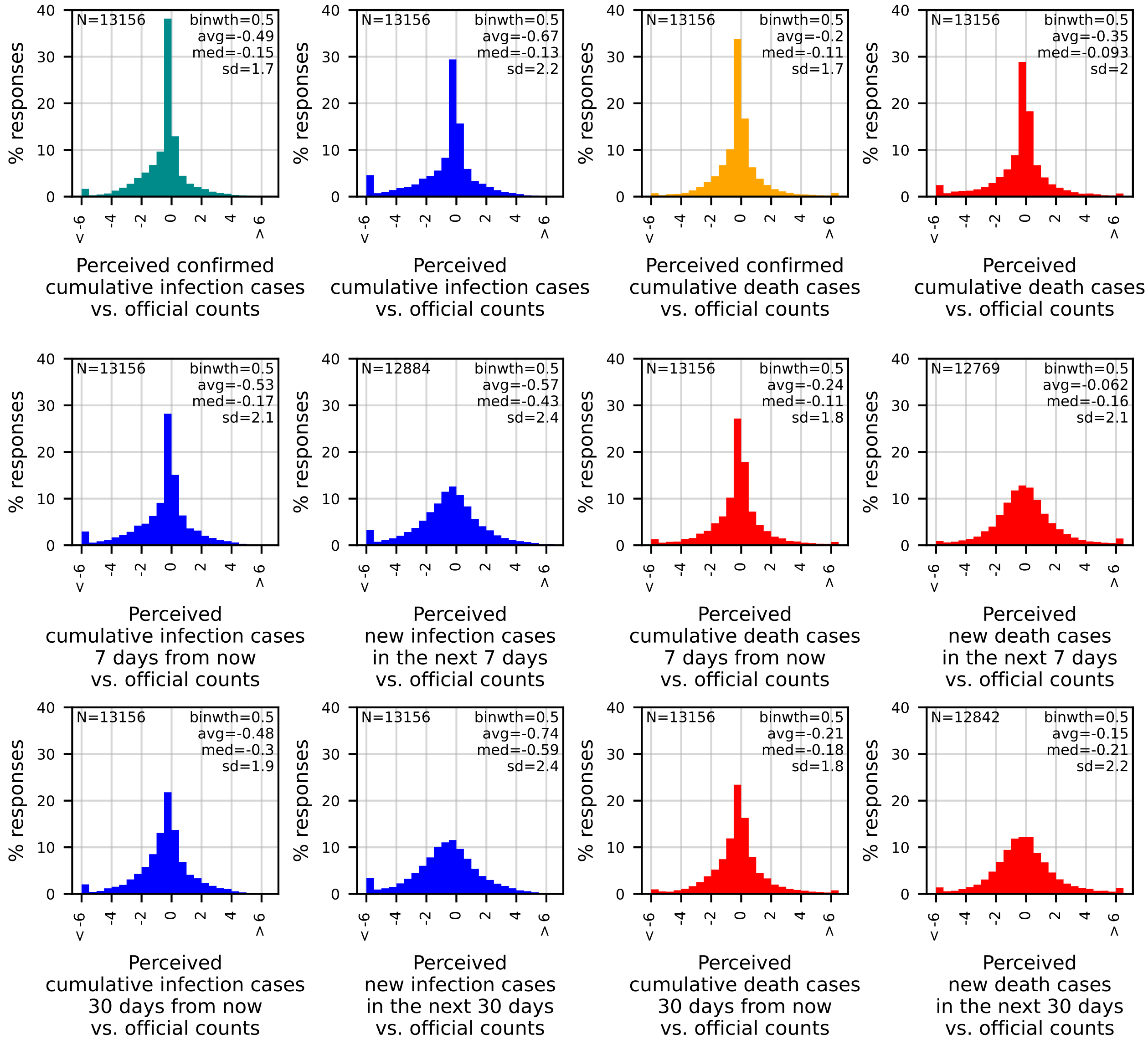
Light-colored areas in the left panels and error bars in the right panels: bootstrapped 95% confidence intervals.

Figure C.2: Perceptions about infection and death cases vs. officially confirmed cases




**Notes**: Upper panel: cumulative cases as of 30 days from now. Lower panel: new cases in the next 30 days. Same notes as under Figure C.1.

Figure C.3: Distribution of difference between case perceptions and officially confirmed cases

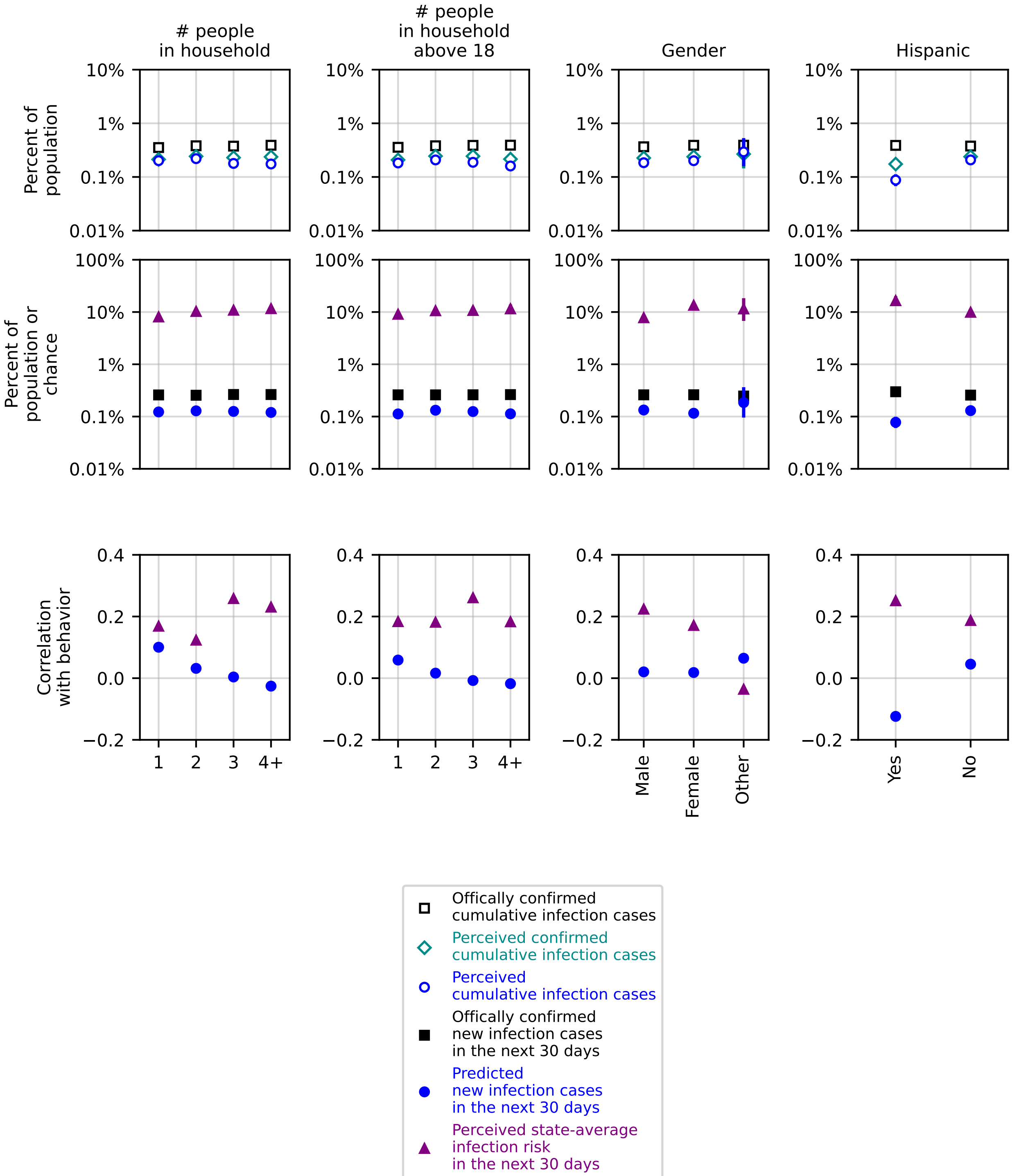



**Notes**: All quantities are differences between log percentages.

## C.2 Main Findings as a Function of Demographics and MTurk Experience

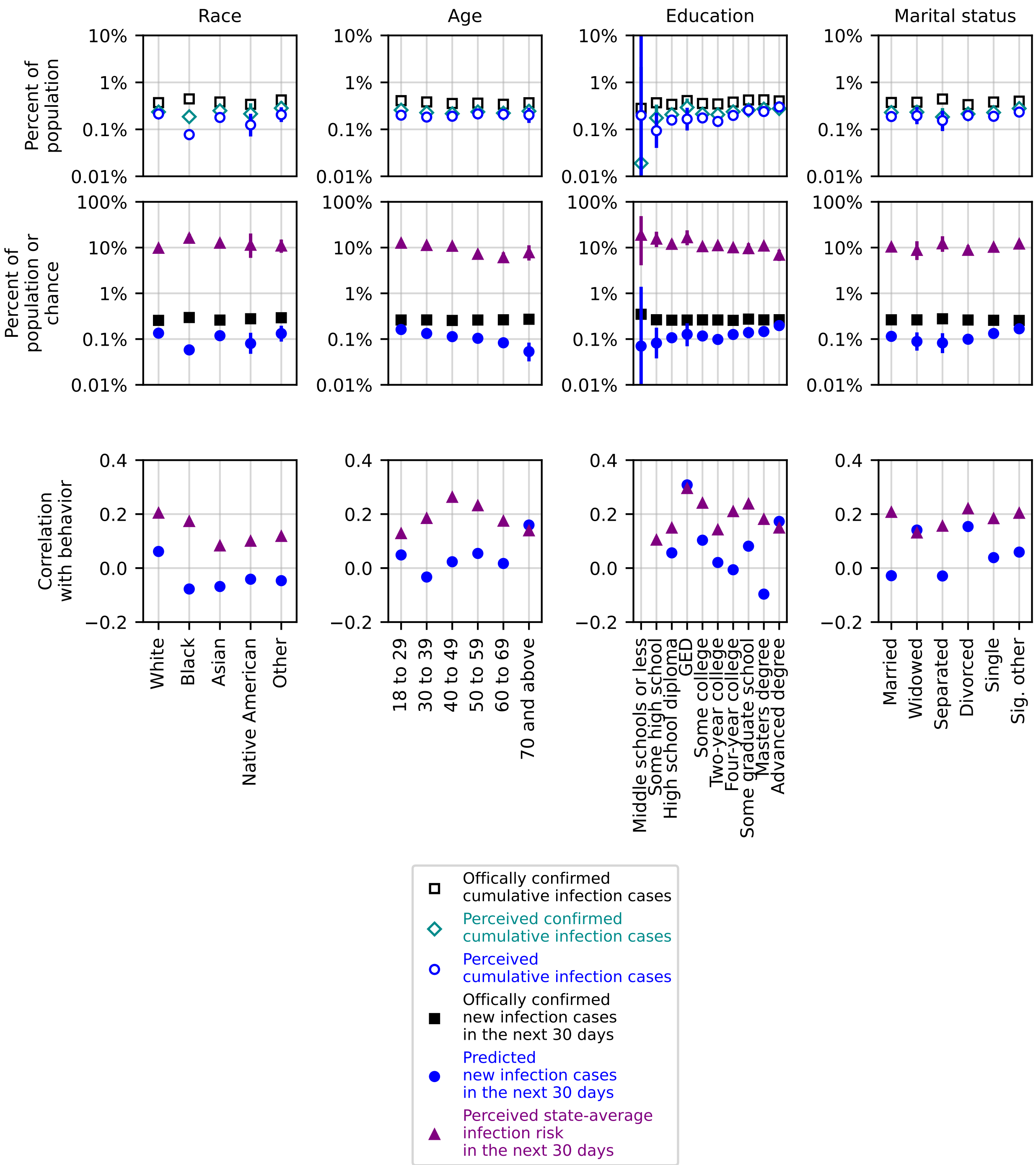
Figures C.4, C.5, C.6, C.7 show Figure 1's results as a function of demographic properties in the sample. Despite some demographic-dependent patterns, our three main findings generally seem to hold across demographic groups.

Figure C.4: Main results from Figure 1 within demographic groups



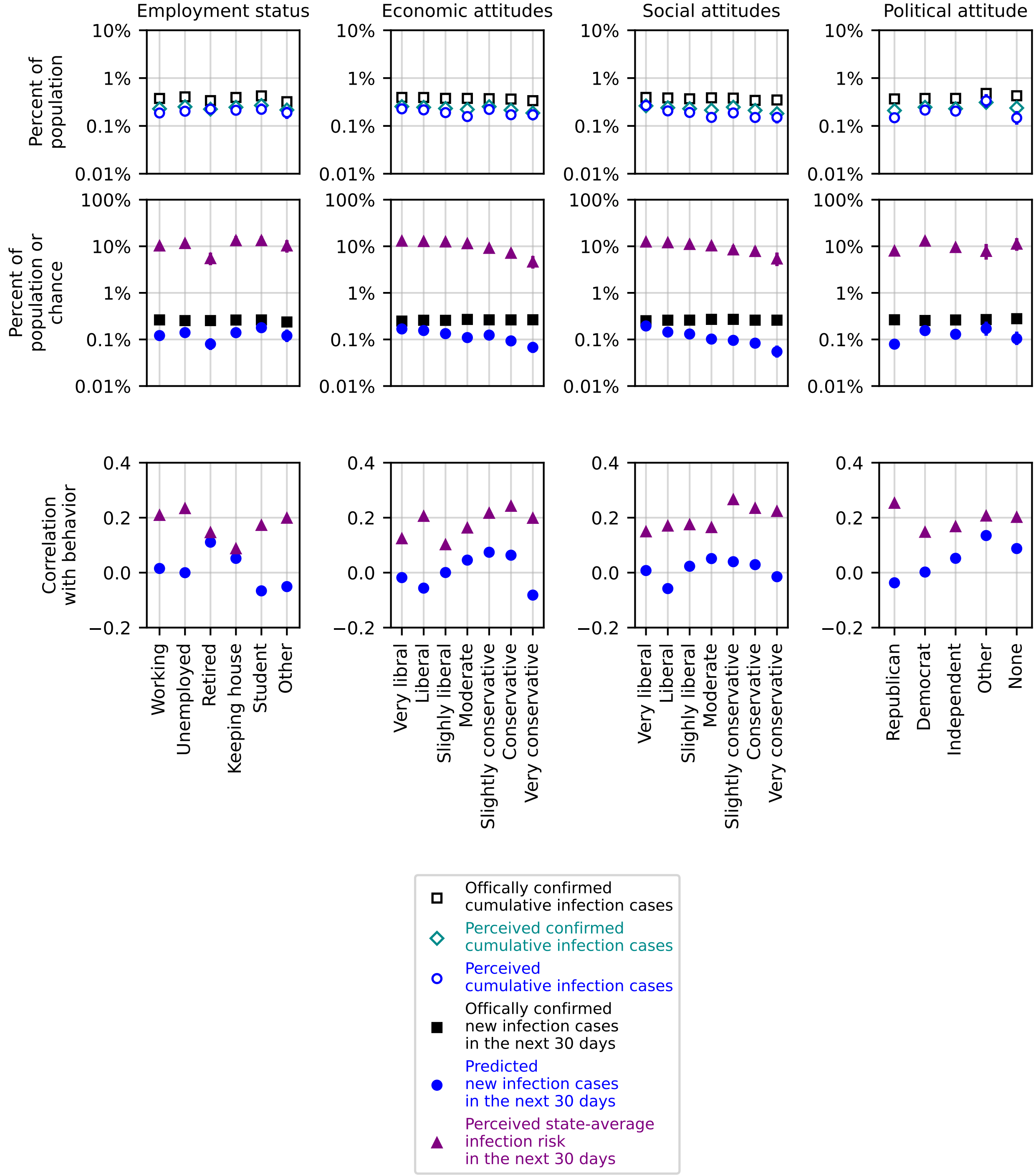

**Notes**: Top two rows: mean log percent perceptions and official case counts within demographic groups. Error bars (hardly visible): bootstrapped 95% confidence intervals. Lower row: Blue squares: correlation of case perceptions—predicted newly infected population percentage in the next 30 days—with self-reported health-protective behavior. Purple squares: correlation of risk perceptions—perceived state-average infection risk in the next 30 days—with behavior.

Figure C.5: Main results from Figure 1 within demographic groups



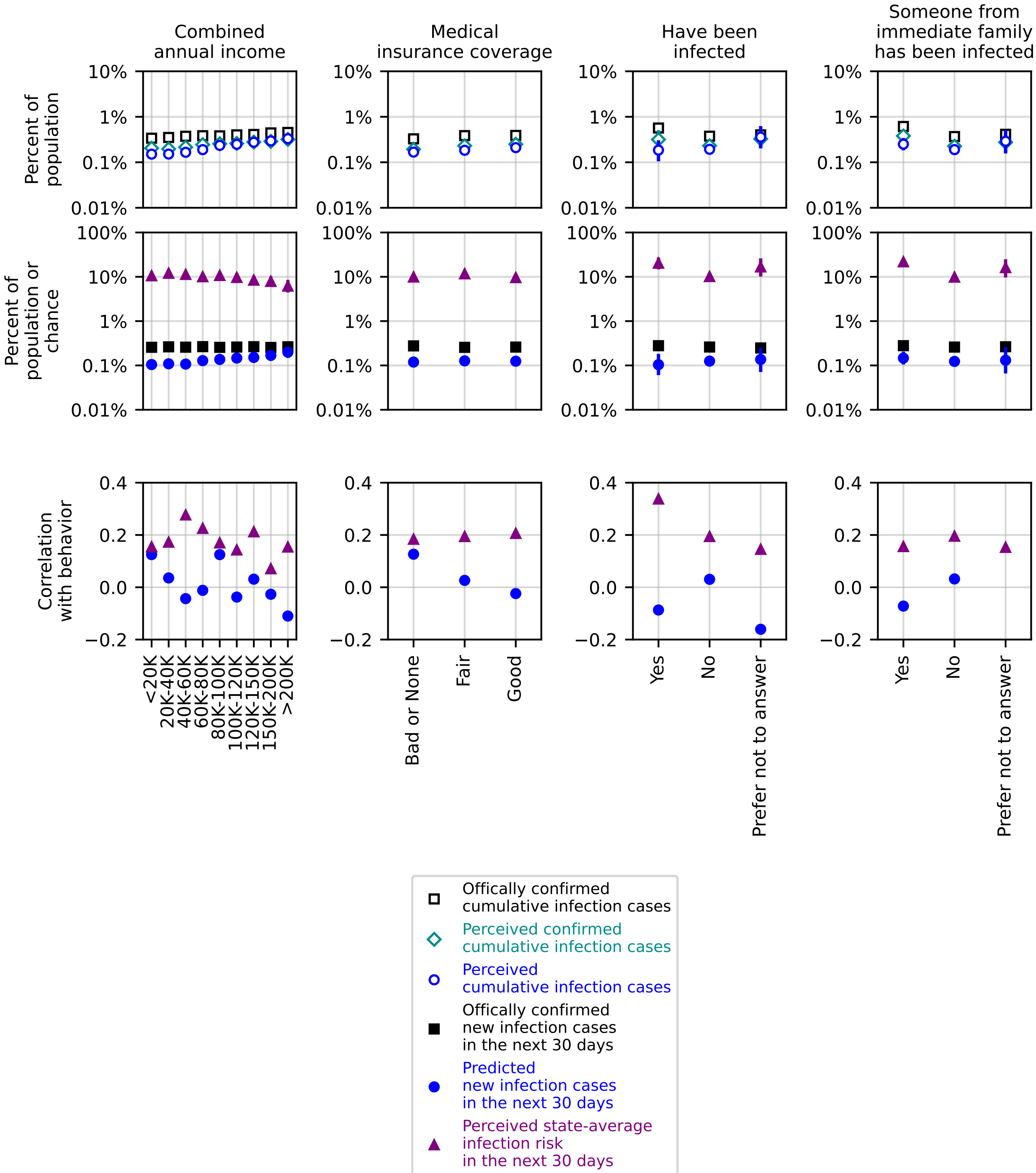

**Notes**: See under Figure C.4.

Figure C.6: Main results from Figure 1 within demographic groups




**Notes**: See under Figure C.4.

Figure C.7: Main results from Figure 1 within demographic groups




**Notes**: See under Figure C.4.

Table C.1 reports regressions of the Present, Future and Risk-Cases gaps' on demographic characteristics, state and day fixed effects. The regressions include a dummy for survey R1, which stands for inexperienced MTurk Workers. The inexperienced sample has a larger Risk-Cases gap than the main sample.

Table C.1: Main gaps as a function of demographic variables

| | Present Cases gap | Future Cases gap | Risk-Cases gap |
|---|---|---|---|
| At least 3 people in household | −0.15 | 0.06 | 0.07 |
| | (0.06) | (0.05) | (0.08) |
| At least 3 people above 18 in household | −0.02 | −0.12 | 0.06 |
| | (0.07) | (0.06) | (0.10) |
| Female | 0.03 | −0.15 | 0.65 |
| | (0.04) | (0.04) | (0.06) |
| Hispanic | −0.64 | −0.48 | 0.82 |
| | (0.11) | (0.09) | (0.12) |
| Age at least 40 | 0.06 | −0.28 | 0.05 |
| | (0.04) | (0.04) | (0.05) |
| Not white | −0.47 | −0.50 | 0.66 |
| | (0.07) | (0.07) | (0.08) |
| Education less than 4-year college | −0.13 | −0.11 | 0.23 |
| | (0.04) | (0.04) | (0.05) |
| Not married | 0.11 | 0.13 | −0.25 |
| | (0.06) | (0.06) | (0.07) |
| Not working | 0.18 | 0.17 | −0.19 |
| | (0.04) | (0.04) | (0.07) |
| Non liberal economic attitudes | 0.08 | −0.01 | −0.15 |
| | (0.06) | (0.05) | (0.07) |
| Non liberal social attitudes | −0.22 | −0.31 | 0.19 |
| | (0.06) | (0.06) | (0.08) |
| Republican | −0.24 | −0.40 | 0.10 |
| | (0.08) | (0.09) | (0.10) |
| Not Democrat or Republican | 0.01 | −0.09 | −0.07 |
| | (0.05) | (0.05) | (0.06) |
| Combined annual less than 60K | −0.33 | −0.26 | 0.42 |
| | (0.06) | (0.05) | (0.06) |
| Fair or bad economic insurance | −0.04 | 0.02 | 0.05 |
| | (0.04) | (0.04) | (0.05) |
| Have been infected | −0.07 | −0.24 | 0.44 |
| | (0.23) | (0.20) | (0.24) |
| Family member has been infected | 0.07 | 0.25 | 0.32 |
| | (0.10) | (0.13) | (0.15) |
| Inexperienced Worker (Survey R1) | −0.41 | −0.15 | 0.74 |
| | (0.03) | (0.07) | (0.17) |
| State FE | Yes | Yes | Yes |
| Day FE | Yes | Yes | Yes |
| Obs | 13411 | 13411 | 11363 |
| $R^2$ | 0.08 | 0.09 | 0.08 |

**Notes**: OLS regressions. Dependent variables: Present Cases gap; Future Cases gap; Risk-Cases gap (all as log percentages). Independent variables: demographic characteristics (binarized, see Appendix A.1); MTurk experience; state and day fixed effects. Sample size is larger than in the main analysis, since inexperienced MTurk Workers participated in survey version R1, whose sample is not included in the main analysis.
In parentheses: Driscoll-Kraay standard errors using Bartlett's kernel and a bandwidth of 4 days.

Table C.2 shows a regression of self-reported health-protective behaviors on Risk perceptions (perceived state-average infection risk in the next 30 days), Case perceptions (predicted newly infected population percentage in the next 30 days) and demographic characteristics, controlling for state and day fixed effects. As shown in Table 2, including demographic variables does not change the relations between perceptions and behavior. Some demographics that emerge as relatively important shifters of protective behavior include having someone from the immediate family infected (associated with increased protective behavior) and right-leaning political attitudes (decreased protective behavior, especially public behaviors).

Table C.2: Behavior as a function of demographic variables

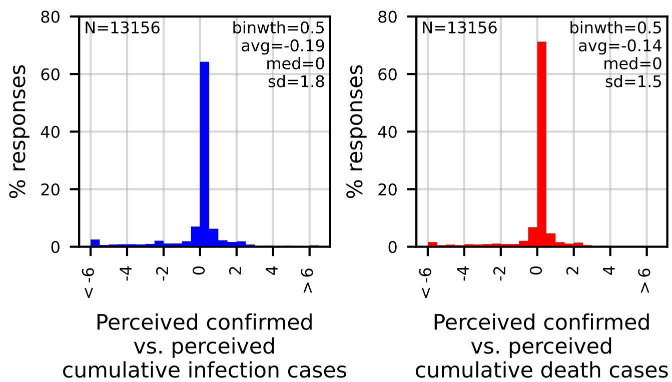
| | Private behaviors | All behaviors |
|---|---|---|
| Risk perceptions | 0.19 | 0.23 |
| | (0.02) | (0.02) |
| Case perceptions | 0.00 | 0.03 |
| | (0.01) | (0.02) |
| At least 3 people in household | 0.13 | 0.10 |
| | (0.08) | (0.09) |
| At least 3 people above 18 in household | 0.11 | 0.14 |
| | (0.08) | (0.12) |
| Female | 0.13 | 0.17 |
| | (0.06) | (0.07) |
| Hispanic | 0.35 | 0.37 |
| | (0.13) | (0.16) |
| Age at least 40 | −0.20 | −0.17 |
| | (0.05) | (0.06) |
| Not white | 0.55 | 0.60 |
| | (0.05) | (0.05) |
| Education less than 4-year college | −0.16 | −0.22 |
| | (0.05) | (0.06) |
| Not married | −0.23 | −0.28 |
| | (0.07) | (0.08) |
| Not working | −0.22 | −0.23 |
| | (0.06) | (0.07) |
| Non liberal economic attitudes | −0.27 | −0.40 |
| | (0.08) | (0.10) |
| Non liberal social attitudes | −0.02 | −0.20 |
| | (0.09) | (0.11) |
| Republican | −0.13 | −0.36 |
| | (0.08) | (0.12) |
| Not Democrat or Republican | −0.27 | −0.33 |
| | (0.10) | (0.12) |
| Combined annual less than 60K | 0.12 | 0.12 |
| | (0.06) | (0.07) |
| Fair or bad economic insurance | −0.20 | −0.25 |
| | (0.07) | (0.09) |
| Have been infected | −0.32 | −0.53 |
| | (0.23) | (0.26) |
| Family member has been infected | 0.52 | 0.57 |
| | (0.15) | (0.20) |
| State FE | Yes | Yes |
| Day FE | Yes | Yes |
| Obs | 5398 | 5397 |
| $R^2$ | 0.11 | 0.11 |

**Notes**: OLS regressions. Dependent variable: number of self-reported health-protective behaviors, out of nine private behaviors or all twelve private and public behaviors. Independent variables: Risk perceptions: log perceived state-average infection risk in the next 30 days; Case perceptions: log predicted newly infected population percentage in the next 30 days; demographic characteristics (binarized, see Appendix A.1); state and day fixed effects.
In parentheses: Driscoll-Kraay standard errors using Bartlett's kernel and a bandwidth of 4 days.

## C.3 Perceived Cases vs. Perceived Confirmed Cases

Figure C.8 shows that the distribution of the difference between perceived (*actual*) cumulative infection cases (deaths) and perceived *confirmed* cumulative infection cases (deaths) is concentrated around zero. While the average difference in the left panel is −17 percent, which may suggest an overall perception of over detection/reporting of COVID-19 infection cases, the negative sign is not robust to random survey order. Responses who see the module order B–C and the prediction horizon order today–week–month (0–7–30) have a positive difference of 27 percent, while responses with the orders B–C × 30–7–0, C–B × 0–7–30 and C–B × 30–7–0 have average differences of −31, −6 and −41 percent respectively. See Figure D.3 in Appendix D.2.

Figure C.8: Distribution of difference between perceived confirmed cases and perceived actual cases



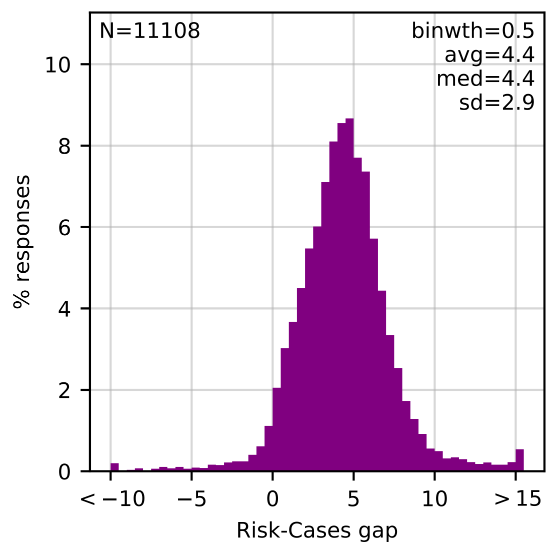

**Notes**: All quantities are differences between log percentages.

In addition, the average negative difference seems to be driven by outliers, since 5,517 responses perceive (actual) infection cases greater than confirmed cases, 4,901 perceive them as equal, and only 2,738 perceive the former smaller than the latter. Excluding the top and bottom 5 percentiles, the average difference increases to −5 percent, and excluding the top and bottom 10 percentiles, it further increases to 3 percent.

## C.4 Distribution of the Risk-Cases Gap

Figure C.9 shows the distribution of the Risk-Cases gap, i.e., the log difference between perceived state-average infection risk in the next 30 days and predicted newly infected population percentage in the next 30 days. Both the mean and median difference indicate a gap of 4.4 log points, and 96 percent of the distribution is above the consistent-beliefs benchmark of zero.

Figure C.9: Distribution of the Risk-Cases gap

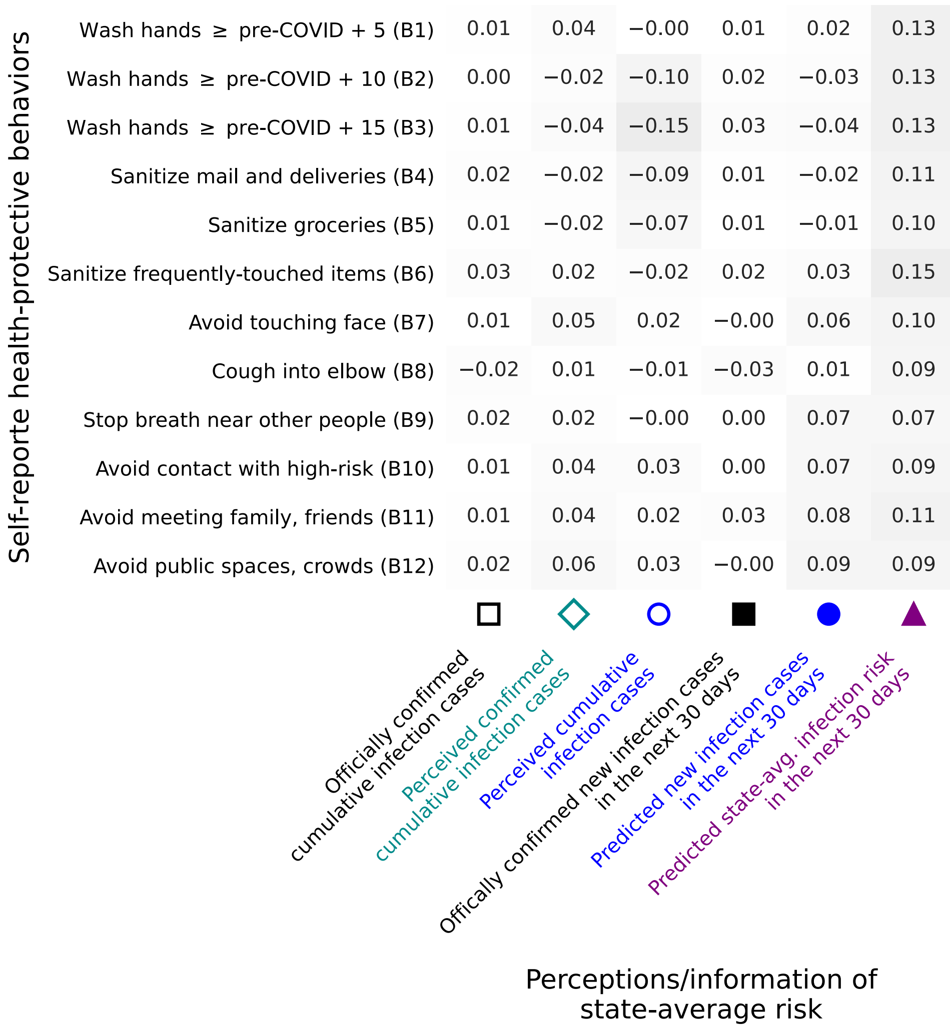



**Notes**: Risk-Cases gap: the log difference between perceived state-average infection risk in the next 30 days and predicted newly infected population percentage in the next 30 days. All quantities are log percentages.

## C.5 Relations Between Single Behaviors and Perceptions

The third main finding relies on an aggregate behavior measure, summing all protective behaviors reported as adopted. Figure C.10 reports the correlations from Figure 1 with each behavior separately. Risk perceptions generally remain the strongest predictor of the first nine private behaviors, while case perceptions have a similar predictive power of the last three public behaviors.

Figure C.10: Correlations of perceptions and single self-reported health-protective behaviors




**Notes**: Correlations of officially confirmed cases, case perceptions and risk perceptions shown in Figure 1 with all twelve self-reported health-protective behaviors separately, listed on the vertical axis.

Tables C.3 and C.4 show regressions of each self-reported behavior separately on risk and case perceptions while controlling for demographics, state and day fixed effects. This reduces public behaviors' endogeneity with state regulations, which are affected by case counts. Risk perceptions are generally more strongly related to behavior than Case perceptions.

Table C.3: Relations of perceptions and single private self-reported health-protective behaviors

| | B1 | B2 | B3 | B4 | B5 | B6 | B7 | B8 | B9 |
|---|---|---|---|---|---|---|---|---|---|
| Risk perceptions | 0.024 | 0.026 | 0.022 | 0.016 | 0.017 | 0.024 | 0.016 | 0.012 | 0.013 |
| | (0.004) | (0.003) | (0.003) | (0.003) | (0.003) | (0.004) | (0.003) | (0.002) | (0.004) |
| Case perceptions | 0.001 | −0.005 | −0.004 | −0.001 | −0.002 | 0.004 | 0.006 | −0.002 | 0.010 |
| | (0.002) | (0.002) | (0.001) | (0.003) | (0.003) | (0.003) | (0.002) | (0.002) | (0.002) |
| Demographics | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State fixed-effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Day fixed-effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Obs | 5403 | 5401 | 5401 | 5402 | 5400 | 5401 | 5402 | 5400 | 5401 |
| $R^2$ | 0.074 | 0.093 | 0.107 | 0.110 | 0.095 | 0.098 | 0.069 | 0.073 | 0.071 |

**Notes**: OLS regressions. Dependent variables: single (not aggregated) self-reported health-protective behaviors (see full list in Figure C.10 above). Independent variables: Risk perceptions: (log) perceived state-average infection risk in the next 30 days; Case perceptions: (log) predicted newly infected population-percentage in the next 30 days; demographics; state and day fixed effects.
In parentheses: Driscoll-Kraay standard errors using Bartlett's kernel and a bandwidth of 4 days.

Table C.4: Relations of perceptions and single public self-reported health-protective behaviors

| | B10 | B11 | B12 |
|---|---|---|---|
| Risk perceptions | 0.014 | 0.017 | 0.011 |
| | (0.003) | (0.003) | (0.003) |
| Case perceptions | 0.006 | 0.009 | 0.009 |
| | (0.002) | (0.003) | (0.002) |
| Demographics | Yes | Yes | Yes |
| State fixed-effects | Yes | Yes | Yes |
| Day fixed-effects | Yes | Yes | Yes |
| Obs | 5401 | 5401 | 5402 |
| $R^2$ | 0.066 | 0.124 | 0.100 |

**Notes**: same as under Table C.4.

## C.6 Within-Respondents Relations of Perceptions and Outcomes

Since we allowed all MTurk Workers to re-participate in the survey once more beginning on June 2, 2020, we have some panel data: the same 2,618 main-sample respondents participated once before the cutoff date and once after it. This large subsample enables testing some of the relations shown in Figure 4 within respondents. Tables C.5, C.6, C.7, C.8 show regressions of all outcome variables except behavior (which was elicited only after June 2, 2020) on risk perceptions and case perceptions, with and without individual fixed effects.

Our third main finding that risk perceptions are more strongly correlated with outcome variables than case perceptions holds at the within-individual level for medical risk outcomes, but only marginally for economic risk outcomes. We cannot support nor reject this finding for anticipated well-being.

Table C.5: Within-individuals relation between perceptions and outcomes
Dependent variable: Perceived personal infection risk

| | (1) | (2) |
|---|---|---|
| Risk perceptions | 0.97 | 0.72 |
| | (0.02) | (0.08) |
| Case perceptions | 0.16 | 0.07 |
| | (0.02) | (0.04) |
| Constant | −0.95 | −0.59 |
| | (0.09) | (0.21) |
| Individual FE | No | Yes |
| Day FE | No | Yes |
| Obs | 4205 | 4205 |
| $R^2$ | 0.30 | 0.87 |

**Notes**: OLS regressions. Dependent variable: (log) perceived personal infection risk in the next 30 days. Independent variables: Risk perceptions: (log) perceived state-average infection risk in the next 30 days; Case perceptions: (log) predicted newly infected population-percentage in the next 30 days; individual and day fixed effects. Regressions use the subsample of respondents that completed the survey twice.
In parentheses: Driscoll-Kraay standard errors using Bartlett's kernel and a bandwidth of 4 days.

Table C.6: Within-individuals relation between perceptions and outcomes
Dependent variable: Perceived family medical risk

| | (1) | (2) |
|---|---|---|
| Risk perceptions | 0.67 | 0.34 |
| | (0.03) | (0.08) |
| Case perceptions | 0.25 | 0.03 |
| | (0.04) | (0.04) |
| Constant | −0.73 | −0.47 |
| | (0.13) | (0.19) |
| Individual FE | No | Yes |
| Day FE | No | Yes |
| Obs | 4262 | 4262 |
| $R^2$ | 0.12 | 0.81 |

**Notes**: Same as under Table C.5, with (log) perceived family medical risk in the next 30 days as the dependent variable.

Table C.7: Within-individuals relation between perceptions and outcomes
Dependent variable: Perceived family economic risk

| | (1) | (2) |
|---|---|---|
| Risk perceptions | 0.49 | 0.16 |
| | (0.05) | (0.07) |
| Case perceptions | 0.21 | −0.05 |
| | (0.04) | (0.08) |
| Constant | −1.63 | −1.45 |
| | (0.19) | (0.27) |
| Individual FE | No | Yes |
| Day FE | No | Yes |
| Obs | 4262 | 4262 |
| $R^2$ | 0.04 | 0.82 |

**Notes**: Same as under Table C.5, with (log) perceived family economic risk in the next 30 days as the dependent variable.

Table C.8: Within-individuals relation between perceptions and outcomes
Dependent variable: Predicted family (minus) well-being

| | (1) | (2) |
|---|---|---|
| Risk perceptions | 0.97 | 0.53 |
| | (0.20) | (0.39) |
| Case perceptions | 0.49 | 0.19 |
| | (0.19) | (0.36) |
| Constant | 26.02 | 26.36 |
| | (0.85) | (1.15) |
| Individual FE | No | Yes |
| Day FE | No | Yes |
| Obs | 4262 | 4262 |
| $R^2$ | 0.01 | 0.76 |

**Notes**: Same as under Table C.5, with minus predicted family well-being in the next 30 days as the dependent variable.

## C.7 Explaining Perceptions' Variation

Table C.9 shows a regression of perceptions of cumulative infections at present ("Present case per."), case perceptions ("Case per."), and risk perceptions ("Risk per.") on officially confirmed cumulative present cases and future cases in the next 30 days, demographic variables and state and day fixed effects. While $R^2 = 0.22$ for cumulative infections at present, it is only 0.11 and 0.08 for case perceptions and risk perceptions, respectively. Using the multi-categorical (non-binarized) demographic variables has little effect on these values, increasing risk perceptions' R-squared to just 0.10.

Table C.9: Perceptions as a function of official information and demographic variables

| | Present case per. | Case per. | Risk per. |
|---|---|---|---|
| Officially confirmed cumulative infection cases | 0.54 | 0.69 | 0.22 |
| | (0.07) | (0.07) | (0.08) |
| Future official cases | 0.04 | 0.17 | 0.07 |
| | (0.03) | (0.03) | (0.04) |
| At least 3 people in household | −0.13 | 0.08 | 0.16 |
| | (0.06) | (0.05) | (0.05) |
| At least 3 people above 18 in household | −0.02 | −0.14 | −0.07 |
| | (0.07) | (0.06) | (0.06) |
| Female | 0.02 | −0.16 | 0.52 |
| | (0.04) | (0.04) | (0.04) |
| Hispanic | −0.66 | −0.43 | 0.38 |
| | (0.11) | (0.09) | (0.07) |
| Age at least 40 | 0.06 | −0.29 | −0.24 |
| | (0.04) | (0.04) | (0.04) |
| Not white | −0.49 | −0.49 | 0.22 |
| | (0.06) | (0.07) | (0.05) |
| Education less than 4-year college | −0.14 | −0.11 | 0.11 |
| | (0.04) | (0.04) | (0.04) |
| Not married | 0.09 | 0.11 | −0.10 |
| | (0.06) | (0.06) | (0.04) |
| Not working | 0.18 | 0.16 | −0.07 |
| | (0.05) | (0.04) | (0.05) |
| Non liberal economic attitudes | 0.10 | 0.02 | −0.14 |
| | (0.05) | (0.05) | (0.06) |
| Non liberal social attitudes | −0.24 | −0.33 | −0.10 |
| | (0.05) | (0.06) | (0.06) |
| Republican | −0.23 | −0.39 | −0.31 |
| | (0.08) | (0.08) | (0.06) |
| Not Democrat or Republican | 0.00 | −0.09 | −0.19 |
| | (0.06) | (0.05) | (0.04) |
| Combined annual less than 60K | −0.31 | −0.26 | 0.15 |
| | (0.07) | (0.05) | (0.05) |
| Fair or bad economic insurance | −0.02 | 0.03 | 0.08 |
| | (0.03) | (0.03) | (0.04) |
| Have been infected | −0.12 | −0.23 | 0.22 |
| | (0.23) | (0.19) | (0.14) |
| Family member has been infected | 0.11 | 0.21 | 0.59 |
| | (0.10) | (0.13) | (0.08) |
| State FE | Yes | Yes | Yes |
| Day FE | Yes | Yes | Yes |
| Obs | 13156 | 13156 | 11108 |
| $R^2$ | 0.22 | 0.11 | 0.08 |

**Notes**: OLS regressions. Dependent variables: Present case perceptions: (log) perceived cumulative infected population percentage as of today; Case perceptions: (log) predicted newly infected population-percentage in the next 30 days; Risk perceptions: (log) perceived state-average infection risk in the next 30 days. Independent variables: Present official cases: (log) officially confirmed infected population percentage as of today; Future official cases: (log) officially confirmed newly infected population-percentage in the next 30 days; demographic characteristics (binarized, see Appendix A.1); state and day fixed effects.
In parentheses: Driscoll-Kraay standard errors using Bartlett's kernel and a bandwidth of 4 days.

Table C.10 shows the same regressions using the subsample of respondents who completed the survey twice. The R-squared values of future risk perceptions and risk perceptions significantly increase when adding individual fixed effects, suggesting that the bulk of variation in these beliefs can be explained by stable individual characteristics.

Table C.10: Perceptions as a function of official information and demographic variables

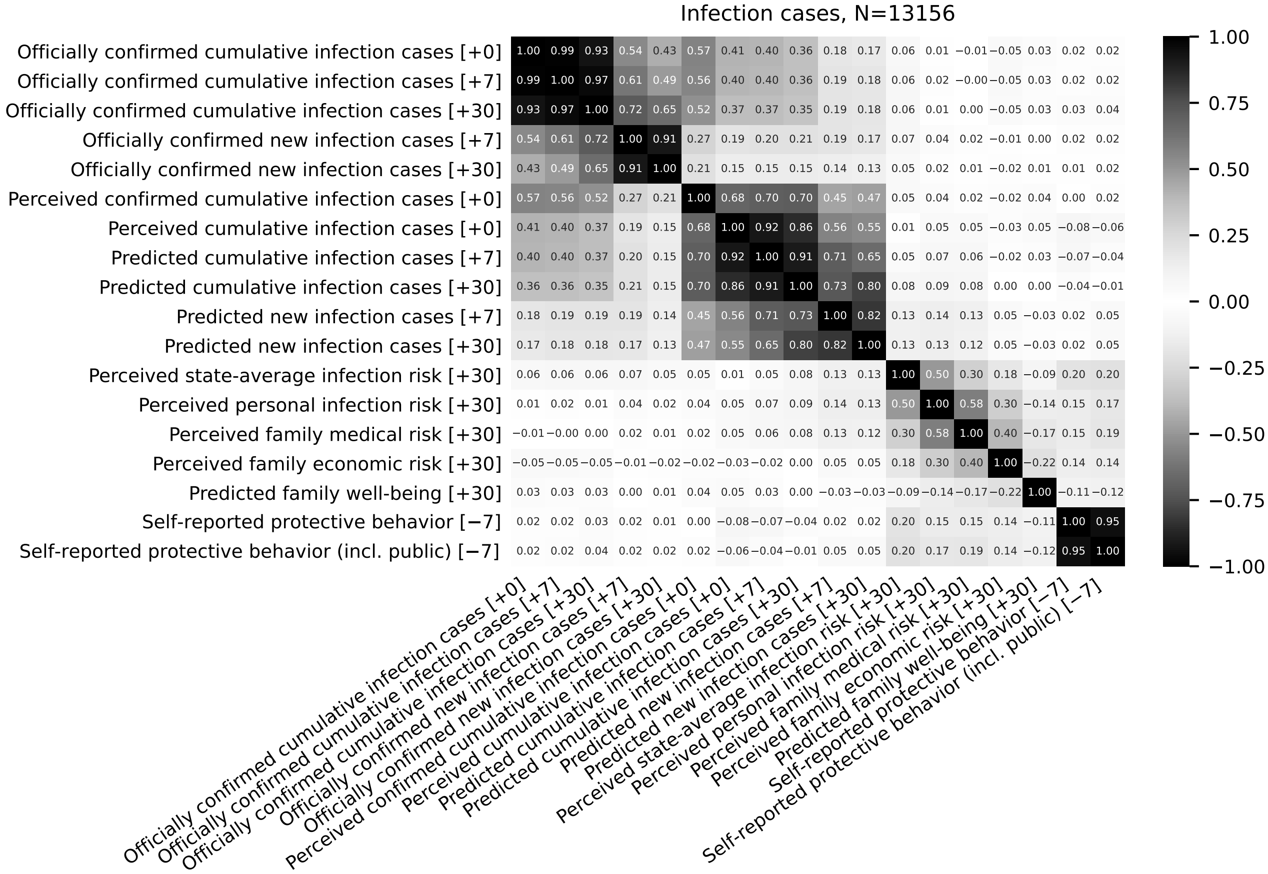
| | Present case per. | | Case per. | | Risk per. | |
|---|---|---|---|---|---|---|
| Present official cases | 0.68 | 0.61 | 0.74 | 0.59 | 0.12 | 0.13 |
| | (0.09) | (0.06) | (0.10) | (0.09) | (0.13) | (0.16) |
| Future official cases | 0.06 | 0.09 | 0.16 | 0.22 | 0.07 | 0.08 |
| | (0.05) | (0.04) | (0.04) | (0.04) | (0.08) | (0.11) |
| Demographics | Yes | No | Yes | No | Yes | No |
| State FE | Yes | No | Yes | No | Yes | No |
| Day FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Individual FE | No | Yes | No | Yes | No | Yes |
| Obs | 5236 | 5236 | 5236 | 5236 | 4262 | 4262 |
| $R^2$ | 0.33 | 0.75 | 0.17 | 0.70 | 0.14 | 0.81 |

**Notes**: OLS regressions using the same variables as in Table C.9, also including individual fixed effects as an independent variable. Regressions use the subsample of respondents that completed the survey twice. In parentheses: Driscoll-Kraay standard errors using Bartlett's kernel and a bandwidth of 4 days.

## C.8 Full Correlation Tables

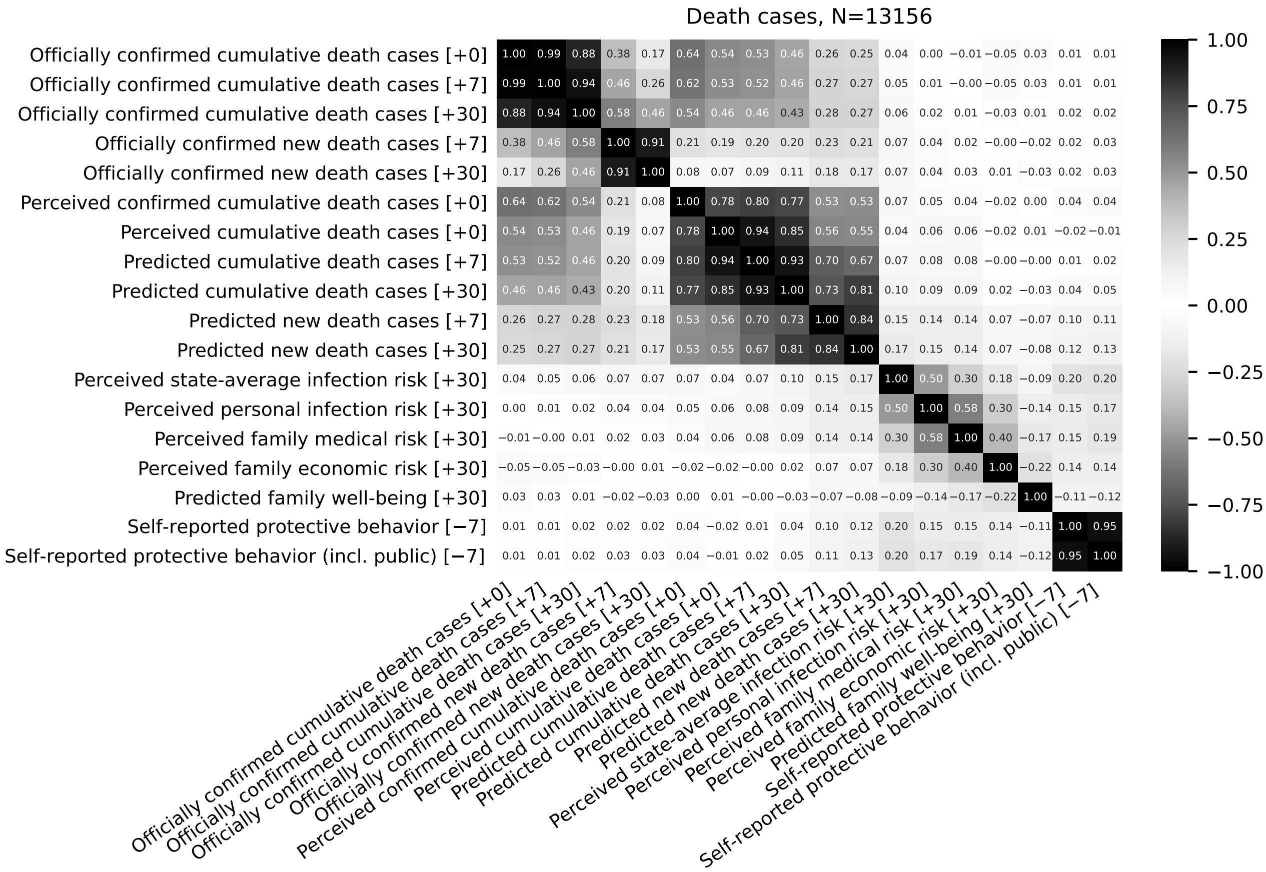
Figures C.11, C.12 explore all correlations between case perceptions, risk perceptions, anticipated well-being and (aggregated) protective behavior. Official reports and case perceptions are correlated with each other and within each; risk perceptions, anticipated well-being and protective behavior are only weakly correlated with them, while being correlated with each other. Perceptions about future deaths are more strongly correlated with behavior than perceptions about future infections.

Figure C.11: Full correlations table (main sample)




**Notes**: Official case counts, case perceptions and risk perceptions (all as log percentages).

Figure C.12: Full correlations table: case perceptions about deaths rather than infections (main sample)

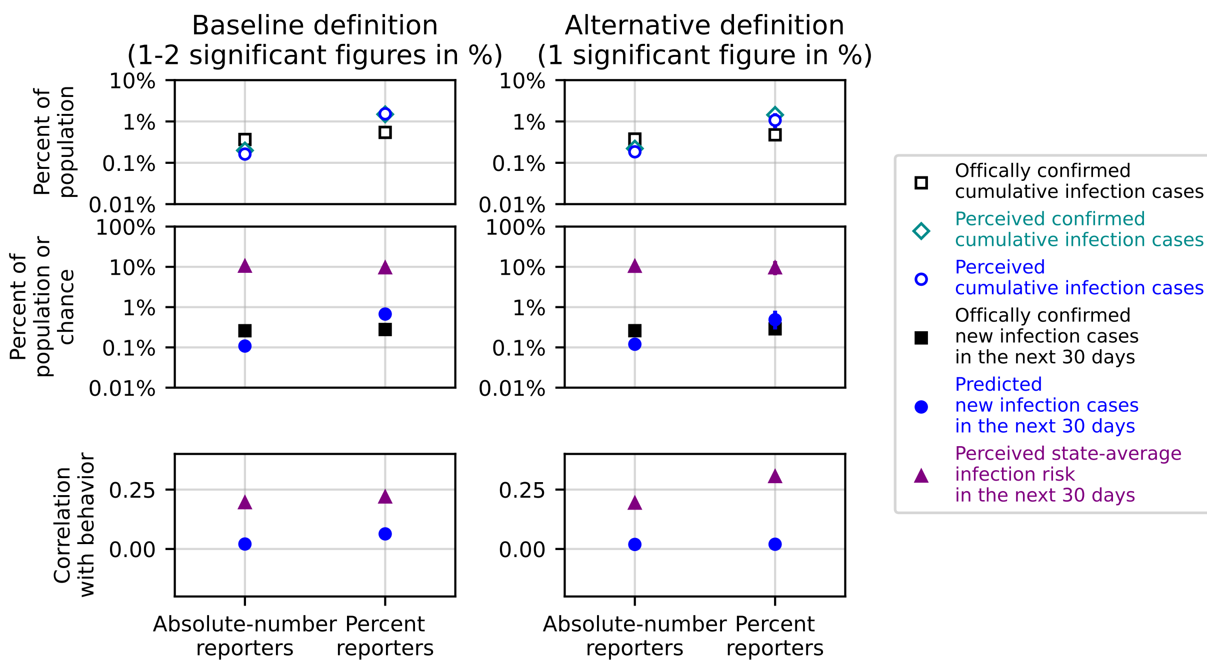



**Notes**: Official case counts, case perceptions and risk perceptions (all as log percentages).

## C.9 The Role of Elicitation Details: More Results

**Robustness to percent-reporters classification.** We distinguish absolute-number reporters and percent reporters by the rounding pattern of percent responses to the three questions about infection cases (B1–B3). Respondents who report in all three questions percent values with at most two significant figures (e.g., 11%, 0.3%, 0.0052%) are classified as percent reporters, while the rest (e.g., 1.385%; respondents could see no more than three significant figures in the survey interface) are classified as absolute-number reporters. We test an alternative classification using just 1 significant figure. The tradeoff between classification criteria is that there is roughly 10 percent false identification rate when using 1–2 significant figures and only 1 percent rate when using one significant figure, but at the cost of a small subsample. Figure C.13 compares percent reporters and absolute-number reporters using both the baseline definition of 1–2 significant figures (resulting with 8 percent being percent reporters) and an alternative definition of only 1 significant figure (resulting with 3 percent being percent reporters).

Figure C.13: Main results within absolute-number reporters and percent reports: two classification definitions




**Notes**: Left column: classification of percent reporters as having percent responses with 1 or 2 significant figures (identical to the two left columns in Figure 5). Right column: only 1 significant figure. Bottom panel: correlation coefficients with self-reported protective behavior. Error bars: bootstrapped 95% confidence intervals; mostly smaller than the markers size.

The Risk-Cases gap among percent reporters is a factor of 14 and 22 using the baseline and alternative classification, respectively, and 92, 82 for absolute-number reporters. The Present Cases gap among percent-reporters is a 2.8-fold and a 2.3-fold overestimation of cases using the baseline and alternative classification, respectively. The lower panel shows that the correlations between case perceptions, risk perception and behavior maintain similar relative standings using both classifications.

**Controlling for demographics.** Self-selection to report percentages or absolute-numbers may be related to demographic characteristics, time and state, which then confound the effect of response format. Tables C.11 and C.12 show the controlled effect of being a percent reporter on the three gaps, which remains qualitatively similar to what shown in Figures 5, C.13: the Present Cases and Future Cases gaps (whose sample-averages are −0.67 and −0.74 log points, respectively) become positive and the Risk-Cases gap (whose sample-average is 4.37 log points) remains positive and large. Table C.13 shows the interacted effects of being percent reporter with risk perceptions vs. with case perceptions on self-reported health-protective behavior, which imply that risk perceptions' relation with behavior remains stronger than case perceptions' both among percent reporters and absolute-number reporters.

Table C.11: Main gaps as a function of being percent reporter (baseline definition)

| | Present Cases gap | Future Cases gap | Risk-Cases gap |
|---|---|---|---|
| Percent reporter | 2.05 | 1.72 | −1.88 |
| | (0.10) | (0.10) | (0.11) |
| Demographics | Yes | Yes | Yes |
| State FE | Yes | Yes | Yes |
| Day FE | Yes | Yes | Yes |
| Obs | 13411 | 13411 | 11363 |
| $R^2$ | 0.15 | 0.14 | 0.13 |

**Notes**: OLS regressions. Dependent variables: Present Cases gap; Future Cases gap; Risk-Cases gap (all as log percentages). Independent variables: dummy for percent reporter (baseline definition of 1-2 significant figures in percent reports); demographics; MTurk experience (survey version R1); state and day fixed effects. In parentheses: Driscoll-Kraay standard errors using Bartlett's kernel and a bandwidth of 4 days.

Table C.12: Main gaps as a function of being percent reporter (alternative definition)

| | Present Cases gap | Future Cases gap | Risk-Cases gap |
|---|---|---|---|
| Percent reporter alt. def. | 1.81 | 1.30 | −1.41 |
| | (0.21) | (0.23) | (0.23) |
| Demographics | Yes | Yes | Yes |
| State FE | Yes | Yes | Yes |
| Day FE | Yes | Yes | Yes |
| Obs | 13411 | 13411 | 11363 |
| $R^2$ | 0.11 | 0.11 | 0.10 |

**Notes**: Same as Table C.11, using percent reporter alternative definition of 1 significant figure to identify percent reports.

Table C.13: Relation of perceptions and behavior as a function of percent reporter

Dependent variable: Self-reported protective behavior

| | 9 private behaviors | | 12 behaviors | 9 private behaviors | | 12 behaviors |
|---|---|---|---|---|---|---|
| Risk perceptions | 0.22 | 0.17 | 0.21 | 0.22 | 0.17 | 0.21 |
| | (0.02) | (0.02) | (0.03) | (0.02) | (0.02) | (0.02) |
| Case perceptions | 0.00 | 0.02 | 0.05 | −0.00 | 0.01 | 0.04 |
| | (0.02) | (0.02) | (0.02) | (0.02) | (0.01) | (0.02) |
| Percent-reporter | −0.26 | −0.34 | −0.42 | | | |
| | (0.10) | (0.09) | (0.12) | | | |
| Percent-rep. × Risk per. | 0.00 | −0.02 | 0.00 | | | |
| | (0.06) | (0.05) | (0.06) | | | |
| Percent-rep. × Case per. | 0.00 | −0.00 | −0.02 | | | |
| | (0.03) | (0.03) | (0.04) | | | |
| Percent-reporter 2nd def. | | | | −0.00 | −0.12 | −0.11 |
| | | | | (0.15) | (0.14) | (0.19) |
| Percent-rep. 2nd def. × Risk per. | | | | 0.09 | 0.04 | 0.09 |
| | | | | (0.08) | (0.08) | (0.09) |
| Percent-rep. 2nd def. × Case per. | | | | −0.05 | −0.04 | −0.06 |
| | | | | (0.04) | (0.04) | (0.05) |
| Constant | 4.36 | | | 4.34 | | |
| | (0.07) | | | (0.07) | | |
| Demographics | No | Yes | Yes | No | Yes | Yes |
| State fixed effects | No | Yes | Yes | No | Yes | Yes |
| Day fixed effects | No | Yes | Yes | No | Yes | Yes |
| Obs | 5398 | 5398 | 5397 | 5398 | 5398 | 5397 |
| $R^2$ | 0.04 | 0.14 | 0.15 | 0.04 | 0.14 | 0.15 |

**Notes**: OLS regressions. Dependent variable: number of self-reported health-protective behaviors, out of nine private behaviors or all twelve private and public behaviors. Independent variables: Risk perceptions: (log) perceived state-average infection risk; Case perceptions: (log) predicted newly infected population-percentage in the next 30 days; Percent-reporter (2nd def.): whether a respondent responded to case perceptions questions using percentages, as defined in the baseline (alternative) classification.
The non-binary interacted variables (Risk perceptions and Case perceptions) are centered around their means to show the mean change of the effect of these variables due to the interaction. In parentheses: Driscoll-Kraay standard errors using Bartlett's kernel and a bandwidth of 4 days.

## C.10 Effects of Difficulty-to-Reach and Previous Participation on Perceptions Gaps

Allowing MTurk Workers to re-participate in the survey beginning on June 2, 2020 allows us to identify the extent to which difficulty to reach of respondents, i.e., their (in)availability to take our survey on the platform, affects our main findings.[1] Such effects may confound time trends or cross-group comparisons (Heffetz and Rabin 2013). The MTurk pool of Workers

[1]Re-participation beginning on June 2, 2020 was primarily aimed to efficiently collect more responses. See Section 1.1.

is limited and changes gradually over time, and hence prior to June 2, 2020 easy-to-reach Workers were likely to have already completed our survey during March and April, leaving the more difficult-to-reach Workers to participate only later, on May and June.

Among all our respondents prior to June 2, 2020 (5,986 in the main sample), we proxy easy to reach ones as those who participated again in the survey after this reset date. We compare their perception gaps to those of difficult to reach respondents based on their *first responses only*, to avoid confounding results with specific experience in our survey. Table C.14 shows the results. None of the perception gaps are economically or statistically significantly affected by difficulty to reach.

Table C.14: Effect of difficulty-to-reach on the perception gaps

| | PC gap | PC gap | FC gap | FC gap | RC gap | RC gap |
|---|---|---|---|---|---|---|
| Constant | −0.43 | | −0.53 | | 4.54 | |
| | (0.05) | | (0.07) | | (0.08) | |
| Participated twice | 0.03 | −0.02 | −0.10 | −0.09 | 0.03 | 0.12 |
| | (0.04) | (0.04) | (0.06) | (0.06) | (0.09) | (0.10) |
| Demographics | No | Yes | No | Yes | No | Yes |
| State FE | No | Yes | No | Yes | No | Yes |
| Day FE | No | Yes | No | Yes | No | Yes |
| Obs | 5989 | 5989 | 5989 | 5989 | 3941 | 3941 |
| $R^2$ | 0.00 | 0.11 | 0.00 | 0.12 | 0.00 | 0.14 |

**Notes**: OLS regressions. Dependent variables: Present Cases (PC) gap; Future Cases (FC) gap; Risk-Cases (RC) gap (all as log percentages). Independent variables: a dummy for two survey completions by a respondent; demographics, state and day fixed effects. Sample is limited to responses recorded *prior* to June 2, 2020.
In parentheses: Driscoll-Kraay standard errors using Bartlett's kernel and a bandwidth of 4 days.

Similarly, we can compare respondents *after* June 2 by their first/second participation to measure the effect of previous participation on second-participation outcomes. Table C.15 shows that there are no such significant effects.

Table C.15: Effect of previous participation on the perception gaps

| | PC gap | PC gap | FC gap | FC gap | RC gap | RC gap |
|---|---|---|---|---|---|---|
| Constant | −1.00 | | −0.86 | | 4.34 | |
| | (0.08) | | (0.07) | | (0.07) | |
| Participated twice | 0.32 | 0.17 | −0.05 | 0.01 | −0.19 | −0.12 |
| | (0.07) | (0.07) | (0.05) | (0.05) | (0.07) | (0.06) |
| Demographics | No | Yes | No | Yes | No | Yes |
| State FE | No | Yes | No | Yes | No | Yes |
| Day FE | No | Yes | No | Yes | No | Yes |
| Obs | 7167 | 7167 | 7167 | 7167 | 7167 | 7167 |
| $R^2$ | 0.00 | 0.10 | 0.00 | 0.14 | 0.00 | 0.09 |

**Notes**: Same as under Table C.14. Sample is limited to responses recorded after June 2, 2020. In parentheses: Driscoll-Kraay standard errors using Bartlett's kernel and a bandwidth of 4 days.

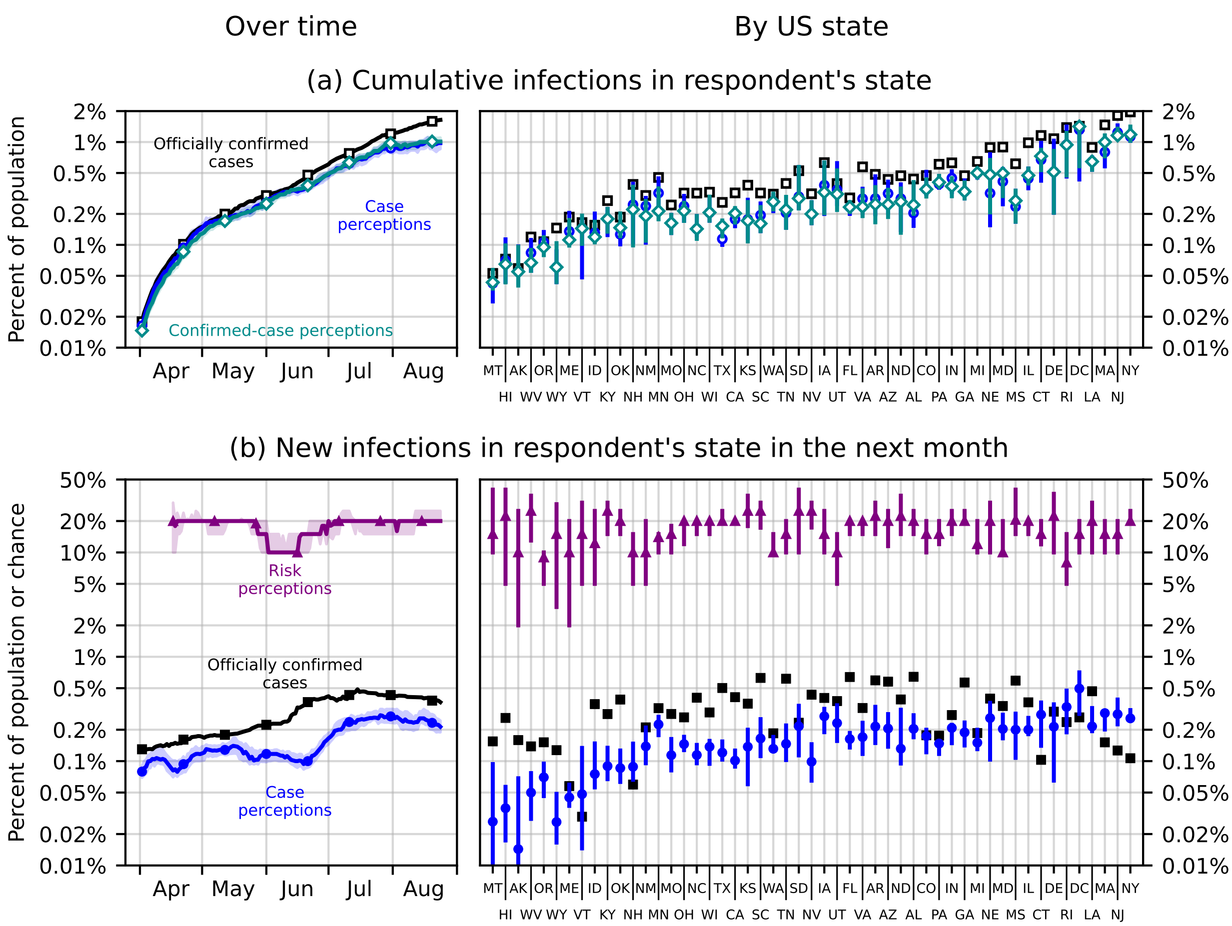
# D Robustness Tests

## D.1 Robustness to the Logarithmic Transformation and to the Analysis of Population Percentages Rather Than Absolute Numbers of People

All quantities $x$ in the analysis are in the format of a population percentage or a percent chance, and the transformation $\log\left(\frac{1+x\cdot(\text{state pop.})}{1+\text{state pop.}}\cdot 100\right)$ is applied on them prior to analysis. The choice to use population percentages or percent chances is natural since this is a common elicitation format for all perceptions in the survey. The logarithmic transformation is useful since most quantities and percentages of infections and deaths vary be orders of magnitude across states and days, therefore investigating relative differences between quantities rather than absolute differences is preferable (relatedly, the response distributions in Appendix B are closer to symmetric on a logarithmic scale than on a linear scale). The analyzed averages throughout the paper are hence geometric rather than arithmetic.

A first concern is that the logarithmic transformation may mechanically generate an artificial negative difference between the average of a noisy variable (such as perceptions) and the average of a less noisy variable (such as official reports), in case the noise is symmetric on a linear scale rather than a log scale. Figure D.1 replicates Figure 1, aggregating the variables at the time or state level using medians, which are invariant to the log transformation, rather than averages. The negative differences between case perceptions and official reports indeed shrink, but maintain the sign. Our first and second main findings—reflected in the Present Cases, Future Cases, and Risk-Cases gaps—remain qualitatively the same when using medians rather than averages of logs.

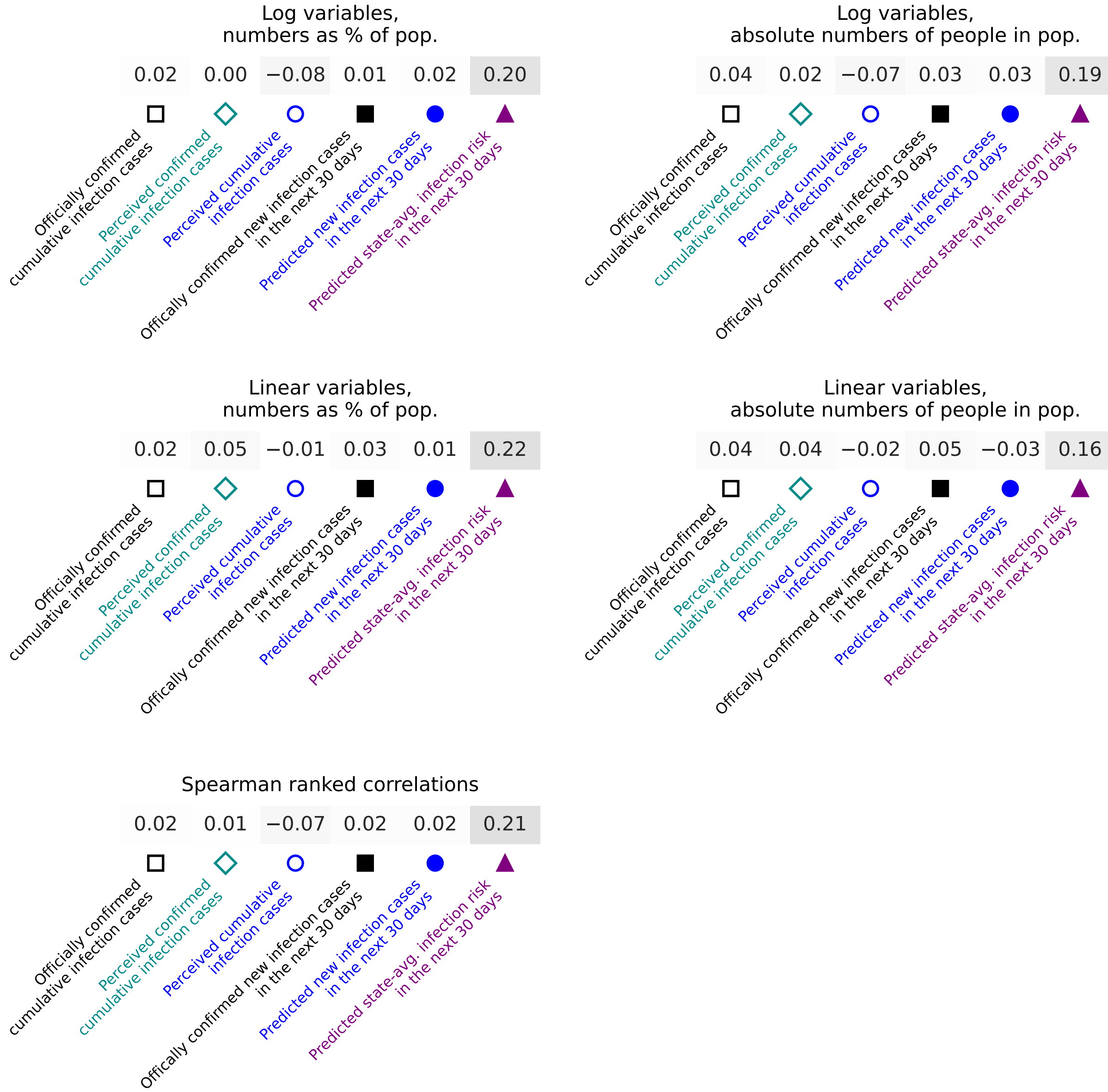
Figure D.1: Main results (as in Figure 1) using medians rather than averages




**Notes**: Light-colored areas in the left panels and error bars in the right panels indicate bootstrapped 95% confidence intervals.

A second concern is that the logarithmic transformation and/or the choice to analyze case and risk perceptions as population percentages rather than as absolute numbers drives correlations with behavior. Figure D.2 explores the correlations shown in Figure 1's lower bar, where variables are expressed as either state population percentages or absolute numbers of people, and are either log or linearly transformed (i.e., not transformed). A Spearman ranked correlation, which is invariant to any monotonic transformation, is also shown. Our third main finding that risk perceptions are more strongly correlated with behavior than case perceptions is robust to these analysis choices.

Figure D.2: Robustness of correlations with behavior to units and transformations of variables

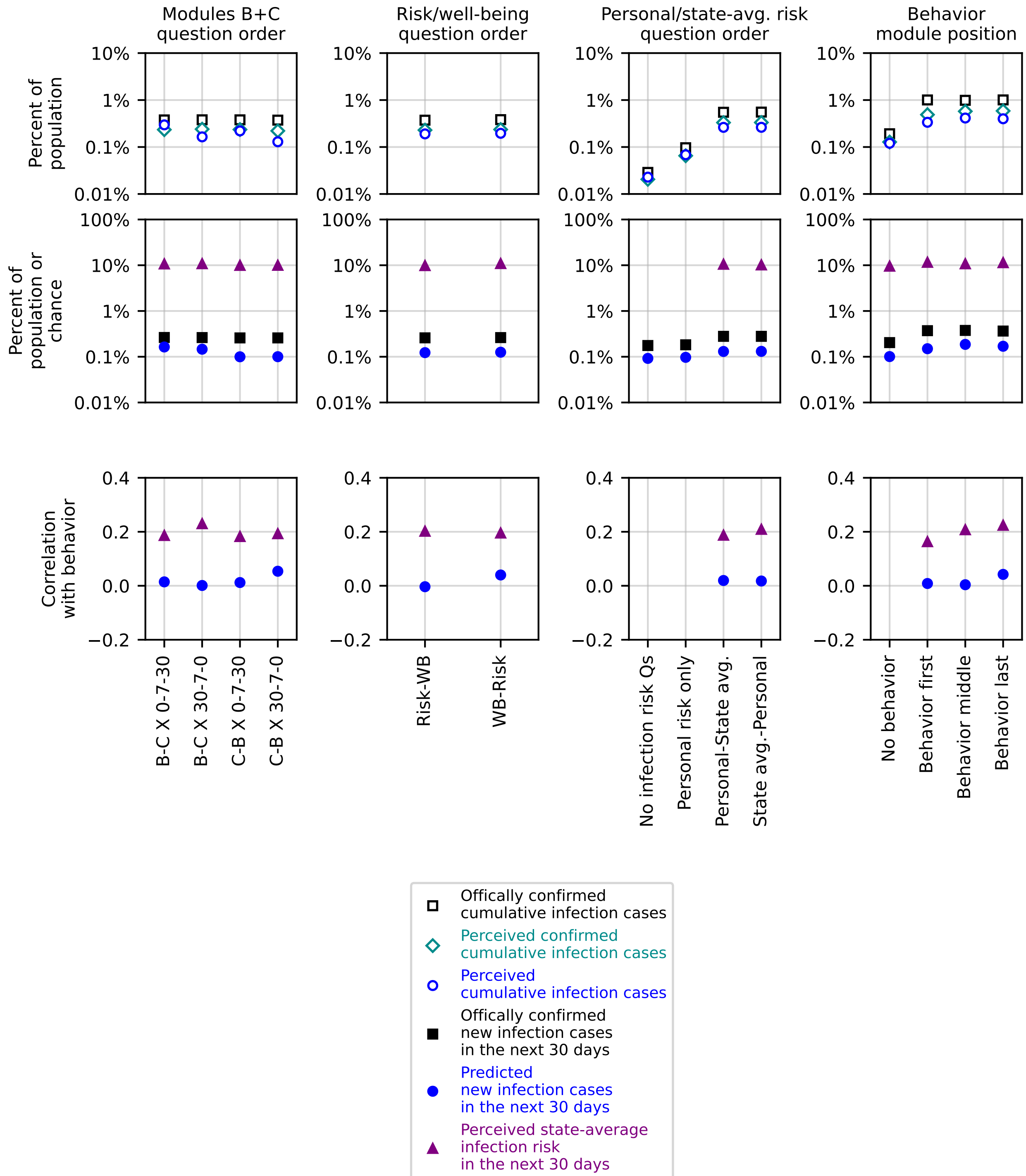



**Notes**: Correlations with the number of self-reported health-protective behaviors, out of nine private behaviors.

## D.2 Robustness to Survey Order

**Order effects on main results.** Figure D.3 shows the main quantities from Figure 1 across the different survey orders. No single order setting qualitatively changes the main findings regarding Present Cases, Future Cases and Risk-Cases gaps, and the correlations with self-reported behavior. However, as discussed in Section 2.1 and Appendix C.3, the direction of the difference between perceived actual and confirmed cases *is* sensitive to survey order.

Figure D.3: Main results from Figure 1 within survey-order groups




**Notes**: Top two rows: mean log percent perceptions and official case counts within question-order groups. Error bars (hardly visible): bootstrapped 95% confidence intervals. Lower row: Blue squares: correlation of case perceptions—predicted new infections in the next 30 days—with self-reported health-protective behavior. Purple squares: correlation of risk perceptions—perceived state-average infection risk in the next 30 days—with behavior.

Table D.1 further investigates survey order effects on the main findings of Present Cases, Future Cases and Risk-Cases gap in a controlled regression. Order still has little effect on the main findings. No change of a single order renders the The Present Cases and Future Cases gaps orders-of-magnitudes large, although they may become closer to zero or even slightly positive in very specific combination of orders: for example, the Present Cases gap is slightly positive early in the sample before module E was added, within the survey order B–C $\times$ 0–7–30 (as indicated by the constant in the left column). The Risk-Cases gap remains orders-of-magnitudes large in all survey orders.

Table D.1: Survey order effects on the main gaps

| | Present Cases gap | Future Cases gap | Risk-Cases gap |
|---|---|---|---|
| C–B | −0.26 | −0.42 | 0.36 |
| | (0.04) | (0.04) | (0.05) |
| 30–7–0 | −0.55 | −0.05 | 0.05 |
| | (0.05) | (0.03) | (0.05) |
| D3–D12 | 0.00 | 0.01 | 0.08 |
| | (0.04) | (0.04) | (0.06) |
| E1 added | −0.12 | 0.02 | |
| | (0.07) | (0.10) | |
| E2 added | −0.21 | −0.17 | |
| | (0.09) | (0.14) | |
| E2–E1 | 0.01 | 0.01 | −0.04 |
| | (0.04) | (0.05) | (0.06) |
| Dates of R2 | 0.02 | 0.45 | −0.12 |
| | (0.09) | (0.11) | (0.10) |
| Survey R2 | 0.09 | −0.09 | −0.13 |
| | (0.13) | (0.06) | (0.06) |
| R2 + E2 after B3 | 0.03 | 0.15 | −0.41 |
| | (0.18) | (0.24) | (0.26) |
| F added | −0.37 | 0.02 | −0.35 |
| | (0.10) | (0.12) | (0.10) |
| F first | −0.18 | −0.14 | 0.14 |
| | (0.08) | (0.07) | (0.09) |
| F middle | 0.05 | 0.07 | −0.15 |
| | (0.08) | (0.08) | (0.09) |
| Constant | 0.18 | −0.42 | 4.33 |
| | (0.06) | (0.09) | (0.06) |
| Obs | 13156 | 13156 | 11108 |
| $R^2$ | 0.03 | 0.01 | 0.01 |

**Notes**: OLS regressions. Dependent variables: Present Cases gap; Future Cases; Risk-Cases gap (all as log percentages). Independent variables: possible orders of survey modules, including the special orders of version R2 (C–B: module C after B; 30–7–0: elicitation order of case perceptions: 30 days from today, then 7 days from today, then today, rather than the opposite order; D3-D12: well-being elicited before family risk perceptions; E1 added: dummy for all dates since question E1 about personal risk perceptions was added; E2 added: same for question E2 about state-average risk perceptions; E2–E1: state-average risk perceptions elicited before personal ones; Dates of R2: dummy for all dates in which survey R2 was conducted; Survey R2: being shown survey version R2 rather than the baseline version; R2 + E2 after B3: being shown version R2 and within this version have risk perceptions elicited right after case perceptions about 30 days from today; F added: dummy for all dates in which behavior was elicited; F first: behavior is the first module; F middle: behavior is in the middle, between modules B\C and D). In parentheses: Driscoll-Kraay standard errors using Bartlett's kernel and a bandwidth of 4 days.

Notable effects include an increased Risk-Cases gap (in magnitude) in the order C–B, even though case perceptions and and risk perceptions are asked closer to one another; a statistically-suggestive effect of asking E2 right after B3 (the two adjacent) in survey version R2, in the intuitive direction of decreasing the Risk-Cases gap, and a statistically-suggestive effect of having the beshavior module F first in the survey, which increases the absolute values of all gaps due to the lower case perceptions reported.

**Effect of behavior module addition on all elicited quantities.** Tables D.2, D.3, D.4 show the effect on elicited quantities of incorporating versions F-first and F-middle in the general analysis alongside the baseline version with the behavior module F last.

Table D.2: Effect of the position module of F on elicited quantities in modules A and B

| | A1 | A2 | B1 | B2 | B3 | B2−B1 | B3−B1 |
|---|---|---|---|---|---|---|---|
| F first | −0.19 | −0.13 | −0.18 | −0.20 | −0.17 | −0.16 | −0.13 |
| | (0.06) | (0.07) | (0.08) | (0.07) | (0.06) | (0.07) | (0.07) |
| F middle | −0.02 | −0.01 | 0.04 | 0.03 | 0.05 | 0.06 | 0.09 |
| | (0.07) | (0.08) | (0.07) | (0.07) | (0.06) | (0.06) | (0.08) |
| Obs | 5398 | 5398 | 5398 | 5398 | 5398 | 5273 | 5398 |
| $R^2$ | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

Notes: OLS regressions. Dependent variables: all quantities elicited in modules A and B (as log percentages), including the new-cases predictions constructed based on them. Independent variables: survey versions F-first; F-middle. As in the main analysis, quantities are in the population percentage units and are log transformed. In parentheses: Driscoll-Kraay standard errors using Bartlett's kernel and a bandwidth of 4 days.

Table D.3: Effect of the position of module F on elicited quantities in module C

| | C1 | C2 | C3 | C2−C1 | C3−C1 |
|---|---|---|---|---|---|
| F first | −0.17 | −0.17 | −0.09 | −0.03 | 0.00 |
| | (0.09) | (0.08) | (0.07) | (0.06) | (0.07) |
| F middle | −0.00 | −0.00 | 0.03 | 0.03 | 0.10 |
| | (0.09) | (0.09) | (0.07) | (0.08) | (0.08) |
| Obs | 5398 | 5398 | 5398 | 5229 | 5250 |
| $R^2$ | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**Notes**: Same as under D.2, except that dependent variables are all quantities elicited in module C (as log percentages), including the new-cases predictions constructed based on them.

Table D.4: Effect of the position of module F on elicited quantities in modules D–F

| | D1 | D2 | D3 | E1 | E2 | F-private | F-all |
|---|---|---|---|---|---|---|---|
| F first | −0.00 | 0.02 | −0.09 | 0.08 | 0.02 | −0.18 | −0.30 |
| | (0.17) | (0.21) | (0.63) | (0.11) | (0.05) | (0.06) | (0.08) |
| F middle | −0.06 | −0.16 | 2.03 | −0.26 | −0.06 | −0.18 | −0.24 |
| | (0.22) | (0.24) | (0.53) | (0.12) | (0.06) | (0.06) | (0.08) |
| Obs | 5398 | 5398 | 5398 | 5398 | 5398 | 5398 | 5397 |
| $R^2$ | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**Notes**: Same as under D.2, except that dependent variables are all quantities elicited in modules D, E and F (as log percentages).

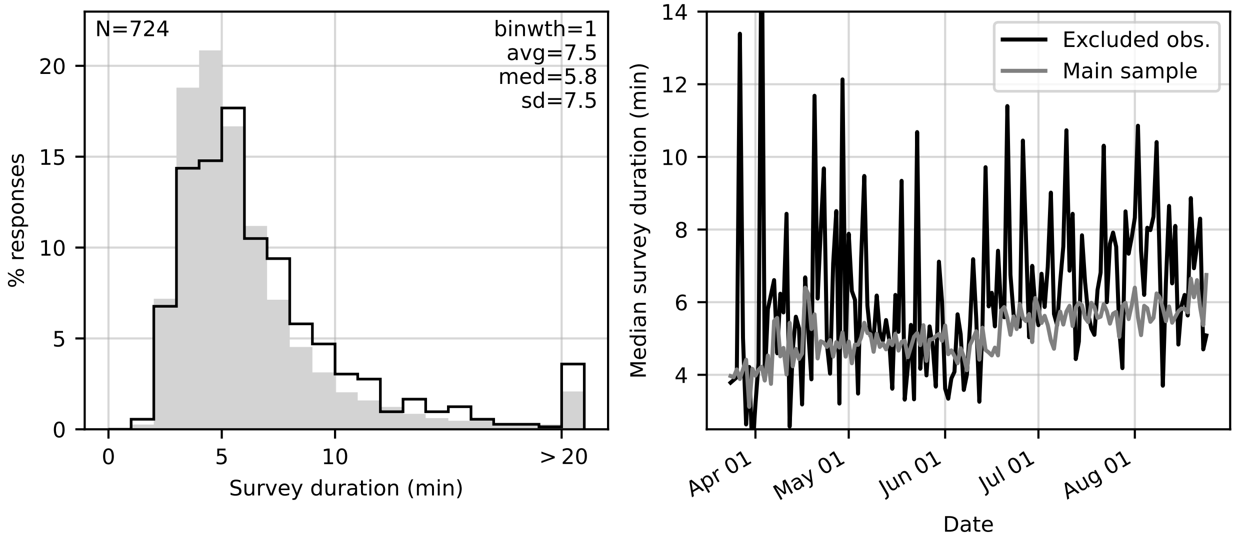
When F is the first module in the survey, respondents report somewhat lower perceptions of infection and death cases than when F is last. Having F in the middle does not have significant effect on elicited quantities in modules A–C. When F is in the middle respondents report somewhat lower economic worries and a higher predicted well being. When F is either first or in the middle respondents report less protective behavior than when F is last. None of these effects is substantial, hence data from these complementary versions is pooled with baseline version in the paper's analysis.

## D.3 Robustness to Data Exclusion and Data Quality

724 observations, which are 5.2 percent of the full sample, are excluded from the main sample due to negative growth predictions of cumulative infections in 30 days. We investigate the characteristics of these excluded observations and test the extent to which the main findings hold in the full sample (including excluded observations) using alternative specifications.

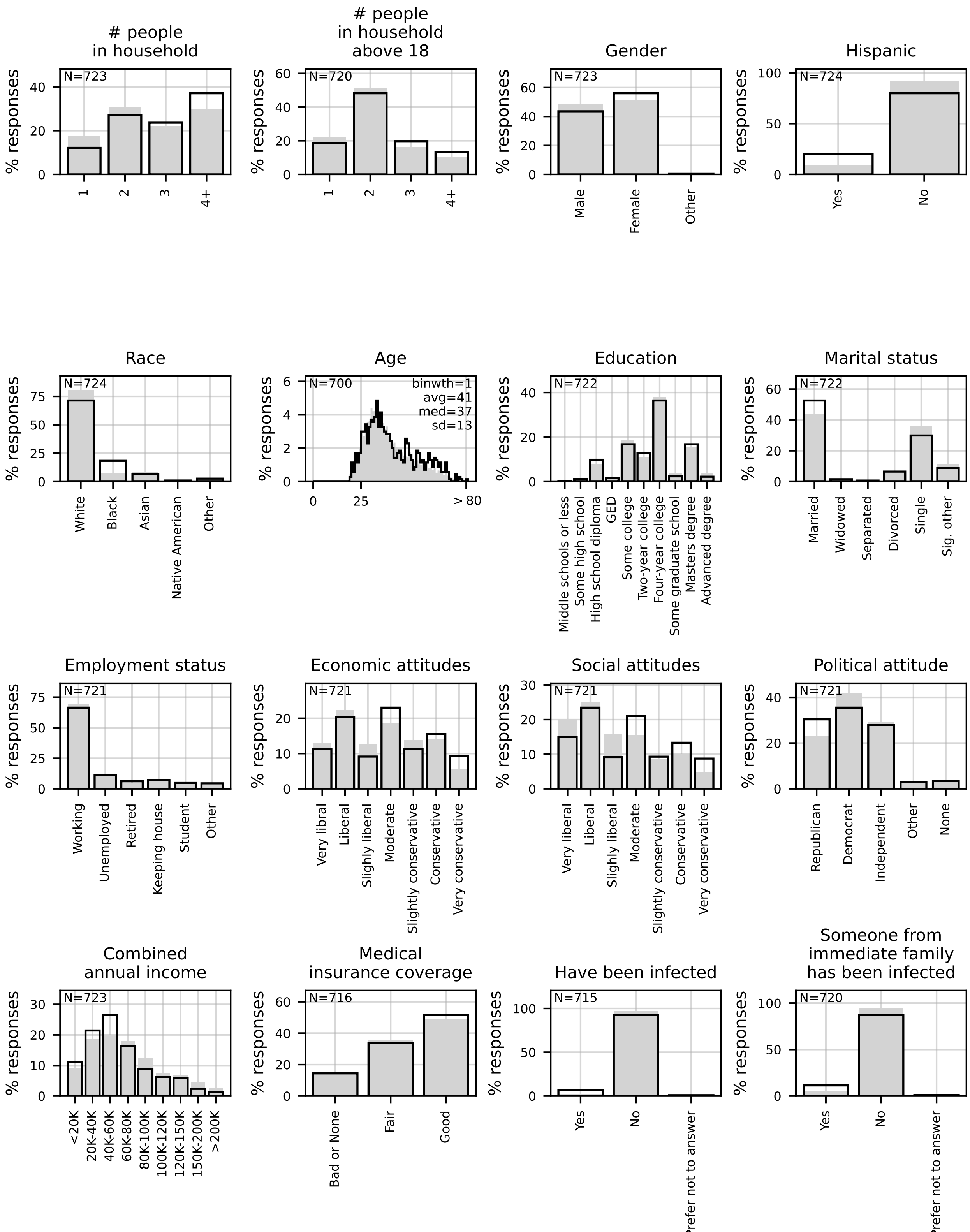
**Characteristics of excluded observations.** Figures D.4, D.5 and D.6 show the survey duration and demographics of the excluded sample (black lines) vs. those of the main sample (gray). Excluded responses take more time to complete the survey on average, are more conservative-leaning and have less income on average than the main sample's responses, but these differences are not stark.

Figure D.4: Distribution of survey completion time and daily median completion time in excluded sample vs. main sample



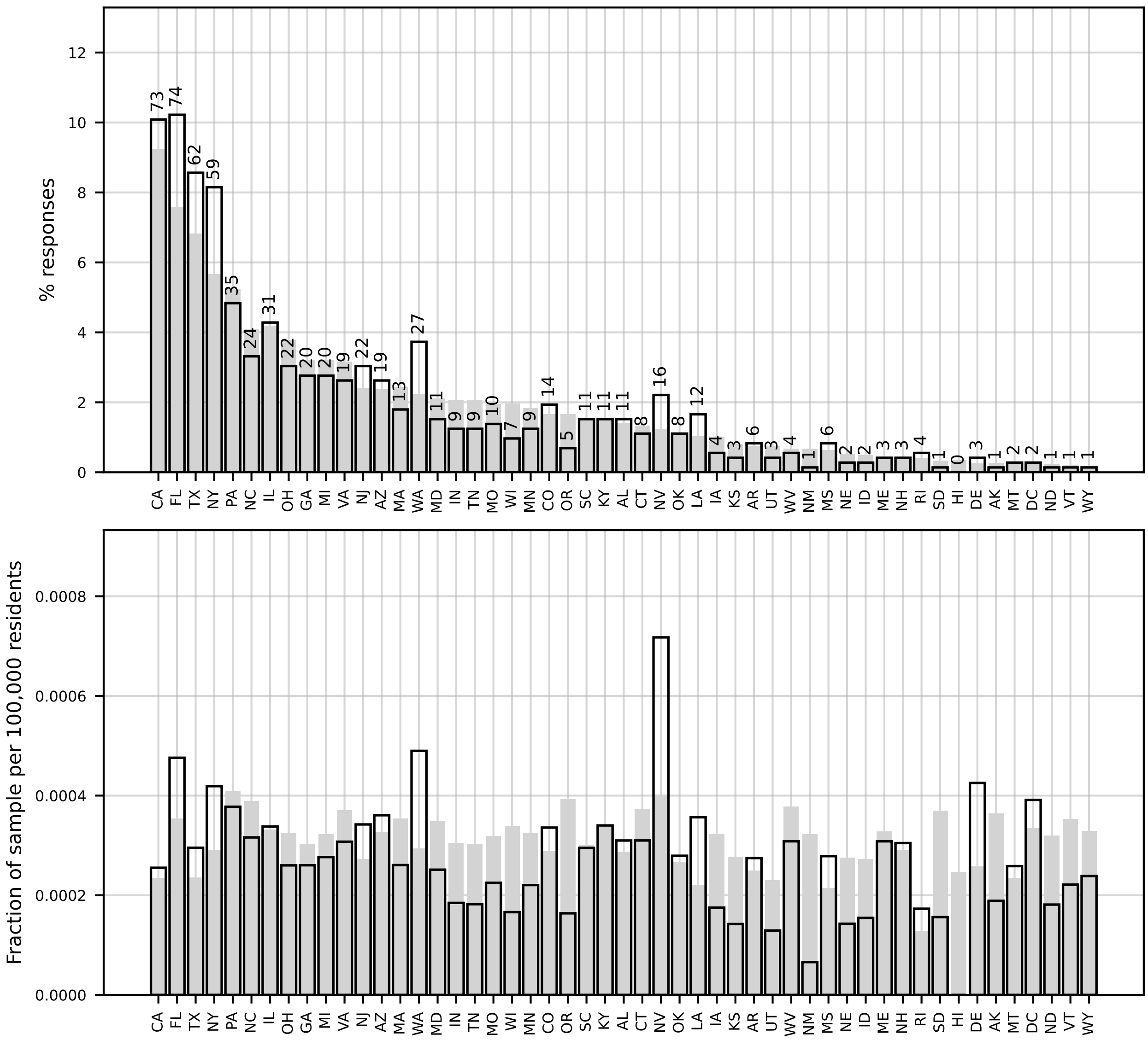

**Notes**: Black: excluded sample. Gray: main sample. Statistics quoted in the panels refer to the excluded sample.

Figure D.5: Demographic characteristics of excluded sample vs. main sample




**Notes**: Black: excluded sample. Gray: main sample. Statistics quoted in the panels refer to the excluded sample.

Figure D.6: US-state of residence distribution in excluded sample vs. main sample

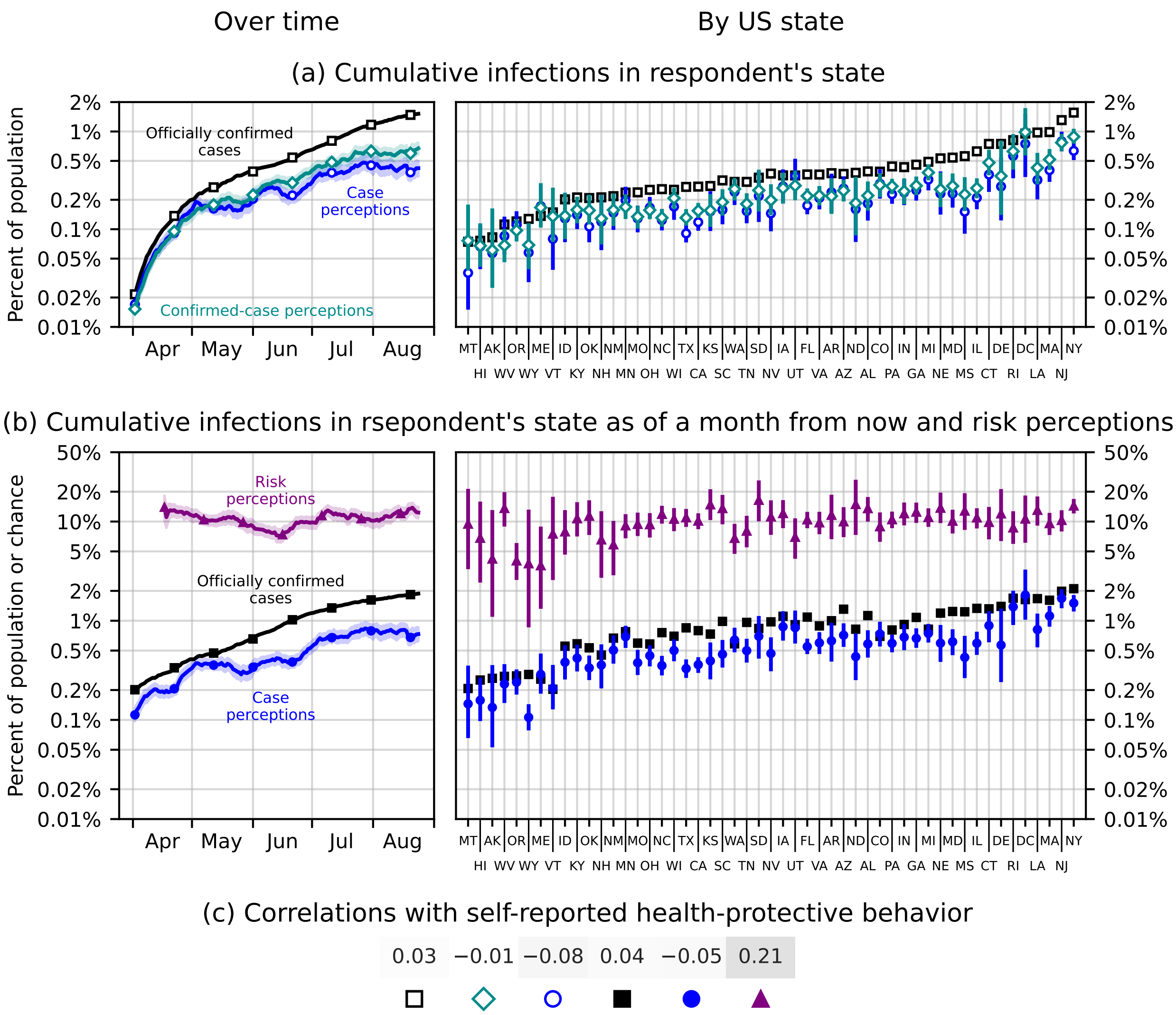



**Notes**: Black: excluded sample. Gray: main sample. Above bars: absolute numbers of responses from each state in the excluded sample.

**Generality of main findings in the full sample.** We verify that data exclusion does not drive any of our three main findings by conducting versions of our main analysis on the full sample, rather than the main sample (see Section 1.1). We find that all findings are stable.

First, we repeat the main analysis of the paper using a modified, cumulative, version of case perceptions. Recall that the main analysis constructs case perceptions about *new* infections in the next 30 days, by subtracting perceived cumulative infection cases as of today from predicted cumulative infection cases as of 30 days from now. We therefore have to omit respondents with negative differences between the two. The cumulative analysis is based on case perceptions about *cumulative* cases alone, and can be conducted on the full sample. We define the difference between perceptions of *cumulative* infections in 30 days and the officially confirmed realized numbers as the Cumulative Future Cases gap. The Cumulative Risk-Cases gap is the difference between the these cumulative case perceptions and the risk perceptions used in the main analysis—the state-average infection chance in the next 30 days. Mathematically, since newly infected people in the next 30 days are only a subset of the cumulative number of infected people as of 30 days from now, the Cumulative Risk-Cases gap should be negative. Figure D.7 replicates Figure 1 using cumulative case perceptions in the full, rather than the main sample.

Figure D.7: Cumulative version of main results in the full sample ($N = 13,880$)

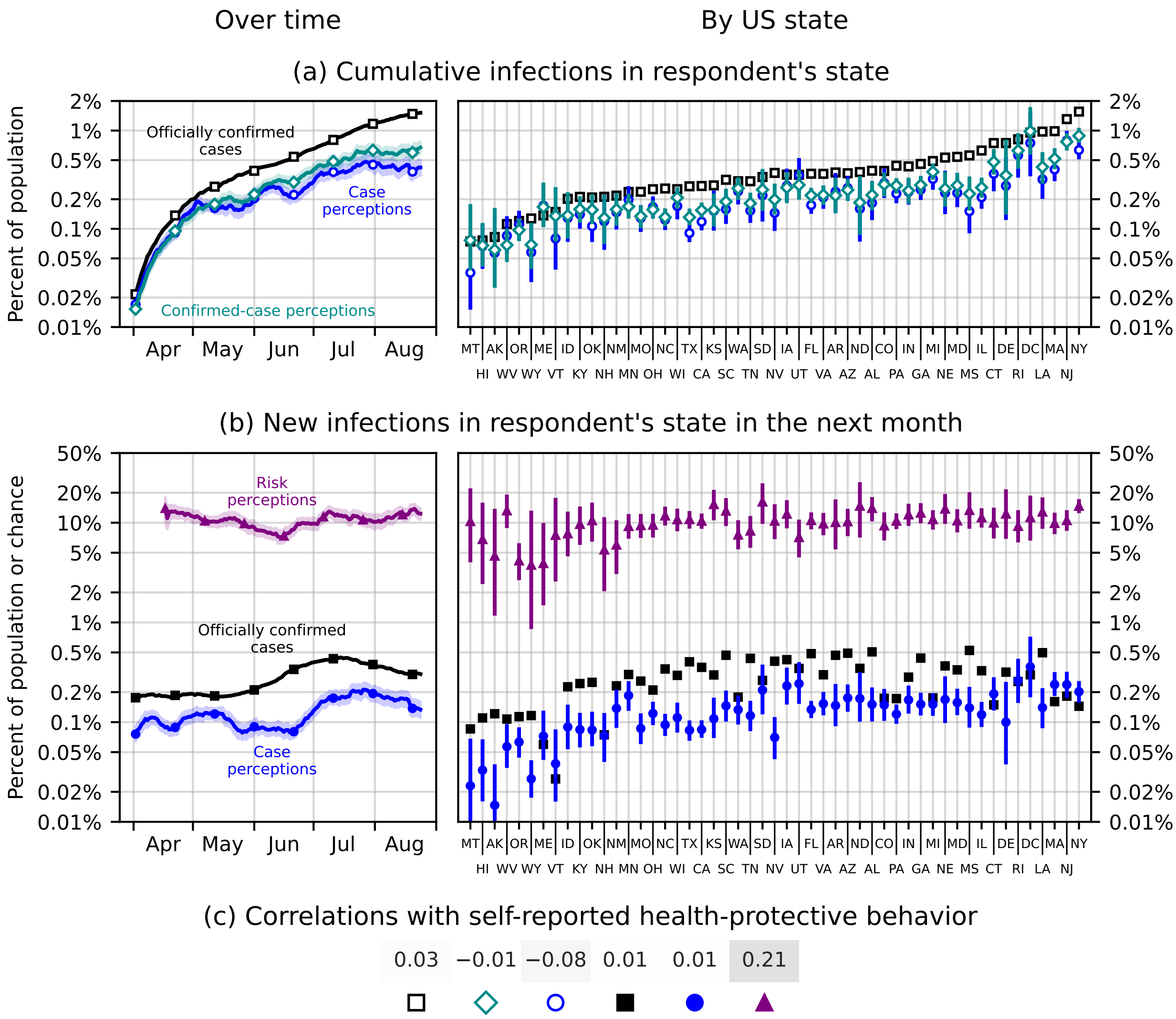



**Notes**: Light-colored areas in the left panels and error bars in the right panels indicate bootstrapped 95% confidence intervals.

Results are qualitatively similar to the main ones—the Present Cases gap indicates an understatement of current cumulative cases by 49 percent (same as in the main sample), the correlation between perceived and official confirmed infections today is 0.54 (0.57 in the main sample), the Cumulative Future Cases gap indicates an under-prediction of future cumulative cases by 46 percent (38 in the main sample, compared with the non-cumulative Future Cases gap of 52 percent), and the Cumulative Risk-Cases gap indicates that risk perceptions are 21 times larger than cumulative case perceptions on average (19 in the full sample, compared with 79 in the non-cumulative version). This large cumulative Risk-Cases gap indicates that the difference between risk perceptions and case perceptions is substantial, and remains large and hard to rationalize even when including all observations and using a tougher mathematical benchmark. Finally, cumulative case perceptions' correlation with self-reported protective behavior is $-0.05$ ($-0.04$ in the main sample, compared with a non-cumulative correlation of 0.02), while risk perceptions' correlation with behavior is 0.21 (0.20 in the main sample).

We conduct a second version of the analysis on the full sample, this time replacing *only excluded observations'* negative predictions of new infection cases in the next 30 days with their predicted cumulative infections cases as of 30 days from today. This accounts for a possibility that respondents with negative differences misunderstood the question as referring to new infections rather than cumulative infections. Again, results are very similar to the main results.

Figure D.8: A version of the main results in the full sample, replacing excluded observations' negative predictions with their cumulative predictions




**Notes**: Light-colored areas in the left panels and error bars in the right panels indicate bootstrapped 95% confidence intervals.

## D.4 Robustness to Matching Between Case Perceptions and Official Reports

Systematic differences between the time of day in which respondents answer the survey and the time of day in which reports are updated at The New York Times may change results regarding case perceptions.

To place bounds on such effects, Table D.5 shows how the Present Cases gap and Future Cases gap change when instead of matching each observation with official reports from the its state-of residence on the same day (the baseline analysis), reports from the previous day or from the next day are being matched. These changes are small relative to the magnitude of the gaps.

Table D.5: Present Cases and Future Cases gap (in log percent differences) as a function of time gap between official reports and survey responses

| | Present Cases gap | Future Cases gap |
|---|---|---|
| Same-day matching | −0.671 | −0.740 |
| | (0.057) | (0.055) |
| Next-day matching | −0.705 | −0.745 |
| | (0.054) | (0.056) |
| Previous-day matching | −0.635 | −0.735 |
| | (0.062) | (0.053) |
| Obs | 13156 | 13156 |

**Notes**: Means are estimated using OLS regressions with a constant only. In parentheses: Driscoll-Kraay standard errors using Bartlett's kernel and a bandwidth of 4 days.

# E An Expected-Utility Framework for the Relation Between Beliefs and Behavior

The direction of the relation between case/risk perceptions and risk-mitigating behavior (positive or negative) does not always have a clear benchmark. This appendix develops the relation using a simple EU model and shows that a clear benchmark is more likely to exist when beliefs are about an *exogenous* risk, in principle independent of the one person's choices, and when we have an idea about whether the returns to protective behavior should be increasing or decreasing with baseline risk. The obtained results may differ if beliefs about this exogenous risk are modeled as endogenous, e.g., in models of motivated beliefs or general equilibrium. To keep our underlying model as simple as we can, we abstract from such mechanisms and view the heterogeneity in beliefs about exogenous risk as resulting from heterogeneity in information and in its interpretation, and not from an equilibrium of beliefs and behavior.

Define a person's utility as

$$u(b) = -p(b, \bar{p}) - c(b),$$

where $b$ is the person's protective behavior, $\bar{p}$ is her perception of the exogenous risk (which we consider from now on the relevant exogenous risk itself), e.g., average infection probability in the state (or predicted percent of state infected), $p(b, \bar{p})$ is the endogenous infection risk decreasing in the person's behavior and increasing in the exogenous risk and $c(b)$ is an increasing convex cost function. The FOC is

$$\text{MB}(\bar{p}, b) \equiv -\frac{\partial p(\bar{p}, b)}{\partial b} = c'(b) \equiv \text{MC}(b).$$

At optimum the FOC and an SOC hold:

$$\text{MB}(\bar{p}, b^*) = \text{MC}(b^*),$$

$$\frac{\partial \text{MB}}{\partial b} - \frac{d\text{MC}}{db} < 0,$$

where $b^*$ and $p^*$ are the optimal behavior and endogenous risk respectively.

## E.1 Comparative Statics

We are interested in the two comparative statics $\frac{\partial b^*}{\partial \bar{p}}$ and $\frac{\partial b^*}{\partial p^*}$, where $p^* = p^*(\bar{p})$ and $b^* = b^*(\bar{p})$ are the optimal infection probability and behavior. The signs of these derivatives are our benchmarks for the signs of the correlation between risk and behavior, for exogenous and endogenous risk, respectively. Note: these comparative statics are valid *within* a person only, where the relations $p(b, \bar{p})$ and $c(b)$ are indeed fixed.

**The relation between behavior and *exogenous* risk, $\frac{\partial b^*}{\partial \bar{p}}$.** To obtain the relation between behavior and *exogenous* risk , $\frac{\partial b^*}{\partial \bar{p}}$, take a derivative with respect to $\bar{p}$:

$$\frac{d}{d\bar{p}}\text{MB}\left(\bar{p}, b^*\left(\bar{p}\right)\right) = \frac{d}{d\bar{p}}\text{MC}\left(b^*\left(\bar{p}\right)\right)$$

$$\frac{\partial \text{MB}}{\partial \bar{p}} + \frac{\partial \text{MB}}{\partial b}\frac{db^*}{d\bar{p}} = \frac{d\text{MC}}{db}\frac{db^*}{d\bar{p}}.$$

All derivatives are evaluated at the optimal point. Rearrange to obtain

$$\frac{\partial b^*}{\partial \bar{p}} = \left[\frac{\frac{d\text{MC}}{db} - \frac{\partial \text{MB}}{\partial b}}{\frac{\partial \text{MB}}{\partial \bar{p}}}\right]^{-1}. \qquad (1)$$

**The relation between behavior and *endogenous* risk, $\frac{\partial b^*}{\partial p^*}$.** To obtain the relation between behavior and *endogenous* risk , $\frac{\partial b^*}{\partial p^*}$, take a derivative with respect to $b^*$ and use the relations $\bar{p} = \bar{p}\left(b, p\right)$ (increasing in both $b$ and $p$; in principle derived from the relation $p\left(b, \bar{p}\right)$) and $p^* = p^*\left(b^*\right)$ (a relation between optimal points):

$$\frac{d}{db}\text{MB}\left(\bar{p}\left(b^*, p^*\left(b^*\right)\right), b^*\right) = \frac{d}{db}\text{MC}\left(b^*\right)$$

$$\frac{\partial \text{MB}}{\partial \bar{p}}\left(\frac{\partial \bar{p}}{\partial b} + \frac{\partial \bar{p}}{\partial p}\frac{\partial p^*}{\partial b^*}\right) + \frac{\partial \text{MB}}{\partial b} = \frac{d\text{MC}}{db}.$$

All derivatives are evaluated at the optimal point. Rearrange to obtain

$$\frac{\partial b^*}{\partial p^*} = \left[\frac{\frac{d\text{MC}}{db} - \frac{\partial \text{MB}}{\partial b}}{\frac{\partial \text{MB}}{\partial \bar{p}}\frac{\partial \bar{p}}{\partial p}} - \frac{\frac{\partial p}{\partial \bar{p}}}{\frac{\partial b}{\partial \bar{p}}}\right]^{-1}. \qquad (2)$$

**Interpretation.** The brackets in both equations 1 and 2 have a first term (in 1 it is the only term) that has a *positive* numerator (due to the SOC), and a denominator whose sign depends on the how the marginal returns to protective behavior change with $\bar{p}$, i.e., on $\frac{\partial \text{MB}}{\partial \bar{p}}$. This makes sense: if protective behavior is perceived as having increasing effectiveness in the exogenous risk, one should invest in more behavior as risk increases. The sign of perceived marginal effectiveness is something that in principle can be measured by panel data or by a designated survey question. However, the brackets in equation 2 have an additional *negative* term whose magnitude depends on the exact relation between $b$, $p$ and $\bar{p}$, which is harder to measure. We can identify 3 cases:

1. If $\frac{\partial \text{MB}}{\partial \bar{p}} < 0$, then both $\frac{\partial b^*}{\partial \bar{p}} < 0$ and $\frac{\partial b^*}{\partial p^*} < 0$.

2. If $\frac{\partial \text{MB}}{\partial \bar{p}} = 0$, then both $\frac{\partial b^*}{\partial \bar{p}} = \infty$ and $\frac{\partial b^*}{\partial p^*} = \infty$. This is a special case where utility over the dimensions $b$, $p$ is quasi linear in $p$, and so optimal solutions have the same value of $b^*$ and varying levels of risk.

3. If $\frac{\partial \text{MB}}{\partial \bar{p}} > 0$, then $\frac{\partial b^*}{\partial \bar{p}} > 0$ but $\frac{\partial b^*}{\partial p^*}$ has an ambiguous sign. In a 2-dimensional framework of $b$ and $p$ subject to the constraint $\bar{p} = \bar{p}\,(b, p)$, $\frac{\partial b^*}{\partial p^*} < 0$ holds when the slopes of iso-$\bar{p}$ lines tangent to the optimal points $(b^*, p^*)$ are increasing in $\bar{p}$.

## E.2 Examples

To illustrate the ambiguity of the relation between behavior and endogenous risk $\frac{\partial b^*}{\partial p^*}$ in case 3, we present two examples with $\frac{\partial \text{MB}}{\partial \bar{p}} > 0$.

**Example 1: $p = \bar{p}/b$, MC $= b$.** This is an intuitive way to think about protective behavior and the way it mitigates risk. For example, washing hands always removes 90% of germs, thereby reducing risk by a constant ratio. The FOC is $\frac{\bar{p}}{b^2} = b$, so that $b^{*3} = \bar{p}$ and $b^{*2} = p^*$. Hence $\frac{\partial b^*}{\partial \bar{p}} > 0$ and $\frac{\partial b^*}{\partial p^*} > 0$.

**Example 2: $p = \bar{p}\,(1 - \alpha b)$ with $0 < \alpha < 1$, MC $= 1 + \alpha b$.** The same parameter $\alpha$ in both the risk function and the cost function is assumed to ease algebra. Units are calibrated such that $1 - \alpha b \geq 0$. The FOC is $\alpha \bar{p} = 1 + \alpha b$, so that $\frac{1}{\alpha} + b^* = \bar{p}$ and $\frac{1}{\alpha} - \alpha b^{*2} = p^*$, and then $\frac{\partial b^*}{\partial \bar{p}} > 0$ but $\frac{\partial b^*}{\partial p^*} < 0$.