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Cognitive Psychology

Moral Judgments Impact Perceived Risks From COVID-19 Exposure

Cailin O'Connor[1][a], Daniel Relihan[2][b], Ashley Thomas[3][c], Peter H. Ditto[2], P. Kyle Stanford[1], James O. Weatherall[1]

[1] Logic and Philosophy of Science, University of California, Irvine, CA, USA, [2] Psychological Science, University of California, Irvine, CA, USA, [3] Psychology, Harvard University, Cambridge, MA, USA

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The COVID-19 pandemic created enormously difficult decisions for individuals trying to navigate both the risks of the pandemic and the demands of everyday life. Good decision making in such scenarios can have life and death consequences. For this reason, it is important to understand what drives risk assessments during a pandemic, and to investigate the ways that these assessments might deviate from ideal risk assessments. In a preregistered online study of U.S. residents (N = 841) using two blocks of vignettes about potential COVID exposure scenarios, we investigated the effects of moral judgment, importance, and intentionality on COVID infection risk assessments. Results demonstrate that risk judgments are sensitive to factors unrelated to the objective risks of infection. Specifically, activities that are morally justified are perceived as safer while those that might subject people to blame or culpability, are seen as riskier, even when holding objective risk fixed. Similarly, unintentional COVID exposures are judged as safer than intentional COVID exposures. While the effect sizes are small, these findings may have implications for public health and risk communications, particularly if public health officials are themselves subject to these biases.

In July of 2020, the Texas Medical Association released an infographic communicating COVID-19 risks for various activities. The infographic categorized activities into risk levels to help readers make informed decisions about their own behaviors.[1] But some of the rankings were at odds with the best medical and scientific knowledge about COVID-19 transmission at the time. In the infographic, going to the beach is ranked as riskier than going to the library, museum, or a doctor's waiting room, even though outdoor spaces had been widely found to be safer than indoor ones. Playing basketball is ranked as riskier than spending a week working in an office building, again even though basketball is often an outdoor activity, and one that is relatively short-lived. This infographic was widely shared and replicated in both the United States and internationally.[2] Other such infographics display similar trends: outdoor recreational activities, such as going to the pool or playground, are often ranked as riskier than indoor activities like grocery shopping. Seeing a doctor is routinely ranked as a low-risk activity, even though it occurs indoors and involves exposure to individuals who see many (possibly sick) patients daily. One such infographic from Nebraska Medicine rates a doctor's visit as less risky than getting gas.[3] And this phenomenon is not limited to a U.S. context. Public communications of risk across multiple countries reflect similar patterns.[4]

Accurately assessing infection risks across activities is difficult. Therefore, it is unsurprising that there is conflicting information on this topic. But it may be that some-

a Corresponding author: cailino@uci.edu

b First authorship is shared between these two authors. Corresponding author: drelihan@uci.edu

c Second authorship reflects extra contributions with respect to statistical analysis. The remaining authors are listed in alphabetical order.

1 This infographic is available at https://www.texmed.org/TexasMedicineDetail.aspx?id=54216. We have preserved the infographics linked in this paper on the OSF page for this study (https://osf.io/6yvgf/?view_only=cec08b28840e4507acdc0224d5c28d19)

2 For example, it was communicated by the Argentinian news website Infobae (https://www.infobae.com/america/ciencia-america/2020/07/26/en-una-escala-del-1-al-9-cuales-son-las-actividades-mas-riesgosas-durante-la-pandemia-del-coronavirus/), the Mexican newspaper Milenio (https://www.milenio.com/ciencia-y-salud/coronavirus-escala-riesgo-contagio-covid-19-actividades), and the Spanish language news source Marca Claro (https://www.marca.com/claro-mx/trending/2020/09/09/5f580105ca4741c9548b45e8.html).

3 Further infographics along these lines are available from Dayton's Children's Hospital (https://www.childrensdayton.org/the-hub/risk-levels-kid-and-family-activities-during-covid-19), and were posted by Grinnell College and Nebraska Medicine during 2020.

thing more systematic is at work here. It seems that rather than reflecting a purely actuarial assessment of the likelihood of contracting COVID-19 from various types of activities, these risk judgments reflected wider judgments about whether an individual ought to engage in a behavior. For example, going to the doctor's office is important, and failing to see a doctor might lead to serious problems down the line. All things considered, a decision to see a doctor is a justifiable one, and thus one that experts might recommend. In labeling a doctor's visit as low risk, it seems that public health experts may have been making a judgment about whether the behavior was laudable, ought to be engaged in, morally correct, or advisable all things considered.

The current study is designed to test whether risk judgments about COVID-19 exposure are impacted by judgments about whether individuals ought to or need to take a risky action. Previous work has shown that humans seek to create coherent narratives or explanations about the world. In doing so, beliefs about how individuals ought to act, including moral beliefs, can shape factual ones. (Clark et al., 2015; see also Read et al., 1997; Thagard, 2000). Work on the culpable control model shows that in cases where people are perceived as blameworthy, their actions are perceived as more intentional (Burra & Knobe, 2006; Knobe, 2003). They are also seen as more causally responsible for outcomes of their actions (Alicke, 2000; Hitchcock & Knobe, 2009; Kominsky et al., 2015), and more in control of outcomes (Cushman et al., 2008; for an overview, see Knobe, 2014). In other words, people reverse engineer good factual reasons to support their judgments of blameworthiness and moral culpability.

Likewise, and especially relevant here, moral judgments shape judgments about the likely consequences – harms and benefits – of certain behaviors. Liu and Ditto (2013) found that manipulating beliefs about the wrongness of the death penalty changed people's factual beliefs about whether it can deter crime, and about the likelihood of executing innocent people. This influence of moral judgments on factual beliefs extends to beliefs about risk. Thomas et al. (2016) found that participants judged unattended children to be in riskier situations when their parents left them alone for morally suspect reasons, even when real risk was controlled. Relihan et al. (under review) likewise found that moral beliefs shape risk perceptions across several situations. For example, participants in their studies thought that morally questionable and intentional actions carried more risk of harm than moral and unintentional actions, respectively.. Notice that moral coherence in these studies involves judgments that good consequences will follow from good behaviors and vice versa. Previous work on "just world beliefs" yields similar findings (Furnham, 2003; Furnham & Procter, 1989; Lerner, 1980; Lerner & Miller, 1978).

Current Study

In the current study, we investigate the possibility that a similar phenomenon could bear on judgments about the risks of COVID-19. In judging COVID risks, perhaps people respond to whether an individual is culpable for engaging in the activity that potentially exposes them or others. We consider several factors that might influence such a judgment: the moral valence of an activity, its importance, and whether an individual intended to engage in it. All three factors can provide good reasons for an individual to engage in a potential exposure activity: an individual may have a moral responsibility to perform an action; it may be important for them to do so; or they may have no choice in the matter. In each case, the presence of one of these factors might alleviate judged culpability for engaging in risky behavior. We hypothesized that a desire for coherence might then drive people to judge these well-motivated behaviors as less likely to produce COVID infections.

To test our hypothesis, we presented participants with two blocks of vignettes describing behaviors in contexts where risk factors remained stable, but where the morality and importance of (block 1), and the intentions behind (block 2), the behaviors varied. We expected participants to judge actions as less risky when individuals exposed themselves for morally positive reasons, while engaged in important actions, or unintentionally. We found that two of these predictions held. Behaviors judged as morally good or as unintentional were judged as less risky. As noted, intentionality is tied to moral judgment. For example, unintentional actions are typically judged as less morally culpable (Clark et al., 2015; Nichols & Knobe, 2007; Parkinson & Byrne, 2017; Shaver, 1985). And previous work considering the impacts of moral judgment on risk has used intentionality as a stand-in for the morality of an action (Ames & Fiske, 2013; Relihan et al., under review; Thomas et al., 2016). Altogether, we take our findings to show an impact of moral judgment on risk assessments related to the COVID-19 pandemic. In doing so, we confirm the robustness of previous results and extend them to a new, important domain relevant to everyday and medical decision making.

Our study design was sensitive to the fact that there is a tight connection between judgments about morality and about importance. Highly moral actions are often judged as highly important, and vice versa. This relationship is likely to be exacerbated during a global pandemic where exposure can create negative outcomes for oneself and others. In such a context, going to the doctor, getting gas, and playing basketball may all be subject to moral judgments. We varied these two factors systematically to test whether both factors influenced risk judgments independently. We found that judgments about whether a behavior was important were correlated with judgments about how risky

4 For example, this infographic from the UK Kidney Association identifies a small outdoor picnic as more dangerous than the doctor or grocery shopping (https://ukkidney.org/sites/renal.org/files/What are the risks of catching COVID19 from various activities.pdf).

it was. Upon controlling for judgments about the morality of the behavior, however, we found only minimal evidence that perceived importance independently influences risk judgments. Conversely, risk judgments were affected by moral judgments even after controlling for the importance of the activity. Note that the observed connection between morality and importance judgments may help shed light on risk judgments, like those seen in various infographics, that seem to track broadly whether an individual should engage in some behavior, rather than COVID risk alone.

The effect sizes in our findings were relatively small, and, in addition, our study population consisted only of online participants who identified as U.S. nationality, reside in the United States, and were disproportionately left-leaning. In the discussion we address the relevance of our results given these factors.

Pretest

Prior to the main study, a pretest was conducted with the goal of ensuring that the conditions in our vignettes indeed elicited the judgments about morality, importance, and intentionality that we expected. Both the pretest and main study were preregistered under the Open Science Foundation (OSF).[5] We adhered to the methods described in our preregistration except where otherwise noted. We report all methods, manipulations, and exclusions for both the pretest and main study. Sample sizes for the pretest and main study were predetermined based on funding limits and similar previous studies.

Method

Sample

Participants (N = 503) were recruited from the data collection website Prolific on December 7th, 2020. Participants were pre-screened using Prolific to include only US citizens residing in the U.S. Each participant was offered $1.90 to engage in a 12 minute study. One participant declined consent, one provided only demographic information, and 55 failed an attention check. Excluding these participants yielded a final sample of N = 446 (mean survey duration = 682 seconds, SD [standard deviation] = 422 seconds). No participants were excluded for spending too little time on the survey, as part of the goal of the pretest was to establish a reasonable time cut-off for the final experiments. Participants ranged in age from 18 to 79 (mean age = 32.40, SD = 12.20; Table S1 in Supplemental Material), 38.57% reported their gender as Man, 58.30% as Woman, 2.91% as Non-Binary, and 0.22% as Other/Prefer not to say. In response to the question "What is your race/ethnicity? Check all that apply" 64.57% reported that they were only Caucasian, 8.30% African-American/Black, 6.05% Latino or Hispanic, 10.31% Asian, 0.45% Native American, 0% Native Hawaiian or Pacific Islander, 0.22% Other/Unknown, and 0.22% Prefer not to say. Another 9.87% checked multiple racial categories. In response to the question "How would you describe your political views?" 21.80% of participants reported that they were very liberal, 28.76% liberal, 13.48% slightly liberal, 18.65% moderate/unsure, 7.19% slightly conservative, 7.87% conservative, and 2.25% very conservative (mean political ideology = 2.93, SD = 1.64, range 1 to 7 where higher = more conservative).

Materials and Procedure

Two blocks of vignettes were included in the pretest. In each vignette, an individual is potentially exposed to COVID-19. For each of the six vignettes in block 1, participants were randomly assigned to a moral (morally good, morally neutral, morally bad) and an importance (low, high) condition (Table S2) and responded to three items assessing: their moral judgment of the action, how important they found the action, and how necessary they found the action. For each of the four vignettes in block 2, participants were randomly assigned to an intention condition (unintentional, intentional) and responded to two items assessing how intentional and necessary they found the action.

Vignettes. Vignettes were organized under vignette types. In each vignette type the name, age, and location of the individual in question remained the same. In addition, the exposure event remained identical. For each vignette type there were different specific vignettes which varied only with respect to the motivations for the individual's exposure, i.e., why that individual engaged in a risky activity.

Participants were given a set of instructions informing them that they would read eleven vignettes (or "scenarios") and be asked to make judgments about the individuals involved. They were instructed to take their time and watch for attention checks. Participants then read six vignettes as part of block 1. These were drawn from each of six vignette types (Table 1). For each vignette type, we generated six conditions corresponding to combinations of morally good, morally neutral, and morally bad, as well as high and low importance, reasons for the individual's actions (for a full list of all vignettes used, see Appendix A). This yielded conditions, for instance, that were morally good-low importance, morally neutral-high importance, etc. We varied these factors independently because moral valence and importance judgments coincide. That is, participants generally judge highly moral actions as highly important as well. Part of our goal was to establish whether both factors influence risk judgments independently, or whether they interact.

To give a concrete example, one vignette type includes Joe who lives in a small city apartment. In each condition for this vignette type, he takes an elevator out of his build-

5 https://osf.io/6yvgf/

Table 1. Vignette Types

Individual	Exposure
Block 1: Morality x Importance Conditions	
Alex (21)	Went to a crowded bar for an hour
Barbara (60)	Spent one hour in the public library
George (35)	Went to a busy grocery store for 45 minutes
Joe (52)	Stuck in an elevator for 25 minutes with 5 strangers
Justine (26)	Danced for 4 hours at a club
Mina (41)	Worked in her restaurant for 12 hours a day for two weeks
Block 2: Intention Conditions	
Andy (33)	Spent five minutes in the middle of a group of protestors
Kristi (45)	Walked briefly through a large, crowded bar
Olivia (24)	Spent two minutes in a small room with 12 friends
Peter (43)	Stayed in his apartment for one hour while a plumber worked on the bathroom

Note. Parentheses = individual's age; Block 1 tested the effects of moral judgment and importance on risk assessment; Block 2 tested the effect of intention on risk assessment.

ing, and gets stuck in it for 25 minutes with five strangers, but his motivations for leaving vary. In the morally good-high importance condition Joe is rushing over to reset the circuit breaker at an elderly neighbor's house because her air conditioner is off and it is getting dangerously hot. In the morally neutral-high importance condition, he is heading out to FedEx to send an important work document. In the morally bad-low importance condition, he wants to buy some cocaine from a dealer.

Each participant was randomly assigned a block of questions which included one from each vignette type and one from each moral x importance condition. This ensured that all participants saw each condition and each vignette type. Within each block, vignettes were ordered randomly ahead of time using a randomization device and remained the same for all participants.[6]

Following block 1, participants were presented with an attention check in the form of an extra vignette with instructions to select particular answers. All participants were then presented with four vignettes of block 2. These were drawn from four vignette types (Table 1). There were two conditions for each vignette type, where individuals either intended or did not intend to engage in the behavior that potentially exposed them to COVID-19. For example, Olivia always spent a few minutes in a room with twelve friends. In the intentional condition, she knew her friends would be having a small party and chose to briefly attend. In the unintentional condition, her roommate planned the party without informing her. Each participant was randomly assigned to a block of four questions, two from each condition. Again, these were ordered randomly ahead of time to avoid ordering effects while ensuring that each participant was exposed to each vignette type and to each condition twice. Following both blocks, every participant was asked to answer a series of questions about their gender, age, racial/ethnic identity, and political ideology.

Moral Judgment. The first item for each block 1 vignette asked, "How moral/immoral was it for X to engage in the activity that potentially exposed him/her to COVID-19?" with the response options 1 (*very moral*), 2 (*moderately moral*), 3 (*slightly moral*), 4 (*neither moral nor immoral*), 5 (*slightly immoral*), 6 (*moderately immoral*), and 7 (*very immoral*).

Importance Judgment. Participants were then asked for each block 1 vignette, "To what degree was it important for X to engage in the activity that potentially exposed him/her to COVID-19?" with the response options 1 (*very important*), 2 (*moderately important*), 3 (*slightly important*), 4 (*neither important nor unimportant*), 5 (*slightly unimportant*), 6 (*moderately unimportant*), or 7 (*very unimportant*). For ease of interpretation, importance judgment scores were reverse scored so that higher = more important.

Necessity Judgment. For both blocks of vignettes in the pretest, we also asked a necessity question with the intention of checking whether responses were similar to the importance question. Participants were asked, "To what degree was it necessary that X engage in the activity that potentially exposed him/her to COVID-19?" with the response options 1 (*very necessary*), 2 (*moderately necessary*), 3 (*slightly necessary*), 4 (*neither necessary nor unnecessary*), 5 (*slightly unnecessary*), 6 (*moderately unnecessary*), or 7 (*very unnecessary*). For ease of interpretation, necessity judgment scores were reverse scored so that higher = more necessary.

Intention Judgment. For each block 2 vignette, participants were asked "To what degree did X intend to engage in the activity that potentially exposed him/her to COVID-19?" with the response options 1 (*very intentional*), 2 (*moderately intentional*), 3 (*slightly intentional*), 4 (*neither intentional nor unintentional*), 5 (*slightly unintentional*), 6 (*moderately unintentional*), and 7 (*very unintentional*). For ease of interpretation, intentional judgment scores were reverse scored so that higher = more intentional.

Self-Identified Political Ideology. At the end of the study participants were asked, "How would you describe your political views?" and responded with 1 (*Very liberal*), 2 (*Liberal*), 3 (*Slightly liberal*), 4 (*Moderate/unsure*), 5 (*Slightly conservative*), 6 (*Conservative*), or 7 (*Very conservative*).

Demographics. At the end of the study, participants completed items asking their gender (*man*, *woman*, *non-binary*, or *other/prefer not to say*), race, (check all that apply: *Caucasian*, *African American / Black*, *Latino or Hispanic*,

6 We did not use randomization during each experiment for ease of programming. There are no theoretical reasons why ordering should matter in this study. And pre-randomization of vignette ordering across blocks should prevent unexpected effects from influencing findings.

Asian, *Native American*, *Native Hawaiian or Pacific Islander*, *Other/unknown*, or *prefer not to say*), and age (free-response answer).

Data Analysis

All analyses for the pretest and main study were conducted using R version 4.0.3 (R Core Team, 2020). Between-subjects analyses were conducted to pretest the effectiveness of the moral and importance condition manipulations. For each block 1 vignette, a 2 (importance condition: low vs. high) x 3 (moral condition: morally good vs. morally neutral. vs. morally bad) analysis of variance (ANOVA) was conducted with Tukey Honestly Significant Difference (HSD) post-hoc comparisons for each vignette on moral, importance, and necessity judgments. For each block 2 vignette, independent samples *t*-tests were conducted with Bonferroni-adjusted alpha levels ($\alpha = .05 / 8 = .006$) comparing intention and necessity judgments between intentional and unintentional conditions.

Results

Full pretest results for each vignette are presented in Supplemental Tables S3-S42. As expected for each vignette in block 1, there was a significant effect of moral condition on moral judgments, *F*-values ranged from 17.86 to 167.04, all *p*-values < .001 (see Tables S39 and S40 for summaries). For all six vignettes, participants made significantly harsher moral judgments in the morally bad than the morally good conditions (differences between conditions ranged from 1.17 to 3.03, all *p*-values < .001) and significantly harsher moral judgments in the morally bad conditions compared to the morally neutral conditions (differences between conditions ranged from 0.79 to 2.39, all *p*-values < .001), suggesting that the morality manipulation worked. There were significant differences in moral judgments between morally good and morally neutral conditions for two of the six vignettes.

Also as expected, there was a significant effect of importance condition on importance judgments for each vignette in block 1, *F*-values ranged from 70.40 to 275.60, all *p*-values < .001. For all six vignettes, participants rated the action as significantly more important in the high importance conditions compared to the low importance conditions, differences between conditions ranged from 1.43 to 2.74, all *p*-values < .001. There was also a significant effect of importance condition on necessity judgment for each vignette, *F*-values ranged from 40.30 to 263.70, all *p*-values < .001. For all six vignettes, participants rated the action as significantly more necessary in the high importance conditions compared to the low importance conditions, differences between conditions ranged from 1.08 to 2.49, all *p*-values < .001. Importance and necessity judgments were significantly positively correlated for each vignette, Pearson *r* ranged from .83 to .89, all Bonferroni-corrected *p*-values < .001 (Table S41). Given the high conceptual and statistical overlap between these two items, only the importance judgment item was retained for the main study.

As expected for the block 2 vignettes (Table S42), there was a significant effect of intention condition on intention judgments, such that for all four vignettes participants judged the actions as significantly more intentional in the intentional conditions than the unintentional conditions, *t*-values ranged from 10 to 22, all Bonferroni-corrected *p*-values < .001, Cohen's *d* ranged from 0.84 to 1.63. For necessity judgments, participants judged the actions as significantly less necessary when committed intentionally than when committed unintentionally for three of the four vignettes (Andy, Kristi, and Olivia), *t*-values ranged from -7 to -4, Bonferroni-corrected *p*-values ranged from < .001 to .002, Cohen's *d* ranged from -0.61 to -0.36. Only the intention judgment item was retained for the main study. For this reason, we did not seek to alter the remaining vignette to obtain significance in the necessity judgment.

Main Study

The pretest demonstrated that the vignettes in block 1 manipulated moral and importance judgments, and the vignettes in block 2 manipulated intention judgment, in the expected directions. To test our main hypotheses, we next investigated the effects of the moral and importance (block 1) and intention (block 2) manipulations on perceived COVID-19 risk across the vignettes with a new set of participants.

Method

Sample

A total of 1,015 participants were recruited through Prolific from January 15th to January 16th, 2021. Participants were prescreened using Prolific to include only U.S. citizens residing in the U.S. Each participant was offered $1.90 to engage in a 12-minute study. Two participants declined consent, 121 were excluded for failing the pre-registered attention check, and 51 were excluded for taking less than 300 seconds to complete the studies. This time limit was adopted in response to pretest data and was decided before any analysis was performed. The large majority of pretest respondents took at least 300 seconds. In addition, trials by the authors suggested that at least this much time was necessary to properly read the vignettes. The remaining 841 participants contributed data to the analyses (Table S43). They ranged in age from 18 to 77 (mean age = 34.20, *SD* = 12.70), 46.14% reported their gender as Man, 52.08% as Woman, 0.95% as Non-Binary, and 0.83% as "Other/Prefer not to say". In response to the question "What is your race/ethnicity? Check all that apply" 66.35% reported that they were only Caucasian, 5.35% African-American/Black, 6.06% Latino or Hispanic, 12.49% Asian, 0.59% Native American, 0.12% Native Hawaiian or Pacific Islander, 0.59% Other/Unknown, and 0.48% Prefer not to say. Another 7.97% checked multiple racial categories. In response to the question "How would you describe your political views?" 23.42% of participants reported that they were very liberal, 29.49% liberal, 13.32% slightly liberal, 17.00% moderate/unsure, 8.68% slightly conservative, 5.83% conserva-

tive, and 2.26% very conservative (mean political ideology = 2.85, *SD* = 1.62, range 1 to 7 where higher = more conservative).

Materials and Procedure

Participants were randomly assigned to read and respond to the same blocks of vignettes as in the pretest.

Risk Assessment. For each vignette in both blocks, participants were first asked, "On a scale from 1 to 10 where 1 is the SAFEST/LOWEST RISK, and 10 is the MOST DANGEROUS/HIGHEST RISK, what is X's risk of contracting COVID-19 from just this exposure event?" They were presented with a slider bar and a horizontal scale with ten units labeled "SAFEST/LOWEST RISK" on the left and "MOST DANGEROUS/HIGHEST RISK" on the right.

Moral Judgment. The same moral judgment item as the pretest was presented for each block 1 vignette.

Importance Judgment. The same importance judgment item as the pretest was presented for each block 1 vignette.

Intention Judgment. The same intention judgment item as the pretest was presented for each block 2 vignette.

Self-Identified Political Ideology. The same political ideology item as the pretest was presented for all participants at the end of the study.

Demographics. The same demographic items as the pretest were presented for all participants at the end of the study.

Data Analysis

Mixed effects modeling was used to test the effects of moral and importance conditions and their interaction on moral judgment, importance judgment, and COVID-19 risk, as well as the effects of self-reported moral and importance judgments and their interaction on COVID-19 risk.[7] Model specification recommendations from Brauer and Curtin (2018) and Singmann and Kellen (2019) were followed. All continuous variables were standardized and grand mean-centered prior to analysis. Each mixed effects model was conducted using a restricted maximum likelihood approach to obtain unbiased variance estimates, used the Kenward-Roger approximation to estimate degrees of freedom (Kenward & Roger, 1997), and controlled for age, gender, race/ethnicity, and self-reported political ideology (see Supplemental Material for model specification details). Each model was first conducted only with main effects, then again with the inclusion of the interaction term. Significant moral and importance condition fixed main effects were followed by Tukey Honestly Significant Difference (HSD) pairwise comparisons.[8] Significant interactions were followed by analyses of simple slopes.

Block 1. There are two random variables in block 1: participant with 841 levels and vignette with six levels. By-participant moral x importance condition interaction random slopes were not specified in block 1 models because there is only one observation per participant for each cell of the interaction.[9] To check that the moral condition manipulation worked, a mixed effects model was constructed predicting moral judgment from moral and importance conditions and their interaction, controlling for covariates, with by-participant random intercepts and moral and importance condition random slopes, by-vignette random intercepts and moral and importance condition random slopes, and correlations among random effects. To check that the importance condition manipulation worked, a mixed effects model was constructed predicting importance judgment from moral and importance conditions and their interaction, controlling for covariates, with by-participant random intercepts and moral and importance condition random slopes, by-vignette random intercepts and importance condition random slopes, and correlations among random effects.

To test the main hypotheses, a mixed effects model was constructed predicting COVID-19 risk judgment from moral and importance conditions and their interaction, controlling for covariates, with by-participant random intercept and importance condition random slopes, by-vignette random intercepts and importance condition random slopes, and correlations among random effects. As a secondary test of the hypotheses, a mixed effects model was constructed predicting COVID-19 risk judgment from moral and importance judgments and their interaction, controlling for covariates, with by-participant random intercepts and moral and importance judgment random slopes, by-vignette random intercepts and moral judgment random slopes, and correlations among random effects.[10]

Moreover, as a robustness check given the politically polarized responses to COVID-19 in the U.S., we explored whether the main effects of moral condition, moral judgment, importance condition, and importance judgment on COVID-19 risk perceptions each depended on self-reported political ideology. This was done by repeating the same risk mixed effects models as above, but with political ideology

7 See Supplemental Material for preregistered between-subjects results. As noted in the preregistration, the main test of our hypothesis uses mixed effects modeling because our hypothesis concerns the effects of moral, importance, and intentionality on COVID risk perceptions in general across contexts. Since individual vignette results are of less interest, we only report the results from the preregistered main test of the hypotheses here. For a meta-analysis of standardized regression coefficients across vignettes, see Supplemental Material.

8 This analysis was not preregistered.

9 This deviates from the preregistered analysis which stated interaction random slopes would be included. The data did not support including random slopes in the model because there was only one observation per cell of the interaction.

10 This analysis was not included in the preregistration.

interacting with the moral and importance main effects in each respective model, and with political ideology random slopes (see Table S45 for a summary of model random effects inclusions).

Block 2. There are two random variables in block 2: participant with 841 levels and vignette with four levels. The same model specification procedure as Block 1 mixed effects model was conducted. As a manipulation check, a mixed effects model was constructed predicting overall intention judgment from intention condition, controlling for covariates, with by-participant random intercepts and intention condition random slopes, by-vignette random intercepts and intention condition random slopes, and random effects correlations.

To test the main hypothesis for block 2, a mixed effects model was constructed predicting COVID-19 risk judgment from intention condition, controlling for covariates, with by-participant random intercepts and intention condition random slopes, by-vignette random intercepts, and random effects correlations. As a secondary test of the hypothesis, a mixed effected model was constructed predicting COVID-19 risk judgment from intention judgment, controlling for covariates, with by-participant random intercepts and intention judgment random slopes, by-vignette random intercepts and intention judgment random slopes, and random effects correlations.[11] As with block 1, we explored whether the main effects of intention condition and intention judgment on risk depended on self-reported political ideology by repeating the same risk mixed effects models as above, but with the interaction between the intention main effect and political ideology.

Results

Block 1: Morality and Importance

Full block 1 results are presented in the Supplemental Material Tables S43-S110 and Figures S1-S7. The first manipulation check confirmed the moral condition manipulation worked, $F(2, 4) = 21.22$, $p = .008$ (Tables S47-S51). As they did in the pretest, participants in the present sample judged actions in the morally good conditions as significantly less immoral than the morally neutral conditions[12], difference = -0.39, standard error (*SE*) = 0.09, $t(4.91) = 4.53$, $p = .015$. Morally good conditions were also judged as significantly less immoral than morally bad conditions, difference = -1.16, *SE* = 0.16, $t(5.08) = -7.26$, $p = .002$. Morally bad conditions were judged as significantly more immoral than morally neutral conditions, difference = 0.77, *SE* = 0.12, $t(4.99) = 6.57$, $p = .003$. There was also a significant effect of importance condition on moral judgment ($F(1, 835) = 547.07$, $p < .001$) where the low importance conditions were judged as more immoral than the high importance conditions, difference = 0.44, *SE* = 0.06, $t(4.87) = 7.68$, $p = .001$. Adding the moral x importance condition interaction to the model revealed that the effect of moral condition on moral judgment depended on importance condition, $F(2, 1669) = 110.13$, $p < .001$ (Figure S2; Tables S50 and S51). Specifically, actions were judged as more immoral in the low importance condition than the high importance condition for morally good (estimate = 0.62, *SE* = 0.07, $t(6.14) = 8.67$, $p < .001$) and neutral (estimate = 0.60, *SE* = 0.07, $t(6.14) = 8.38$, $p < .001$) conditions (Figure S2). There was no difference in moral judgment between importance conditions for the morally bad condition (estimate = 0.09, *SE* = 0.07, $t(6.14) = 1.23$, $p = .264$). The amount of moral judgment variance explained by the fixed effects in the model was 29.80% (marginal $R^2 = .2980$) and the amount of moral judgment variance explained by both fixed and random effects in the model was 66.90% ($R^2 = .6690$; Nakagawa & Schielzeth, 2012), moral judgment intraclass correlation coefficient (ICC) adjusted = .5280 (unadjusted ICC = .3710).

The second manipulation check confirmed the importance manipulation worked, $F(1, 6) = 351.34$, $p < .001$ (Tables S52-S56). Participants judged actions in the low importance conditions as significantly less important than the same actions in the high importance conditions, difference = - 1.00, *SE* = 0.05, $t(5.54) = -18.74$, $p < .001$. There was also a significant main effect of moral condition on importance judgment, $F(2, 3349) = 333.99$, $p < .001$. Actions in the morally good conditions were judged as significantly more important than actions in the morally neutral (difference = 0.26, *SE* = 0.02, $t(3350) = 11.58$, $p < .001$) and morally bad (difference = 0.59, *SE* = 0.02, $t(3349) = 25.80$, $p < .001$) conditions. Actions in the morally bad conditions were judged as significantly less important than those in the morally neutral conditions (difference = -0.32, *SE* = 0.02, $t(3349) = -14.22$, $p < .001$). Adding the moral x importance condition interaction term to the model revealed a significant interaction, $F(2, 1673) = 107.32$, $p < .001$ (marginal $R^2 = .3230$, conditional $R^2 = .6450$; adjusted ICC = .4760, unadjusted ICC = .3220; Tables S55 and S56). Specifically, actions were judged as less important in the low importance condition than the high importance condition in all three moral conditions, and this difference was larger for the morally good (estimate = -0.91, *SE* = 0.06, $t(8.60) = -16.30$, $p < .001$) and neutral (estimate = -1.33, *SE* = 0.06, $t(8.60) = -23.86$, $p < .001$) conditions than the morally bad condition (estimate = -0.74, *SE* = 0.06, $t(8.60) = -13.31$, $p < .001$; Figure S4).

A violin plot illustrating the distribution of COVID-19 risk judgments by moral and importance conditions is shown in Figure 1. Supporting the first hypothesis, there was a significant effect of moral condition on COVID-19 risk judgments, $F(2, 3345) = 16.62$, $p < .001$ (Table S57). Participants judged actions in the morally good conditions as significantly less risky than the morally bad conditions (dif-

11 This analysis was not included in the preregistration.

12 This difference was more notable than in the pretest results, which may be because this study had more power.

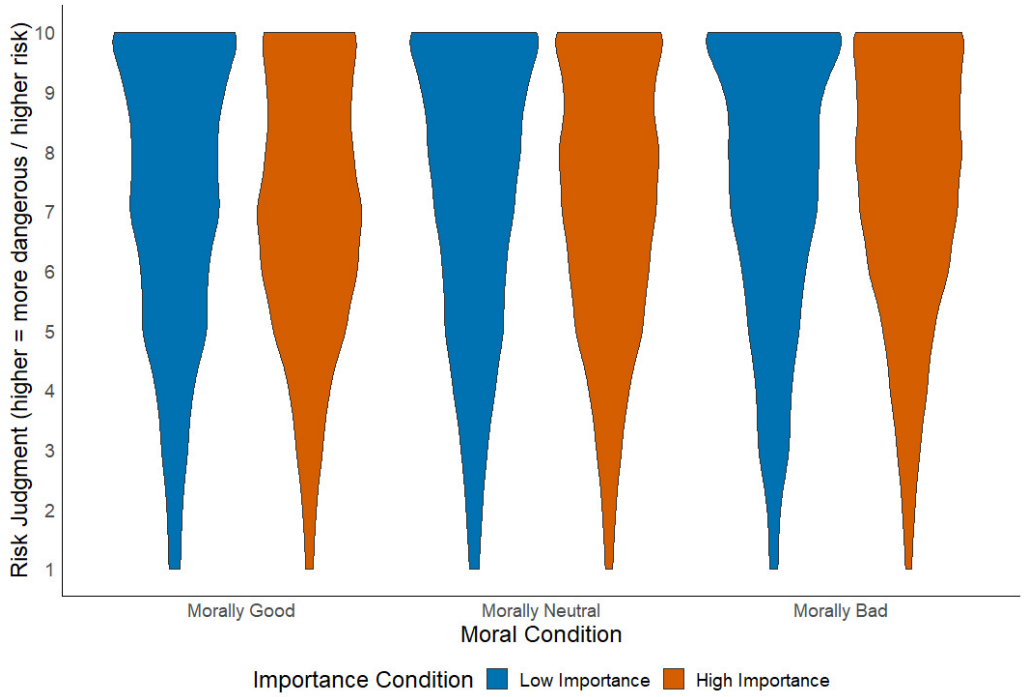

Figure 1. Block 1 COVID-19 Risk Judgment Distribution Across Vignettes

Note. Violin plot demonstrating the distribution of COVID-19 risk judgment by moral and importance conditions across vignettes; Risk judgment ranged from 1 (*safest / lowest risk*) to 10 (*most dangerous / highest risk*); N = 841.

ference = -0.11, SE = 0.02, t(3345) = -5.72, p < .001), and less risky but not significantly different from the neutral conditions (difference = -0.04, SE = 0.01, t(3347) = -2.20, p = .071. However, counter to our second hypothesis, there was no significant effect of importance condition, F(1, 5) = 3.71, p = .114, high importance condition versus low importance condition difference = 0.07, SE = 0.03, t(4.84) = 1.93, p = .114.[13] Additionally, there was no significant moral x importance condition interaction on COVID-19 risk judgments, F(2, 3343) = 0.68, p = .508 (marginal R^2 = .0550; conditional R^2 = .6880, adjusted ICC = .670, unadjusted ICC = .6330; Table 2; Table S57).

Results from the main effects model also showed there was a significant main effect of political ideology on COVID-19 risk perceptions (F(1, 830) = 91.89, p < .001; Table S57). Controlling for moral and importance conditions, age, gender, and race/ethnicity, a one standard deviation increase in conservatism was associated with a .20 decrease in perceived COVID-19 risk, β = -.20, SE = .02,, p < .001 (Tables S58 and S59). To examine whether the effects of moral and importance conditions on risk are dependent on self-reported political ideology, we tested the interaction between moral condition and importance condition, each separately, with political ideology.[14] After adding the interaction term, results indicated there was no significant moral condition x political ideology interaction, F(2, 4180) = 1.13, p = .324 (Table S60), nor a significant importance condition x political ideology interaction on COVID-19 risk judgments, F(1, 835) = 0.02, p = .890.

The first analysis tested the effect of the experimentally manipulated moral and importance conditions on perceived COVID-19 risk. As a secondary test of the hypotheses, we examined the effect of participants' self-reported moral and importance judgments about the actions on the likelihood they thought the actions would lead to a COVID-19 infection. Supporting the first hypothesis, there was a significant effect of moral judgment on COVID-19 risk perceptions, F(1, 5) = 27.24, p = .003 (Table S61). The more participants judged the actions as immoral, the more they thought the actions could lead to a COVID-19 infection. For every 1 standard deviation increase in moral judgment where higher indicates more immoral, there was a .17 standard deviation increase in COVID-19 risk perceptions, β = .17, SE = .03, p = .003 (Figure 3A; Tables S62 and S63; see Figures S7 and S8 for meta-analyzed standardized regression coefficient effect sizes across vignettes). However, there was no significant effect of importance judgment, F(1,5) = 3.33, β = -.03, SE = .02, p = .123 (Figure 3B), and

13 Note that the main effect of importance condition on risk perceptions is significant when excluding importance condition random slopes from the model (see Supplemental Material for more details).

14 The models in both blocks that examine political ideology as a moderator of the effects of moral and importance conditions on risk were not preregistered. These were included at the request of a reviewer.

Table 2. Block 1 COVID-19 Risk Judgment Mixed Effects Moral x Importance Condition Interaction Model

Random Effects				
Group	Random effect	Variance	*SD*	Correlation
Participants	Intercept	.28	.52	
	Low importance condition	.03	.18	-.03
Vignette	Intercept	.38	.61	
	Low importance condition	.01	.07	-.37
Residual		.33	.58	
Fixed Effects				
Variable	Std. Est.	*SE*	*t*	*p*
Intercept	-.19	.25	-0.76	.483
Moral condition (ref = morally neutral)				
Morally good	-.05	.03	-1.68	.093
Morally bad	.09	.03	3.13	.002
Importance condition (ref = high importance)				
Low importance	.08	.04	1.84	.100
Covariates				
Age	.08	.02	3.65	< .001
Gender (ref = man)				
Woman	.20	.04	4.84	<.001
Other	-.11	.16	-0.72	.472
Race (ref = Caucasian)				
African-American / Black	.16	.09	1.79	.073
Asian	.15	.06	2.39	.017
Latino or Hispanic	.18	.09	2.13	.034
Other / unknown	-.04	.16	-0.28	.783
2+ races	.10	.08	1.33	.185
Political ideology (higher = more conservative)	-.19	.02	-9.59	< .001
Moral x importance condition interaction				
Morally good-low importance	.01	.04	-0.17	.863
Morally bad-low importance	-.04	.04	-0.91	.363

Note. Std. = standardized; Est. = estimate; *SD* = standard deviation; *SE* = standard error; df = Kenward-Roger approximated degrees of freedom; Ref = comparison reference category; Results were estimated using a restricted maximum likelihood (REML) approach; All continuous variables were standardized and grand mean-centered prior to analysis; $N = 841$.

adding the moral x importance judgment interaction to the model showed no significant interaction, $F(1, 3120) = 0.31$, $p = .580$, on COVID-19 risk judgments (Table 3; marginal $R^2 = .0810$, conditional $R^2 = .6790$, adjusted ICC = .6510, unadjusted ICC = .5980).

As before, we investigated whether political ideology moderates the effects of moral and importance judgments, each on COVID-19 risk perception. Results showed there was a weak but significant moral judgment x political ideology interaction such that the effect of moral judgment on COVID-19 risk perceptions depended on political ideology, $F(1, 379) = 4.83$, $p = .029$ (Tables S64-S66). The stronger participants identified as conservative and the more immoral they found the actions, the riskier they judged the actions to be, $\beta = .02$, $SE = .01$, $p = .029$ (Figure S5a). There was also a significant importance judgment x political ideology interaction on perceived COVID-19 risk, $F(1, 655) = 9.05$, $p = .003$ (Table S64). This suggests that the more participants identified as conservative and the more important they judged the vignette actions, the less likely they thought the vignette actors would contract COVID-19, $\beta = -.03$, $SE = 0.01$, $p = .003$ (Figure S5b; Table S67 and S68).

Together, results demonstrate that how participants felt morally about actions in our vignettes affected their perceptions of how likely it was these actions would lead to COVID-19 infection, and this may depend on participants' self-reported political ideology. Counter to the second hypothesis, there was no significant effect of how important an action is on how risky the action is perceived to be in a COVID-19 context, accounting for the morality of the action and demographic covariates. In addition to morality, there were also significant associations between demographic covariates and COVID-19 risk perceptions. Participants who were older ($\beta = .08$, $SE = 0.02$, $p < .001$) identify as women (compared to men, $\beta = .20$, $SE = 0.04$, $p < .001$), and identify as Asian ($\beta = .15$, $SE = 0.06$, $p = .017$) or Latino

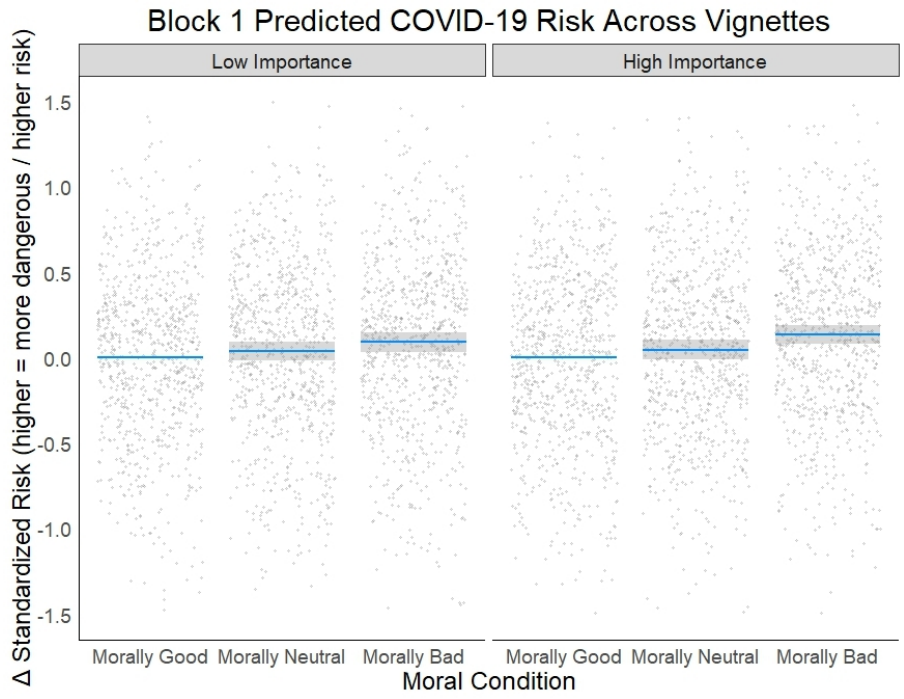

Figure 2.

Note. This figure illustrates the interaction of the experimental moral x importance condition manipulations on the expected value of standardized risk judgment by contrasting moral conditions from the standardized mean of the reference group for each level of moral condition; For visual purposes, the contrast reference group is the morally good condition, which differs from the analysis where the contrast reference group is the morally neutral condition; The y-axis was rescaled, excluding 38 partial residuals from the visual range of the figure; Gray dots illustrate partial residuals; Shaded gray area represents 95% confidence intervals; N = 841.

or Hispanic (β = .18, *SE* = 0.09, *p* = .034) compared to White, saw greater COVID-19 risk across the scenarios.

Block 2: Intentionality

In block 2 we investigated the effect of the intention manipulation on COVID-19 risk judgments, as well as the effect of participants' individual intention judgment on COVID-19 risk. Full block 2 results are presented in the Supplemental Material Tables S111-120 and Figures S8-S10. The manipulation check confirmed the intention condition manipulation worked, $F(1, 3) = 31.32$, $p = .011$ (Table S111). Participants judged the actions as more intentional in the intentional conditions than the same actions in the unintentional conditions, difference = 1.25, *SE* = 0.22, $t(3.01) = 5.60$, $p = .011$ (marginal $R^2 = .3820$, conditional $R^2 = .6240$, adjusted ICC = .3910, unadjusted ICC = .2410; Figure S8; Tables S112 and S113).

Supporting the hypothesis for block 2, there was a significant effect of intention condition on COVID-19 risk judgments, $F(1, 836) = 17.67$, $p < .001$ (Table S114). Participants judged the actions as more likely to lead to a COVID-19 infection when the actions were committed intentionally than when they were committed unintentionally, difference = 0.11, *SE* = .03, $t(836) = 4.20$, $p < .001$ (marginal $R^2 = .0260$, conditional $R^2 = .5330$, adjusted ICC = .5210, unadjusted ICC = .5080; Figures 4 and 5; Table 4).

As with block 1, we tested whether the effect of intention condition on COVID-19 risk judgments depended on participants' self-identified political ideology. Results showed this was not the case for the interaction, $F(1, 834) = 0\ .83$, $p = .363$ (Tables S114-S116).

Like block 1, a secondary analysis was conducted testing the effect of intention judgment on COVID-19 risk judgment. This was the same model as the prior analysis, except that participants' self-reported judgments of how intentional they perceived the actions to be was the main predictor that replaced intention condition. Results supported the hypothesis in that there was a main effect of intention judgment, $F(1, 3) = 12.44$, $p = .036$ (Table S117); the more participants judged the actions as intentional, the more likely they thought the actions could lead to COVID-19 infection. For every one unit increase in intention judgment there was a .12 increase in perceived COVID-19 risk, β = .12, *SE* = 0.03, $p = .036$ (marginal $R^2 = .0390$, conditional $R^2 = .5550$, adjusted ICC = .5370, unadjusted ICC = .5160; Figure 6; Table 5; see Figure S10 for a meta-analysis of standardized regression coefficient effect sizes across block 2 vignettes). Moreover, participants who identified as African American / Black (β = .39, *SE* = .11, $p = .001$), Asian (β = .27, *SE* = .08, $p < .001$), or Latino or Hispanic (β = .22, *SE* = .11, $p = .040$) compared to White perceived greater COVID-19 risk across vignettes. Moreover, the stronger participants identified as conservative the less COVID-19 risk they perceived across contexts (β = -.09, *SE* = .03, $p = .001$).

Lastly, we tested whether the effect of intention judgment on COVID-19 risk judgments depended on participants' self-identified political ideology. Results indicated that there was a significant intention judgment x political ideology interaction on COVID-19 risk, $F(1, 655) = 6.07$, $p = .014$ (Table S117); the more participants identified as con-

Table 3. Block 1 COVID-19 Risk Judgment Mixed Effects Moral x Importance Judgment Interaction Model

Random Effects					
				Correlation	
Group	Random effect	Variance	*SD*	1	2
Participants	Intercept	.22	.47		
	Moral judgment	.02	.14	-.52	
	Importance judgment	.004	.07	.36	.12
Vignette	Intercept	.32	.57		
	Moral judgment	.004	.06	.001	
Residual		.31	.55		
Fixed Effects					
Variable		Std. Est.	*SE*	*t*	*p*
Intercept		-.11	.23	-0.47	.660
Moral judgment (higher = more immoral)		.17	.03	5.95	.001
Importance judgment (higher = more important)		-.03	.01	-2.69	.007
Covariates					
Age		.07	.02	3.61	.003
Gender (ref = man)					
Woman		.15	.04	4.16	< .001
Other		-.14	.14	-0.96	.337
Race (ref = Caucasian)					
African-American / Black		.16	.08	1.99	.046
Asian		.11	.06	1.99	.047
Latino or Hispanic		.20	.07	2.66	.008
Other / unknown		-.02	.14	-0.17	.868
2+ races		.11	.07	1.73	.083
Political ideology (higher = more conservative)		-.15	.02	-8.15	< .001
Moral x importance condition interaction		-.01	.01	-0.55	.580

Note. Std. = standardized; Est. = estimate; *SD* = standard deviation; *SE* = standard error; 1 = random intercepts, 2 = by-vignette moral judgment random slopes; df = Kenward-Roger approximated degrees of freedom; Results were estimated using a restricted maximum likelihood (REML) approach; Prior to analysis, continuous variables were standardized, between-subjects continuous predictors were mean-centered, within-subjects continuous predictors were cluster mean-centered, and categorical predictors were sum (deviation) contrast coded; Ref = reference group of sum contrast codes; N = 841.

servative and the more they judged the actions as intentional, the riskier they found the actions, β = .04, *SE* = .01, p = .014 (Figure S9; Tables S118 and S119).

General Discussion

The current study investigated how moral judgments, importance judgments, and intentionality judgments affect risk judgments related to COVID-19. Results from the first block of vignettes showed that even when details of possible exposure were held fixed, the less moral an individual's reasons for exposure, the riskier their actions were seen to be. Results from the second block of vignettes showed the same for intentionality – when people intentionally put themselves in a situation in which they might get COVID, participants judged the situation to be riskier than when the same person found themselves in the same situation unintentionally. Given prior work showing the tight link between intentionality and moral culpability, these two findings provide two strains of evidence that moral evaluations impact judgments of COVID-19 risk.

In a related study by Timmons et al. (2020) subjects judged the risk of COVID infection in the face of alternative medical, financial, and psychosocial risks. As in our study, the authors present vignettes where exposure is fixed, but the reasons for exposure vary. They find that when the vignettes include more serious medical and psychosocial "risks"- for instance, if an individual really must see a doctor or has been terribly lonely - participants judge the exposure risks lower.

In some ways, the manipulations in their vignettes are similar to our importance condition in that individuals have reasons for exposure that are judged to be better or worse. But the reasons for exposure in their study are not necessarily moral ones in the sense we attempt to elicit in this study. That said, it may be that their results are, in fact, driven by the moral effect we observe. Our design, which permitted us to test the effects of both importance and

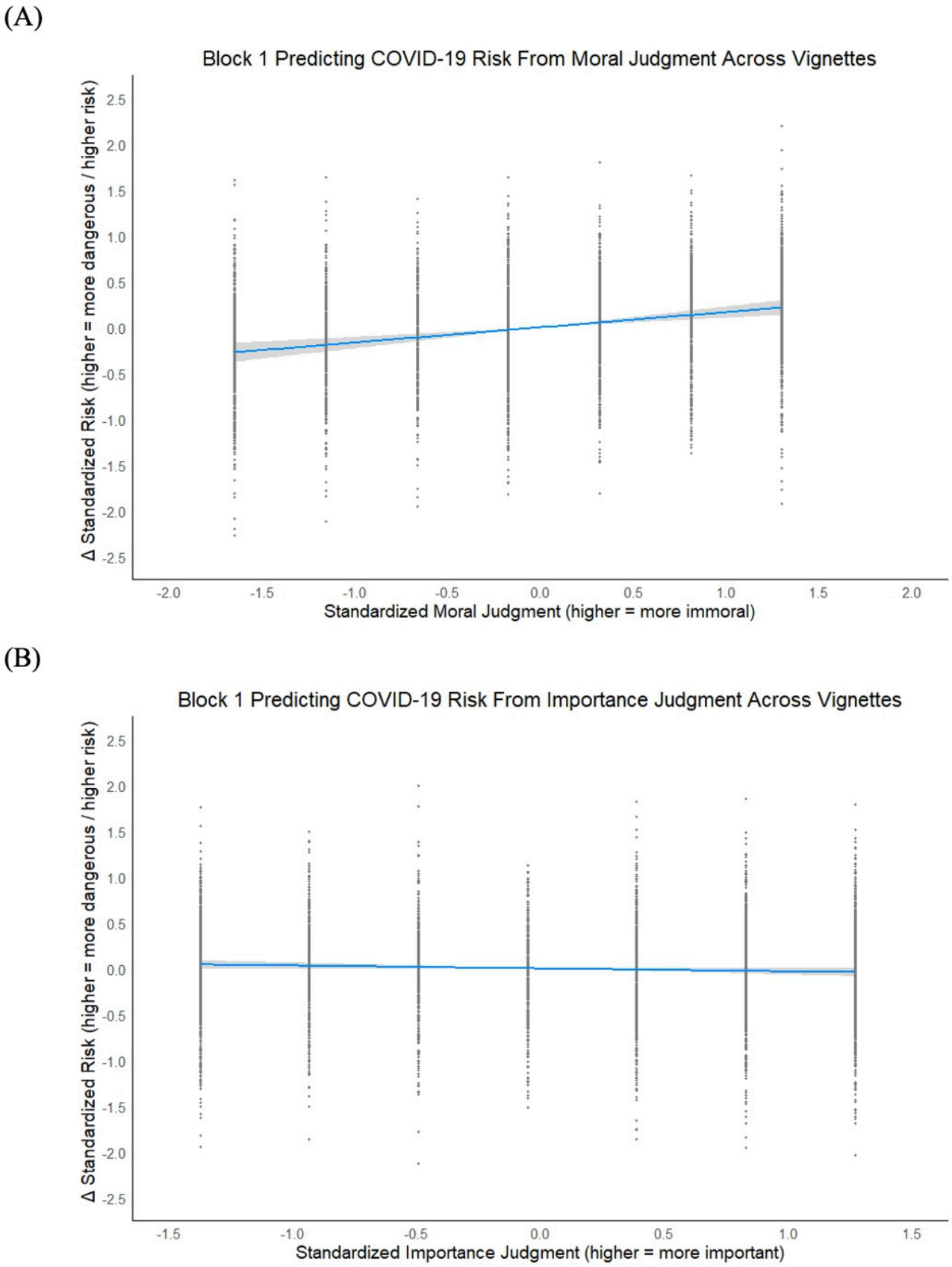

Figure 3.

Note. (A) Main effect of moral judgment on COVID-19 risk judgment, controlling for importance judgment and covariates; (B) Main effect of importance judgment on COVID-19 risk judgment, controlling for moral judgment and covariates; Gray dots illustrate partial residuals; Shaded area represents 95% confidence intervals; $N = 841$.

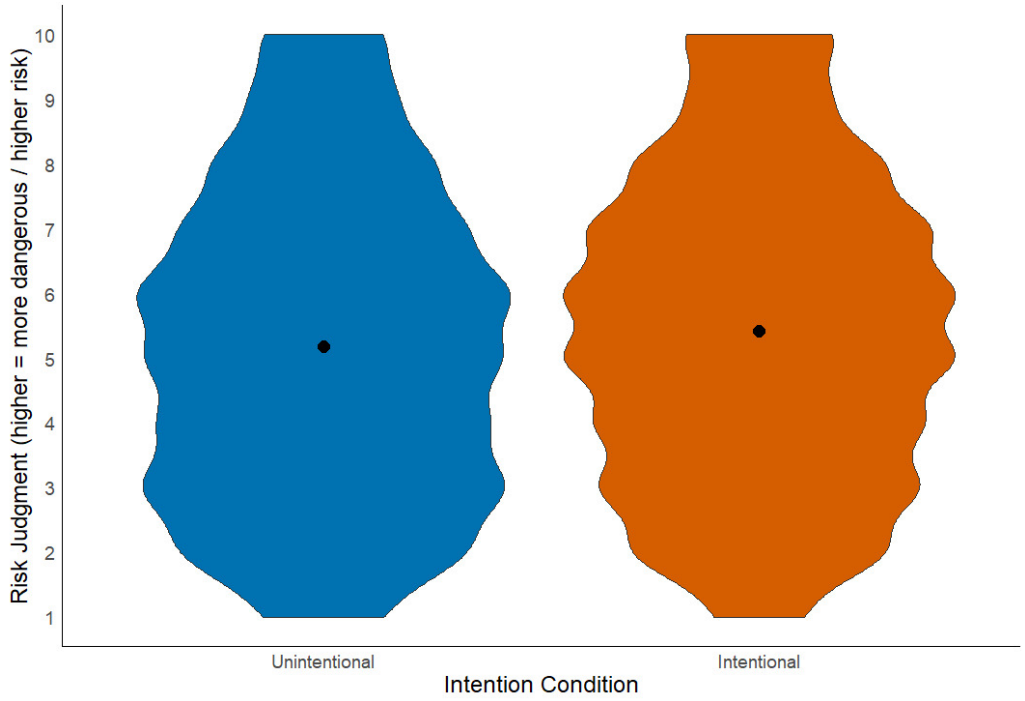

Figure 4. Block 2 COVID-19 Risk Judgment Distribution Across Vignettes

Note. Violin plot demonstrating the distribution of COVID-19 risk judgment by intention condition across vignettes; Black dot = average; Risk judgment ranged from 1 (*safest / lowest risk*) to 10 (*most dangerous / highest risk*); $N = 841$.

moral judgments on risk judgments while controlling for the other, suggests that it is moral judgments that matter. That said, it is possible that the reason we did not find a significant effect of importance on risk judgments when interacting with moral judgments was because the effect is small, and we did not generate enough vignettes to have adequate power to see the effect. Further research is needed to determine whether importance judgments alone impact risk judgments.

Possible Mechanisms

The current study was not designed to identify the underlying psychological mechanisms by which moral concerns affect risk judgments. Past research, however, suggests several processes that may drive the effect, none of them necessarily mutually exclusive.

As outlined in the introduction, our results may be driven by needs for narrative coherence, especially between moral and factual judgments. This mechanism is in line with a wide range of previous findings and theoretical work (Alicke, 2000; Clark et al., 2015; Cushman et al., 2008; Hitchcock & Knobe, 2009; Knobe, 2003; Kominsky et al., 2015; Liu & Ditto, 2013; Relihan et al., under review; Thagard, 2000; Thomas et al., 2016).

Related to needs for coherence are "just world beliefs". Many studies show that people believe the world is just, i.e., that good things happen to good people and bad things to bad people, despite ample evidence to the contrary (Furnham, 2003; Furnham & Procter, 1989; Lerner, 1980; Lerner & Miller, 1978). Beliefs of this sort may help individuals deal with a chaotic world by projecting control, stability, and orderliness onto it (Lerner & Miller, 1978). Typical investigations look into unfair attributions of blame or culpability after individuals have already suffered some misfortune. For instance, those with strong beliefs in a just world might be especially likely to attribute immoral behavior to an AIDs patient (Furnham, 2003). Our results may, in part, arise from just world beliefs applied before some misfortune occurs. Those who expose themselves to COVID without good reason for doing so are morally culpable, and in a just world they would be the ones infected with the illness. Thus, their risk is judged higher.

Relihan et al. (under review) suggest the affect heuristic as another possible explanation for the influence of moral judgment on risk judgment. (Notably, Timmons et al (2020) also suggest that their effects may be due to the affect heuristic). According to this view (Finucane et al., 2000; Slovic et al., 2007; Slovic & Peters, 2006), people judge risk based on feelings. When people feel favorably toward an action, they deem it as having low costs and high benefits. When people have negative feelings toward an action, they perceive it as having high costs and low benefits. As Relihan et al point out, previous work shows that moral judgments are often driven by "gut feelings" (Haidt, 2001; Haidt & Joseph, 2004), and associated with affective responses (Graham et al., 2013). This may prompt people to judge morally laudable actions as less risky (low cost), and morally culpable actions as more risky. In other words, the negative feelings that go along with negative moral judgements may prompt people to see immoral situations as riskier. It may be that this heuristic is responsible, or partly responsible, for the results we observe here. Future work might assess this possibility by directly testing affective responses to

Table 4. Block 2 COVID-19 Risk Judgment Predicted From Intention Condition

Random Effects				
Group	Random effect	Variance	*SD*	Correlation
Participants	Intercept	.46	.68	
	Intentional condition	.04	.21	-.26
Vignette	Intercept	.08	.28	
Residual		.48	.69	
Fixed Effects				
Variable	Std. Est.	*SE*	*t*	*p*
Intercept	-.18	.15	-1.22	.296
Intention condition (ref = unintentional)				
Intentional	.11	.03	4.20	< .001
Covariates				
Age	.06	.03	2.12	.035
Gender (ref = man)				
Woman	.09	.05	1.66	.097
Other	-.07	.21	-0.32	.748
Race (ref = Caucasian)				
African-American / Black	.39	.12	3.36	< .001
Asian	.28	.08	3.34	< .001
Latino or Hispanic	.21	.11	1.90	.058
Other / unknown	.20	.20	0.98	.328
2+ races	.16	.10	1.62	.105
Political ideology (higher = more conservative)	-.08	.03	-2.98	.003

Note. Std. = standardized; Est. = estimate; *SD* = standard deviation; *SE* = standard error; df = Kenward-Roger approximated degrees of freedom, Ref = reference group category; Results were estimated using a restricted maximum likelihood (REML) approach; All continuous variables were standardized and grand mean-centered prior to analysis; *N* = 841.

similar scenarios to see whether these mediate risk judgments.

Notice that any of these mechanisms may also operate through person-centered moral judgment (Critcher et al., 2020; Pizarro & Tannenbaum, 2012; Uhlmann et al., 2015). Although most psychological treatments of morality focus on judgments about *acts*, ordinary people may be more concerned with global assessments of the moral character of the individual engaging in the act. As such, participants may be responding to our vignettes by asking themselves, "Is this the sort of person who deserves to get COVID-19?" Or, in the case of the affect heuristic, positive feelings about a character may be driving judgments about their likely risks.

Some Limitations

One challenge for our experimental design was to properly control for perceived exposure. We used identical wording across vignettes to describe the potential COVID exposure. Other details in the vignettes, though, might influence beliefs about this event. For instance, we describe Joe as living in a "small city apartment". As noted, in some vignettes Joe is a cocaine user, while in another he has a job that requires him to rush out to FedEx. Readers might assume that a cocaine user is a different sort of person who lives in a different sort of neighborhood than someone with pressing job responsibilities. This, in turn, might influence inferences about the sorts of neighbors Joe would have, their chances of contracting COVID-19, and thus Joe's chances of contracting it from them. On this picture, one might think that observed shifts in risk judgment are based on rational inference. Note, though, that it is very hard to disambiguate this interpretation of our results from one where moral judgments are influencing reasoning. If moral judgments influence reasoning about objective risk, those influenced will presumably develop justificatory factual beliefs supporting their risk judgments to avoid cognitive dissonance. Determining whether such factual beliefs are post-hoc, i.e., following from a moral judgment, or follow directly from reasoning about the scenario is difficult.

It is important to note that the effect sizes in our study were small (block 1 partial Cohen's *d* morally good versus morally neutral condition comparison = -0.04 and morally good vs. morally bad conditions = -0.10; block 2 intention condition = 0.15). Block 1 risk judgments were generally very high, which may have produced ceiling effects. The effect of morality on risk perceptions was also demonstrated using hypothetical third-person scenarios in which participants themselves were not personally involved. It is possible that the effect could be stronger in real-world situations with direct implications for participants. It is also possible of course for small effects to have a significant impact

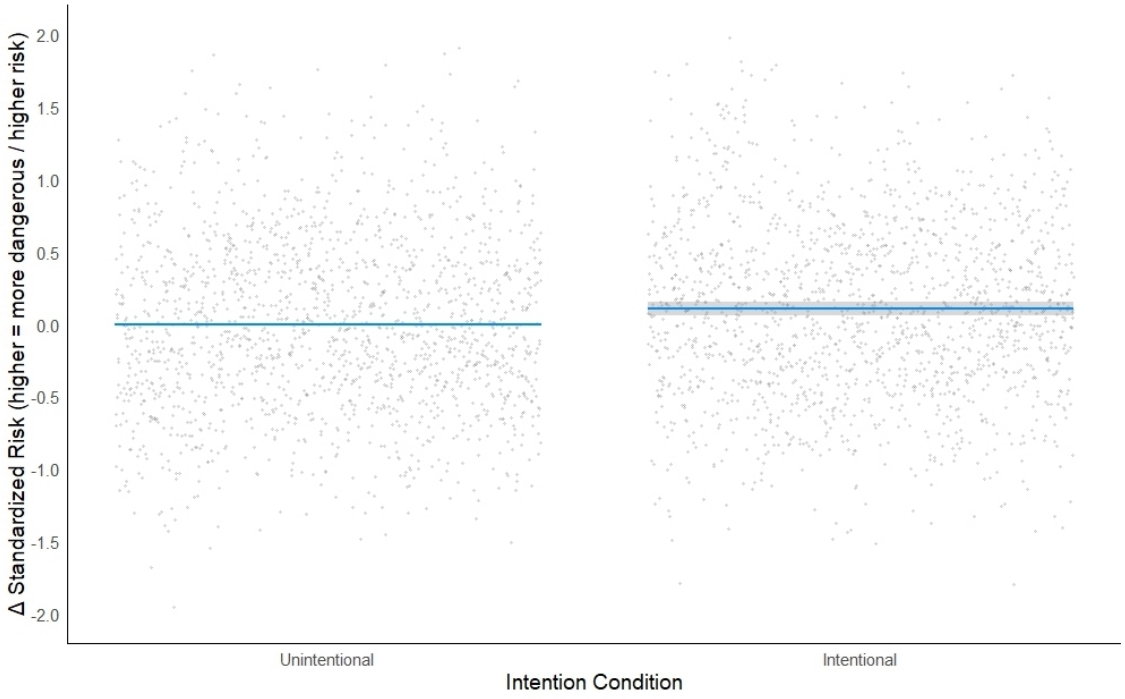

Figure 5. Block 2 Predicted COVID-19 Risk Across Vignettes

Note. This figure illustrates the effect of the experimental intention condition manipulation on the expected value of COVID-19 risk judgment by contrasting the intentional condition from the standardized mean of the unintentional condition reference group; The y-axis was rescaled, excluding 8 partial residuals from the visual range of the figure; Gray dots illustrate partial residuals; Shaded area represents 95% confidence intervals; $N = 841$.

when repeated over time (Prentice & Miller, 1992). That is, if these moral judgments influence many small decisions about exposure across a population they might significantly influence emergent group behavior. Small effects of this sort might also be amplified if media and scientific sources regularly miscommunicate about risks related to COVID-19 as a result, thus further impacting risk judgments of the wider community. The infographics mentioned in our introduction may be an example of this.

Besides relatively small effect sizes, our study was performed on a non-representative sample of U.S. citizens residing in the United States during December 2020 and January 2021, at the height of a COVID-19 surge in the United States. For this reason, it is unclear whether the results would generalize to other samples and social and cultural contexts. As noted, the general phenomenon – where moral judgments impact risk judgments – has been established across several studies (Relihan et al., under review; Thomas et al., 2016). This prior research used designs similar to the one employed here and found convergent results. Study 4 in Relihan et al. (under review), for example, find a similar effect in a non-representative sample from 56 countries, where a portion of their sample ($n = 483$, 22.90%) was from outside the U.S. More generally, the current results also add to a growing body of research showing that prescriptive (i.e., moral) concerns can influence descriptive (i.e., fact-based) judgments (Alicke, 2000; Clark et al., 2015; Cushman et al., 2008; Hitchcock & Knobe, 2009; Knobe, 2003; Kominsky et al., 2015; Liu & Ditto, 2013; Relihan et al., under review; Thagard, 2000; Thomas et al., 2016). Both the circumstances of data collection (during the middle of a global pandemic) and the topic of judgment (the risks of the pathogen driving the global pandemic) in the current study are certainly unique, so additional replication is advisable. But the robustness of the phenomena across topic matter and study suggests that it is a reliable effect, even if the size of the effect is likely relatively modest. Further study is needed to fully establish the relevance of these effects cross-culturally.

One specific concern reflects the relatively small number of conservatives in our sample, compared to the US population more generally. It may be that our results would look different with a more representative sample. But note that the main effects were qualitatively robust across political ideology.

Conclusion

At the beginning of this paper, we suggested that certain COVID infographics may reflect inaccurate risk assessments along the lines of those we document in this paper. Our findings suggest that the experts generating them could have been influenced by moral judgments in the same way that subjects in our study were. In assessing behaviors like going to the beach, they may have judged these actions as riskier because they seemed morally irresponsible during a pandemic. On the other hand, it may be that these specific experts were making calculated decisions about what behaviors members of the public should engage in. Whatever the cause of the inaccurate risk assessments in these infographics, deceptive or misleading public health messaging may decrease public trust in science (Dayrit et al., 2020; OECD, 2020). Thus, it may be worthwhile for public health

Table 5. Block 2 COVID-19 Risk Judgment Predicted From Intention Judgment

Random Effects				
Group	Random effect	Variance	*SD*	Correlation
Participants	Intercept	.42	.65	
	Intention judgment	.04	.19	.08
Vignette	Intercept	.06	.25	
	Intention judgment	.004	.06	.08
Residual		.45	.67	
Fixed Effects				
Variable	Std. Est.	*SE*	*t*	*p*
Intercept	-.13	.13	-0.99	.383
Intention judgment (higher = more intentional)	.12	.03	3.53	.036
Covariates				
Age	.05	.03	1.96	.050
Gender (ref = man)				
Woman	.09	.05	1.84	.067
Other	-.07	.20	-0.35	.427
Race (ref = Caucasian)				
African-American / Black	.39	.11	3.43	< .001
Asian	.27	.08	3.32	< .001
Latino or Hispanic	.22	.11	2.06	.040
Other / unknown	.22	.20	1.09	.275
2+ races	.15	.10	1.60	.111
Political ideology (higher = more conservative)	-.09	.03	-3.32	.001

Note. Std. = standardized; Est. = estimate; *SD* = standard deviation; *SE* = standard error; df = Kenward-Roger approximated degrees of freedom, Ref = reference group category; Results were estimated using a restricted maximum likelihood (REML) approach; All continuous variables were standardized and grand mean-centered prior to analysis; *N* = 841.

experts to consider whether such infographics going forward should fall more in line with objective medical risks.

There may be other policy implications for future public health messaging. In particular, our results suggest that individuals may be prone to underestimate the risks of behaviors that they consider highly morally laudatory, such as attending church or participating in a protest. If so, it may be worthwhile to create direct messaging about such behaviors, emphasizing their true riskiness. In addition, our results may point towards a useful lever for public health messaging. In communicating public health measures, it may be more effective to emphasize the moral virtues and benefits of such measures than to emphasize narrowly practical benefits such as minimizing one's own risk of exposure or infection. Doing so may be effective both because of the strength of human moral norms, but also because it may shift risk judgments in useful ways. Further study is needed to assess whether such measures would be successful.

The COVID-19 pandemic created enormously difficult decisions for individuals trying to balance the risks of the pandemic against the demands of everyday life. Good decision making in such scenarios can have life and death consequences. For this reason, it is important to understand what drives risk assessments during a pandemic, and to investigate the ways that these assessments might deviate from ideal risk assessments. As we demonstrate, moral judgments may play a role in shaping risk judgments, and thus in shaping choices during a pandemic. These results are not only relevant to the current pandemic, however. They add to a growing literature suggesting that moral evaluations shape risk judgment more generally. When it comes to other important medical judgments with moral character, such as those surrounding pregnancy for instance, we might expect similar effects. If so, patients, doctors, public health professionals, and members of the public may be systematically failing to make appropriate health choices based on objective risks.

Author Contributions

Contributed to conception and design: All authors
Acquired data: CO
Analyzed data: DR
Drafted article: DR, CO with input from all authors
Revised article and contributed to interpretation of data: All authors
Approved submitted version for publication: All authors

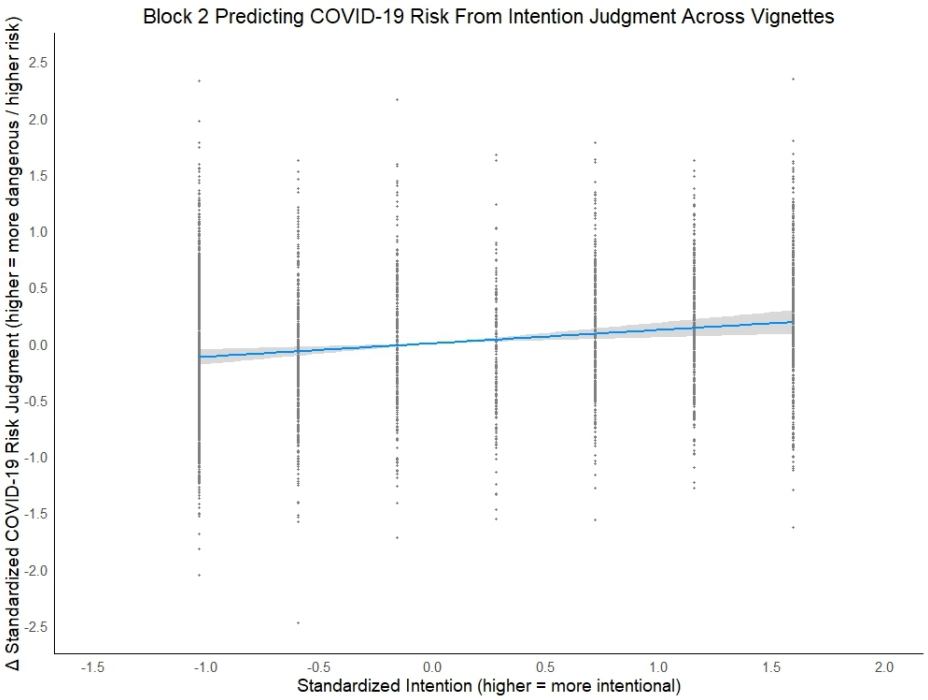

Figure 6.

Note. This figure illustrates the main effect of intention judgment on the expected value of the COVID-19 risk judgment (across the four block 2 vignettes) by moving importance judgment away from its mean on the x-axis; Gray dots illustrate partial residuals; Shaded gray area represents 95% confidence intervals; $N = 841$.

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Competing Interests

The authors have no competing interests.

Data Accessibility Statement

All the stimuli, presentation materials, participant data, and analysis scripts can be found on this paper's project page at the Open Science Foundation https://osf.io/6yvgf/.

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Appendix

Vignettes

Block 1, Condition 1: Morally Good, High Importance

Joe	Mina	Alex	Barbara	George	Justine
During the COVID-19 pandemic, Joe (52) was living alone in a small city apartment. Because he could work remotely, he was mostly staying home. One day Joe got a call from his friend Alice, an older woman who lived down the block. A circuit breaker had tripped, and her AC was no longer working. It was getting dangerously hot in her apartment. She wanted Joe to reset the breaker, which was in the basement of her building and hard for her to access. Joe decided to rush over. Joe went to the elevator and got on. On the next floor down five people entered the elevator laughing and talking. None of them were wearing masks. Before reaching the ground, a malfunction caused the elevator to get stuck. It took 25 minutes for maintenance to repair the elevator, and for Joe to exit.	Mina (41) runs a restaurant in a small tourist town. During the COVID-19 pandemic, Mina was forced to shut down for several months. Mina's earnings normally help support her elderly mother. During this time she was forced to spend all her savings and take on debt to pay their bills and buy food. In addition, Mina's mother started showing symptoms of osteoporosis, but refused to go to the doctor because she was worried about Mina's financial state. Mina grew increasingly desperate to get her mother to the doctor. Mina decided to reopen. For two weeks Mina worked 12 hours a day running the restaurant with her staff of four before being forced to shut down again. While at work Mina and her staff wore masks at all times. Customers, mostly tourists, wore masks while moving about the restaurant, but not while sitting and eating.	During the COVID-19 pandemic, Alex (21) missed seeing friends, but was doing all right living in a rented house in the small town where he grew up. One evening, a close friend, Greg, called to say that he was really struggling and was considering hurting himself. He was drunk and sitting at the local bar. Alex decided to rush over and try to calm Greg down. Alex was at the bar for about an hour. It was fairly crowded, with about 20 people in one small room. They ranged in age from mid-twenties to around sixty. Most of them had their masks off and were drinking beer and talking loudly.	During the COVID-19 pandemic, Barbara (60) was living alone in her townhome in a small city. She had retired earlier that year, and was spending her time talking on zoom with friends and her children. One day, her daughter called in a panic because Barbara's grandson had a strange rash and fever. Her daughter was too busy taking care of him to investigate and asked Barbara to please google the symptoms. Barbara's internet was down, but she knew that she could use the computers at the local library. She decided to head over there. Barbara was at the library for about an hour. Altogether, 25 people came through the library while she was there. About half of them were wearing masks. Barbara wore her mask for 30 minutes, but then took it off because it was uncomfortable.	During the COVID-19 pandemic, George (35) was living with his wife and three children in a small suburban home. One day his wife realized that she had not ordered a refill of their five-year old son's asthma medication, which she usually got delivered. She asked George to please drive to the store, since their son needed to take his medicine every night to prevent asthma attacks. George decided to go right away. George was at the store for about 45 minutes. It was packed with people who had just gotten off from work and were buying groceries for dinner. They were wearing masks, but were not entirely able to social distance given the crowding.	During the COVID-19 pandemic, Justine (26) was living in an apartment in the city. She was mostly social distancing, though missed normal social life. Her sister, Jane, had been fighting late-stage breast cancer for the past several years. One day Jane called to tell Justine that she was going to stop treatments given how advanced the cancer was. The doctors expected that she would only have another month or so in decent health. Jane had a special request that Justine take her for one last evening at their favorite club. Justine agreed to do so. Justine was at the club for four hours. It was a large room, with about 100 young people laughing and dancing. She danced and drank, and flirted with a few men. No one was wearing masks.

Block 1, Condition 2: Morally Good, Low Importance

Joe	Mina	Alex	Barbara	George	Justine
During the COVID-19 pandemic, Joe (52) was living alone in a small city apartment. Because he could work remotely, he was mostly staying home. One day Joe got a call from his friend Alice, an older woman who lived down the block. A circuit breaker had tripped, and her TV was no longer working. She wanted Joe to reset the breaker, which was in the basement of her building and hard for her to access. Joe decided to head over and help her. Joe went to the elevator and got on. On the next floor down five people entered the elevator laughing and talking. None of them were wearing masks. Before reaching the ground, a malfunction caused the elevator to get stuck. It took 25 minutes for maintenance to repair the elevator, and for Joe to exit.	Mina (41) runs a restaurant in a small tourist town. During the COVID-19 pandemic, Mina was forced to shut down for several months. During this time, she was supported by government aid, and had just enough money to pay her bills and buy food. For her five year old niece, Amy's, upcoming birthday, Mina really wanted to get her a nice new bike. Amy had been asking for months, but her parents could afford not it. It became increasingly clear that Mina couldn't get the money for the bike together without going back to work. Mina decided to reopen. For two weeks Mina worked 12 hours a day running the restaurant with her staff of four before being forced to shut down again. While at work Mina and her staff wore masks at all times. Customers, mostly tourists, wore masks while moving about the restaurant, but not while sitting and eating.	During the COVID-19 pandemic, Alex (21) missed seeing friends, but was doing all right living in a rented house in the small town where he grew up. One evening, a close friend, Greg, called to say that he was feeling lonely and sad. He was drunk and sitting at the local bar. Alex decided to head over and cheer up his friend. Alex was at the bar for about an hour. It was fairly crowded, with about 20 people in one small room. They ranged in age from mid-twenties to around sixty. Most of them had their masks off and were drinking beer and talking loudly.	During the COVID-19 pandemic, Barbara (60) was living alone in her townhome in a small city. She had retired earlier that year, and was spending her time talking on zoom with friends and her children. One day, her daughter called because she was confused about her taxes and was hoping her mother could look up some information. Barbara's internet was down, but she knew that she could use the computers at the local library. She decided to head over there. Barbara was at the library for about an hour. Altogether, 25 people came through the library while she was there. About half of them were wearing masks. Barbara wore her mask for 30 minutes, but then took it off because it was uncomfortable. .	During the COVID-19 pandemic, George (35) was living with his wife and three children in a small suburban home. One day his wife realized that she had not ordered balloons for their five year old son's birthday. Since their son had been unable to see friends for several months, they wanted to make sure his birthday was special. George decided to drive to the store and get balloons right away, since they would be celebrating the birthday that night. George was at the store for about 45 minutes. It was packed with people who had just gotten off from work and were buying groceries for dinner. They were wearing masks, but were not entirely able to social distance given the crowding.	During the COVID-19 pandemic, Justine (26) was living in an apartment in the city. She was mostly social distancing, though missed normal social life. Her sister, Jane, was living alone in the same city. Jane had been having a rough time, and was especially lonely since the pandemic started. One day Jane called with a special request that Justine take her for an evening at their favorite club. Justine agreed to do so. Justine was at the club for four hours. It was a large room, with about 100 young people laughing and dancing. She danced and drank, and flirted with a few men. No one was wearing masks.

Block 1, Condition 3: Morally Neutral, High Importance

Joe	Mina	Alex	Barbara	George	Justine
During the COVID-19 pandemic, Joe (52) was living alone in a small city apartment. Because he could work remotely, he was mostly staying home. One day Joe realized he did not mail a crucial work document that should have gone out several days before. Given the urgency, he decided to take it to FedEx for same day delivery. Joe went to the elevator and got on. On the next floor down five people entered the elevator laughing and talking. None of them were wearing masks. Before reaching the ground, a malfunction caused the elevator to get stuck. It took 25 minutes for maintenance to repair the elevator, and for Joe to exit.	Mina (41) runs a restaurant in a small tourist town. During the COVID-19 pandemic, Mina was forced to shut down for several months. During this time, she was forced to spend all her savings and take on debt to pay her bills and buy food. Mina grew increasingly desperate over her financial state. Mina decided to reopen. For two weeks Mina worked 12 hours a day running the restaurant with her staff of four before being forced to shut down again. While at work Mina and her staff wore masks at all times. Customers, mostly tourists, wore masks while moving about the restaurant, but not while sitting and eating.	During the COVID-19 pandemic, Alex (21) missed seeing friends, but was doing all right living in a rented house in the small town where he grew up. The construction company where he worked, however, went out of business. With no work, Alex found himself in increasingly dire financial straits. His landlord started threatening to evict Alex. One evening, Alex's close friend, Greg, called to say that he could lend Alex some money to pay the rent. Greg was having a beer at the local bar and wanted Alex to meet him there. Alex decided to head over and pick up the money. Alex was at the bar for about an hour. It was fairly crowded, with about 20 people in one small room. They ranged in age from mid-twenties to around sixty. Most of them had their masks off and were drinking beer and talking loudly.	During the COVID-19 pandemic, Barbara (60) was living alone in her townhome in a small city. She had retired earlier that year, and was spending her time talking on zoom with friends and her children. One day, Barbara got a credit card bill in her name, although she had not opened that account. Alarmed, she wanted to quickly protect herself from further identity theft. Barbara's internet was down, but she knew that she could use the computers at the local library. She decided to head over there. Barbara was at the library for about an hour. Altogether, 25 people came through the library while she was there. About half of them were wearing masks. Barbara wore her mask for 30 minutes, but then took it off because it was uncomfortable.	During the COVID-19 pandemic, George (35) was living with his wife and three children in a small suburban home. One day George realized he had not ordered a refill of his asthma medication, which he usually got delivered. George decided to go to the store and get it right away since he needed to take his medicine every night to prevent asthma attacks George was at the store for about 45 minutes. It was packed with people who had just gotten off from work and were buying groceries for dinner. They were wearing masks, but were not entirely able to social distance given the crowding.	During the COVID-19 pandemic, Justine (26) was living in an apartment in the city. She was mostly social distancing, though missed normal social life. Justine was also struggling financially. Before the pandemic, she used to work weekends as a club promoter to make ends meet. Without that extra pay, she was behind on rent, and had recently gotten an eviction notice. She got a call from the club saying they were reopening, and asking her to come back. Justine decided to do so that evening. Justine was at the club for four hours. It was a large room, with about 100 young people laughing and dancing. She danced and drank, and flirted with a few men. No one was wearing masks.

Block 1, Condition 4: Morally Neutral, Low Importance

Joe	Mina	Alex	Barbara	George	Justine
During the COVID-19 pandemic, Joe (52) was living alone in a small city apartment. Because he could work remotely, he was mostly staying home. One day Joe decided he'd like a comic book to read that evening. Joe went to the elevator and got on. On the next floor down five people entered the elevator laughing and talking. None of them were wearing masks. Before reaching the ground, a malfunction caused the elevator to get stuck. It took 25 minutes for maintenance to repair the elevator, and for Joe to exit.	Mina (41) runs a restaurant in a small tourist town. During the COVID-19 pandemic, Mina was forced to shut down for several months. During this time, she was supported by government aid, but had just enough money to pay her bills and buy food. For her birthday, Mina really wanted to get a nice new exercise bicycle. It became increasingly clear that she couldn't get the money together without going back to work. Mina decided to reopen. For two weeks Mina worked 12 hours a day running the restaurant with her staff of four before being forced to shut down again. While at work Mina and her staff wore masks at all times. Customers, mostly tourists, wore masks while moving about the restaurant, but not while sitting and eating.	During the COVID-19 pandemic, Alex (21) was lucky enough to keep his job working outside in landscaping. He missed seeing friends, but was doing all right living in a rented house in the small town where he grew up. One evening, Alex's friend Greg called to suggest that they meet at the local bar. Alex decided to head over and see Greg. Alex was at the bar for about an hour. It was fairly crowded, with about 20 people in one small room. They ranged in age from mid-twenties to around sixty. Most of them had their masks off and were drinking beer and talking loudly.	During the COVID-19 pandemic, Barbara (60) was living alone in her townhome in a small city. She had retired earlier that year, and was spending her time talking on zoom with friends and her children. One day, Barbara wanted to download a few knitting patterns to keep herself busy. Barbara's internet was down, but she knew that she could use the computers at the local library. She decided to head over there. Barbara was at the library for about an hour. Altogether, 25 people came through the library while she was there. About half of them were wearing masks. Barbara wore her mask for 30 minutes, but then took it off because it was uncomfortable.	During the COVID-19 pandemic, George (35) was living with his wife and three children in a small suburban home. One day George realized he had not ordered more of his favorite kind of coffee, which he usually got delivered. George decided to go to the store and get it that day, since he wanted to have it for the next morning. George was at the store for about 45 minutes. It was packed with people who had just gotten off from work and were buying groceries for dinner. They were wearing masks, but were not entirely able to social distance given the crowding.	During the COVID-19 pandemic, Justine (26) was living in an apartment in the city. She was mostly social distancing, though missed normal social life. One evening she saw that her favorite club was reopening. Justine decided to go that evening. Justine was at the club for four hours. It was a large room, with about 100 young people laughing and dancing. She danced and drank, and flirted with a few men. No one was wearing masks.

Block 1, Condition 5: Morally Bad, High Importance

Joe	Mina	Alex	Barbara	George	Justine
During the COVID-19 pandemic, Joe (52) was living alone in a small city apartment. Because he could work remotely, he was mostly staying home. Joe owed his drug dealer, Pat, about $200 from a recent cocaine purchase. Pat called to tell Joe that if he didn't drop the money in Pat's mail chute that day, there would be serious consequences. Joe decided to head over immediately. Joe went to the elevator and got on. On the next floor down five people entered the elevator laughing and talking. None of them were wearing masks. Before reaching the ground, a malfunction caused the elevator to get stuck. It took 25 minutes for maintenance to repair the elevator, and for Joe to exit.	Mina (41) runs a restaurant in a small tourist town. During the COVID-19 pandemic, Mina was forced to shut down for several months. During this time, she was unable to afford to support her gambling habit. She continued to gamble online, falling further and further into debt. Mina grew increasingly desperate over her financial state. Mina decided to reopen. For two weeks Mina worked 12 hours a day running the restaurant with her staff of four before being forced to shut down again. While at work Mina and her staff wore masks at all times. Customers, mostly tourists, wore masks while moving about the restaurant, but not while sitting and eating.	During the COVID-19 pandemic, Alex (21) missed seeing friends, but was doing all right living in a rented house in the small town where he grew up. The construction company where he worked, however, went out of business. With no work, Alex found himself in increasingly dire financial straits. His landlord started threatening to evict Alex. One evening, his close friend Greg called to ask Alex to meet him at the local bar. Alex knew that Greg would likely get drunk, and once he did it would be easy to steal a few hundred dollars from Greg's wallet. Alex decided to head over and see Greg. Alex was at the bar for about an hour. It was fairly crowded, with about 20 people in one small room. They ranged in age from mid-twenties to around sixty. Most of them had their masks off and were drinking beer and talking loudly.	During the COVID-19 pandemic, Barbara (60) was living alone in her townhome in a small city. She had retired earlier that year, and was spending her time talking on zoom with friends and her children. Since retiring Barbara had also been making some extra cash helping a doctor friend, Ava, deliver illegal pain medications to neighbors. One day Ava called in a panic, worried that the police were going to arrest them. Barbara wanted to quickly do some legal research to protect herself, but didn't want a search record on her computer. She knew that she could use the computers at the local library. She decided to head over there. Barbara was at the library for about an hour. Altogether, 25 people came through the library while she was there. About half of them were wearing masks. Barbara wore her mask for 30 minutes, but then took it off because it was uncomfortable.	During the COVID-19 pandemic, George (35) was living with his wife and three children in a small suburban home. George's wife, Linda, suffers from a serious pain condition, and takes prescription pain medication each morning to manage it. George had recently started sneaking her pills in the evening to relax and enjoy himself. One day, he realized that her pills had run out. Knowing she had to have the pills the next morning, and not wanting Linda to figure out what he had done, George decided to go to the store that day and refill them at the pharmacy. George was at the store for about 45 minutes. It was packed with people who had just gotten off from work and were buying groceries for dinner. They were wearing masks, but were not entirely able to social distance given the crowding.	During the COVID-19 pandemic, During the COVID-19 pandemic, Justine (26) was living in an apartment in the city. She was mostly social distancing, though missed normal social life. Justine was also struggling financially. Before the pandemic, she used to scam unsuspecting men for cash every weekend at the club after they had been drinking. Without that extra money, she was behind on rent, and had recently gotten an eviction notice. One evening she saw that her favorite club was reopening. Justine decided to go that evening. Justine was at the club for four hours. It was a large room, with about 100 young people laughing and dancing. She danced and drank, and flirted with a few men. No one was wearing masks.

Block 1, Condition 6: Morally Bad, Low Importance

Joe	Mina	Alex	Barbara	George	Justine
During the COVID-19 pandemic, Joe (52) was living alone in a small city apartment. Because he could work remotely, he was mostly staying home. One day Joe wanted to buy some cocaine from his dealer, Pat. Joe went to the elevator and got on. On the next floor down five people entered the elevator laughing and talking. None of them were wearing masks. Before reaching the ground, a malfunction caused the elevator to get stuck. It took 25 minutes for maintenance to repair the elevator, and for Joe to exit.	Mina (41) runs a restaurant in a small tourist town. During the COVID-19 pandemic, Mina was forced to shut down for several months. During this time, she was supported by government aid, but had just enough money to pay her bills and buy food. The change in her financial state meant that Mina could not spend as much time gambling online as she wanted. It became increasingly clear that she couldn't get the money together to gamble online the way she usually liked to do. Mina decided to reopen. For two weeks Mina worked 12 hours a day running the restaurant with her staff of four before being forced to shut down again. While at work Mina and her staff wore masks at all times. Customers, mostly tourists, wore masks while moving about the restaurant, but not while sitting and eating.	During the COVID-19 pandemic, Alex (21) missed seeing friends, but was doing all right living in a rented house in the small town where he grew up. One evening, his close friend Greg called to ask Alex to meet him at the local bar. Alex knew that Greg would likely get drunk, and once he did it would be easy to steal a few hundred dollars from Greg's wallet. Alex decided to head over and see Greg. Alex was at the bar for about an hour. It was fairly crowded, with about 20 people in one small room. They ranged in age from mid-twenties to around sixty. Most of them had their masks off and were drinking beer and talking loudly.	During the COVID-19 pandemic, Barbara (60) was living alone in her townhome in a small city. She had retired earlier that year, and was spending her time talking on zoom with friends and her children. Since retiring Barbara had also been making some extra cash helping a doctor friend, Ava, deliver illegal pain medications to neighbors. One day Ava called to ask Barbara to email other friends who might be looking for prescriptions. Barbara's internet was down, but she knew that she could use the computers at the local library. She decided to head over there. Barbara was at the library for about an hour. Altogether, 25 people came through the library while she was there. About half of them were wearing masks. Barbara wore her mask for 30 minutes, but then took it off because it was uncomfortable.	During the COVID-19 pandemic, George (35) was living with his wife and three children in a small suburban home. George's wife, Linda, suffers from a mild pain condition, and occasionally takes prescription pain medication in the morning to improve it. George had recently started sneaking her pills in the evening to relax and enjoy himself. One day, he realized that her pills had run out. Not wanting Linda to figure out what he had done, George decided to go to the store that day and refill them at the pharmacy. George was at the store for about 45 minutes. It was packed with people who had just gotten off from work and were buying groceries for dinner. They were wearing masks, but were not entirely able to social distance given the crowding.	During the COVID-19 pandemic, Justine (26) was living in an apartment in the city. She was mostly social distancing, though missed normal social life. Before the pandemic, Justine used to scam unsuspecting men for cash every weekend at the club after they had been drinking. She usually used the money to buy nice clothes, and treat herself. With the clubs closed, she missed having the extra cash. One evening she saw that her favorite club was reopening. Justine decided to go that evening. Justine was at the club for four hours. It was a large room, with about 100 young people laughing and dancing. She danced and drank, and flirted with a few men. No one was wearing masks.

Block 2, Condition 1: Unintentional

Olivia	Peter	Kristi	Andy
During the COVID-19 pandemic, Olivia (24) was living with her roommate Joanna. They had all been mostly careful about social distancing. One weekend, Joanna decided to invite over a group of mutual friends without telling Olivia about the plan. Olivia came home to find their friends in their living room. Olivia passed through the small sitting room in about two minutes. Twelve friends were there drinking wine and talking. None of them were wearing masks. Olivia shut herself in her bedroom for the rest of the party.	During the COVID-19 pandemic, Peter (43) was living alone in a small city apartment. One day he headed out to get his groceries. Unbeknownst to him, his landlord decided to send a plumber by to check on the pipes in Peter's bathroom. When Peter returned, he had no idea the plumber was working quietly in the bathroom while Peter put away his groceries. He didn't realize until after the plumber finished working and went to leave. Peter and the plumber were in his apartment together for nearly an hour. Neither was wearing a mask.	During the COVID-19 pandemic, Kristi (45) was living with her family in their small suburban home. One day she decided to order take-out for dinner. She called a local restaurant and placed her order, paying by credit card. Unbeknownst to Kristi the restaurant had opened its bar, and she would have to walk through it to carry out her food. She entered at one end, picked up her order, and was told to exit through the bar. Kristi walked through the large, crowded bar. There were about 40 people talking loudly and laughing, few of whom were wearing masks. It took her about 1 minute to exit.	During the COVID-19 pandemic, Andy (33) was living in an apartment in a small city. Andy liked to read in a local park in the late afternoon. One day he headed there with his book, and fell asleep against the trunk of a tree. When Andy woke up, he found himself surrounded by protesters. He got up to leave. Andy was in the middle of a group of several hundred protesters for about five minutes. They were wearing masks, and loudly shouting slogans. He was not wearing a mask.

Block 2, Condition 2: Intentional

Olivia	Peter	Kristi	Andy
During the COVID-19 pandemic, Olivia (24) was living with her roommate Joanna. They had all been mostly careful about social distancing. One weekend, Joanna told Olivia that she was going to invite over a group of mutual friends. Olivia could choose to stay in her room for the entire party, but decided to say hello. Olivia passed through the small sitting room in about two minutes. Twelve friends were there drinking wine and talking. None of them were wearing masks. Olivia shut herself in her bedroom for the rest of the party.	During the COVID-19 pandemic, Peter (43) was living alone in a small city apartment. One day he headed out to get his groceries. His landlord texted to say he was going to send a plumber by to check on the pipes in Peter's bathroom. When Peter returned, he put away his groceries while the plumber was working quietly in the bathroom. Peter and the plumber were in his apartment together for nearly an hour. Neither was wearing a mask.	During the COVID-19 pandemic, Kristi (45) was living with her family in their small suburban home. One day she decided to order take-out for dinner. She called a local restaurant and placed her order, paying by credit card. Kristi had talked to the restaurant owner the previous day, and knew that it had opened its bar, and that she would have to walk out through the bar after getting her food. She entered at one end, picked up her order, and was told to exit through the bar. Kristi walked through the large, crowded bar. There were about 40 people talking loudly and laughing, few of whom were wearing masks. It took her about 1 minute to exit.	During the COVID-19 pandemic, Andy (33) was living in an apartment in a small city. Andy liked to read in a local park in the late afternoon. One day he headed there with his book, and fell asleep against the trunk of a tree. When Andy woke up, he saw a group of protesters across the park. He decided to join them for a bit on his way home. Andy was in the middle of a group of several hundred protesters for about five minutes. They were wearing masks, and loudly shouting slogans. He was not wearing a mask.

Supplementary Materials

Peer Review History

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Supplemental Material

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