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Ketki Sheth, Greg C. Wright

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Poschingerstr. 5, 81679 Munich, Germany
Telephone +49 (0)89 2180-2740, Telefax +49 (0)89 2180-17845, email office@cesifo.de
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The Usual Suspects: Does Risk Tolerance, Altruism, and Health Predict the Response to COVID-19?

Abstract

Using a registered pre-analysis plan, we survey college students during California's Stay-at-Home order to test whether compliance with social distancing requirements depends on key parameters that affect their marginal benefit from doing so. We find a quarter of students violated the order. Yet, neither risk preference, altruism, nor preexisting health conditions were predictive of compliance. Our findings raise doubt about the efficiency of minimally enforced social distancing policies, as well as commonly assumed motivations for compliance. Our results also imply that that those with pre-existing health conditions may not voluntarily comply, resulting in higher health care congestion than otherwise expected.

JEL-Codes: I100, D800.

Keywords: COVID-19, risk, altruism, health.

Ketki Sheth
University of California
USA – Merced, 95343
ksheth@ucmerced.edu

Greg C. Wright
University of California
USA – Merced, 95343
gwright4@ucmerced.edu

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1 Introduction

In response to the COVID-19 pandemic Americans are being encouraged – and in the majority of states are being *ordered* – to socially distance and stay at home.[1,2] Yet there are concerns that many people are failing to comply,[3] with important efficiency implications of these policies. This raises two key questions: To what extent are people not complying with orders to reduce social interaction? And what drives this non-compliance?

Given the policy's dual mandate to both protect individuals from harm and to reduce the transmission to others, this paper examines whether preferences and characteristics that align with these objectives are predictive of compliance. Specifically, whether preexisting health factors, risk preferences, and altruism predict staying at home and socially distancing. If individuals respond to the policy based on their own benefits from compliance, we should expect that those who are more risk averse, or at greater risk of severe consequences from an infection, will be more likely to comply. Likewise, those who are more altruistic should also be more willing to comply because this reduces the likelihood of infecting others.[4]

Following a registered pre-analysis plan[5] and exploiting multiple surveys of California undergraduate students during a stay-at-home order, we find that a quarter of our subjects violated the order for non-essential reasons. Yet neither risk tolerance, preexisting health factors, nor altruism predicted compliance with social distancing orders. This is despite the fact that both risk aversion and existing health risks have been shown to increase adoption of preventative health behavior, and altruism has been shown to affect similar decisions in the context of communicable diseases (Anderson and Mellor, 2008; Schmitz and Wubker,

[1] 42 states have explicit state-wide orders to stay-at-home, and 3 more have ordered some locations to stay-at-home (Mervosh et al., 2020).

[2] Social distancing is broadly defined as staying six feet away from others. Stay-at-home is generally a legal order for people to stay in their home unless they need to leave for essential activities, such as obtaining food and health care, and for work.

[3] E.g., Murdoch (2020) and Behrmann (2020).

[4] Altruism is defined as a strictly positive derivative of the utility function of an individual with respect to the material resources received by any other agent (Fehr, 2006).

[5] This analysis is part of a pre-analysis plan registered in the American Economic Association's Randomized Controlled Registry, in which we pre-specify testing whether risk preferences, personal health risks, and altruism predicts social distancing (AEARCTR-0005612).

2010; Hurley and Mentzakis, 2013).

Current stay-at-home orders are minimally enforced, such that individuals mostly self-select into compliance. Theory suggests that this may be efficiency enhancing when compliance is determined by underlying preferences or health conditions that individuals face. In contrast, if an individual's decision-making is driven by *misperceptions* of their true costs and benefits, then self-enforcement will be welfare reducing (Allcott et al., 2020; Barrios and Hochberg, 2020). Our findings are in line with the latter, as variation in compliance does not appear to reflect differences in either fundamental preferences or the primary factors that affect the severity of illness. Our results also suggest that policies with minimal enforcement cannot rely on self-selection into preventative behaviors to protect those most vulnerable to severe illness.[6] Given that these individuals are more likely to require hospitalization, minimal enforcement may then result in greater health care congestion than expected.

Contrary to our findings, many people seem to assume that preferences and health risks are driving the response to stay-at-home orders. Those who violate social distancing guidelines are accused of being less altruistic (i.e., selfish) (BBC, 2020). At the same time, those who argue against the orders claim that risk aversion (i.e., cowardice) is resulting in an over-reaction to the pandemic, and that relaxing restrictions will give people the freedom to tailor the recommendations to their own health risks (Williams, 2020; Emerson and DeSilvia, 2020). Our results suggest that these inferences may be misguided, undermining productive debate on the public policy response to the pandemic.

Beyond the implications for optimal policy design, our findings suggest that messaging campaigns that highlight personal risk and reduced transmission to others may be ineffective at improving compliance, at least at this stage of the pandemic. Our results also suggest that as stay-at-home orders continue, voluntary compliance is unlikely to alter the composition of the electorate in upcoming elections – i.e., more risk-loving, less altruistic, or healthier individuals are no more likely to defy social distancing guidelines in order to vote.

[6]This finding is similar to the lack of selective recruitment found with respect to seat-belt adoption among youth (Cohen and Einav, 2003).

We contribute to a growing literature that finds that demographics and risk perceptions play an important role in the response to health policy directives during a pandemic (Bish and Michie, 2010; Ibuka et al., 2010; Bults et al., 2011). In the context of COVID-19, Wise et al. (2020) find that perceived personal risk is associated with preventative behaviors, but note that people are poor at assessing their actual risk. Indeed, Barrios and Hochberg (2020) find that risk perception of the COVID-19 pandemic is affected by partisan leanings. Focusing on social distancing, Allcott et al. (2020) and Chiou and Tucker (2020) find that political ideology and internet access predict adoption, respectively. Our focus on risk tolerance is guided by a literature that finds that risk aversion predicts adoption of preventative health behavior (Anderson and Mellor, 2008), and a related literature on risk-taking in the presence of low-probability events, a canonical example of which is Tversky and Kahneman (1979). Similarly, our focus on altruism and preexisting health conditions builds on a literature exploring these factors in the adoption of preventative health behaviors (Hurley and Mentzakis, 2013; Schmitz and Wubker, 2010). Finally, we also contribute to the broader literature exploring the role of altruism in decision-making when externalities are present (Frey and Meier, 2004; Fischbacher and Gachter, 2010; Korinek and Bethune, 2020).

2 Research Design and Data

We implement two survey instruments on a sample of 338 undergraduate economics students at a large public California university between March 26th and April 7th, 2020, 6 days after California's stay-at-home order went into effect. Both surveys asked subjects about their compliance in the previous 24 hours with different aspects of the order: 1) whether they left their home (*Left Home*), and 2) whether they were within six feet of another person, excluding people living in their home, for any purpose other than obtaining food, health care, or banking services (*Socialized*). In the second survey instrument, we additionally ask whether an affirmative to the latter question was for paid, work-related purposes (*Socialized,* *Not Work*).

We also ask subjects standard questions eliciting their risk and altruism preferences. We elicit risk and altruism preferences using self-reported measures that have been validated across various populations (and countries), and have been shown to be predictive of risky behaviors (e.g., smoking, holding stocks) and altruistic behaviors (e.g., helping strangers, volunteering time), respectively (Dohmen et al., 2011; Falk et al., 2018, 2016).[7] Subjects were also asked whether they had, or were living with others that had, underlying conditions that the Center for Disease Control report are associated with increased severity of a COVID-19 infection (i.e., *High Risk*) (CDC, 2020).[8] The online Appendix provides more detail on the construction and validation of these measures, additional control variables, and summary statistics of our sample.

As both surveys were implemented within days of one another, we assume that these characteristics, asked in only one survey instrument, are time-invariant for our primary analysis.[9] Subjects were informed that their responses would be confidential, even from the researchers. Due to recruitment through courses, subjects in multiple courses were invited to complete a survey more than once. We therefore calculate subject means across all surveys for all variables and outcomes in our primary analysis. We observe two to six responses to per subject.

3 Results

Though many subjects are in compliance with the Calfornia stay-at-home order, we find a large minority are not. Strikingly, during March 29th to April 7th, 9 days after the stay-at-home order was in place and when an average of 1,131 *new* cases were reported each day in California, 25 percent of subjects violated the stay-at-home order and socially interacted

[7]Risk preference is an 11-point scale, increasing with tolerance of risk. Altruism is a weighted average of two normalized measures, increasing with altruism.

[8]Results are generally robust to considering each condition individually.

[9]Our main results are robust, in both magnitude and statistical significance, when we relax this assumption, and use only responses from the survey in which a question was asked.

Table I: Predicting Non-Compliance

Dependent Variable:	Left Home		Socialized		Socialized, Not Work	
	(1)	(2)	(3)	(4)	(5)	(6)
Risk Tolerant	0.0439***	0.0392***	0.0134*	0.0145*	0.00643	0.00988
	(6.02)	(5.05)	(1.65)	(1.72)	(0.80)	(1.16)
Altruism	0.00787	0.0279	0.0197	0.0155	0.0147	0.00490
	(0.33)	(1.14)	(0.81)	(0.64)	(0.62)	(0.20)
High Risk	0.0371	0.0391	0.0453	0.0306	0.0607	0.0550
	(0.85)	(0.88)	(0.98)	(0.66)	(1.26)	(1.15)
Observations	333	333	333	333	333	333
Controls	No	Yes	No	Yes	No	Yes

Notes: Observations are individuals that completed both surveys at least once. Subject means across all surveys are used for independent and dependent variables. Using a 24 hour recall period, Left Home is an indicator that the subject left home, Socialized is an indicator that the subject socially interacted within six feet of people not living with them and not for the purposes of food, health care, or banking services; Socialized, Not Work additionally excludes social interaction for paid employment purposes. Risk Tolerant ranges from 0 to 11 and is increasing in risk tolerance, Altruism ranges from -1.94 to 1.94 and is increasing in altruism, and High Risk is an indicator for whether the subject, or anyone they are living with, has a factor that increases the risk of a severe illness from a COVID-19 infection. Controls include all covariates listed in Appendix Table A1, except for Hosp. Rate and Potential Spread. Robust standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

with others for non-essential, non-work purposes. We also find that others continued to leave their home and socially interact in violation of the recommendations for socially distancing that accompany the order. We find the rate of leaving home in the previous 24 hours to be 51 percent, and the rate of socially interacting (for purposes other than food, health care, and banking services) to be 35 percent in the previous 24 hours. This corresponds to 70 percent of subjects leaving their home and 50 percent socially interacting for at least one 24 hour recall period. When limiting observations to the second survey, which occurs further into the stay-at-home order, we continue to find significant non-compliance: 52 percent left home and 33 percent were in social proximity to others, only 8 percentage points of which were due to paid employment.

Table I regresses our primary measures of violating stay-at-home orders on risk tolerance, altruism, and the health factors that are associated with increased severity from a COVID-19 infection (i.e., *High Risk*).

We find that those with higher risk tolerance are both more willing to leave their home and more likely to interact socially. But surprisingly, when focusing on social interactions unrelated to essential services or paid employment, risk tolerance is no longer associated with non-compliance. This suggests risk preference may factor into the decision on whether to stay protected versus engage in important activities that are allowed under the order (e.g., obtaining food, employment). But when it comes to engaging in social interactions not sanctioned by the order, risk preference is not a deciding factor.

We also find that those who are more altruistic are no more likely to comply with the order, suggesting that altruistic individuals are not more responsive to the positive externalities associated with the recommendations. The point estimates are close to 0, and robust to using either underlying measure of altruism separately.

Similarly, those who have (or are living with those that have) health factors that increase the severity of a COVID-19 infection are also no more likely to comply. The point estimates even go in the opposite direction – though statistically insignificant, those with health concerns are *less* likely to comply with recommendations. We generally find the same pattern when observing each health condition separately.

One explanation is that factors correlated with pre-existing health have an opposing effect on the decision to socially distance. For example, these individuals may be employed in sectors requiring social contact or have greater reliance on extended social networks. While this is an explanation for *why* underlying health factors do not predict social distancing, it still implies that policies that assume those with greater risk factors will naturally have higher compliance with socially distancing may be misguided.

Our results are robust to excluding any additional controls (Appendix Table A2), expanding the sample to include subjects that completed only one survey instrument (Appendix Table A3), and relaxing the assumptions that measures are time-invariant (Appendix Table A4, A5, and A6).

4 Discussion and Conclusion

We find that key preferences and health risk factors fail to predict compliance with recommendations and orders on social distancing, a key strategy of the public policy response to the pandemic. Our results suggest that voluntary enforcement may not have expected efficiency gains from higher selective compliance by those who experience greater benefits from social distancing, including those most at risk for severe illness from COVID-19. It also suggests that inferences of other people's preferences based on whether or not they socially distance may be misguided. Our findings may be most externally valid to younger populations, who in the context of an infectious disease will have a meaningful effect on the larger population.

It may be that these factors did affect initial decisions on how to respond to the threat of COVID-19, but are not factors that affect compliance on the margin once the pandemic had developed. On the other hand, given the novelty of the situation and uncertainty of basic information about the virus, it may be difficult for individuals to accurately ascertain risks and benefits. As a result, people may be relying on other social cues and varied information sources, driving a wedge between responses and individuals' preferences or existing health conditions.

References

Allcott H, Boxell L, Conway J, Gentzkow M, Thaler M, Yang DY. 2020. Polarization and public health: Partisan differences in social distancing during COVID-19. *Available at SSRN 3570274* .

Anderson LR, Mellor JM. 2008. Predicting health behaviors with an experimental measure of risk preference. *Journal of Health Economics* **27**: 1260–1274.

Barrios JM, Hochberg YV. 2020. Risk perception through the lens of politics in the time of the COVID-19 pandemic. *University of Chicago, Becker Friedman Institute for Economics Working Paper* .

BBC. 2020. Very selfish: Matt Hancock condemns those still socializing amid coronavirus pandemic. *The Guardian* .

Behrmann S. 2020. Fauci takes heat from protesters of stay-at-home orders, says ignoring guidelines will 'backfire'. *Newsweek* .

Bish A, Michie S. 2010. Demographic and attitudinal determinants of protective behaviours during a pandemic: a review. *British Journal of Health Psychology* **15**: 797–824.

Bults M, Beaujean DJ, de Zwart O, Kok G, van Empelen P, van Steenbergen JE, Richardus JH, Voeten HA. 2011. Perceived risk, anxiety, and behavioural responses of the general public during the early phase of the Influenza A (H1N1) pandemic in the Netherlands: results of three consecutive online surveys. *BMC Public Health* **11**: 2.

CDC. 2020. How to protect yourself and others. *Center for Disease Control* . URL `https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/prevention.html`

Chiou L, Tucker C. 2020. Social distancing, internet access and inequality. *NBER Working Paper* **26982**.

Cohen A, Einav L. 2003. The effects of mandatory seat belt laws on driving behavior and traffic fatalities. *Review of Economics and Statistics* **85**: 828–843.

Dohmen T, Falk A, Huffman D, Sunde U, Schupp J, Wagner GG. 2011. Individual risk attitudes: Measurement, determinants, and behavioral consequences. *Journal of the European Economic Association* **9**: 522–550.

Emerson E, DeSilvia K. 2020. Las Vegas mayor's CNN interview on COVID-19 goes viral, faces criticism. *Fox 5 Vegas* .

Falk A, Becker A, Dohmen T, Enke B, Huffman D, Sunde U. 2018. Global evidence on economic preferences. *The Quarterly Journal of Economics* **133**.

Falk A, Becker A, Dohmen T, Huffman D, Sunde U. 2016. The preference survey module: A validated instrument for measuring risk, time, and social preferences. *IZA Discussion Paper* **9674**.

Fehr KMS Ernst. 2006. The economics of fairness, reciprocity and altruism - experimental evidence and new theories. In Kolm JMY Serge-Christophe (ed.) *Handbook of the Economics of Giving, Altruism, and Reciprocity*, chapter 8. Elsevier.

Fischbacher U, Gachter S. 2010. Social preferences, beliefs, and the dynamics of free riding in public goods experiments. *American Economic Review* **100**: 541–56.

Frey BS, Meier S. 2004. Social comparisons and pro-social behavior: Testing "conditional cooperation" in a field experiment. *American Economic Review* **94**: 1717–1722.

Hurley J, Mentzakis E. 2013. Health-related externalities: Evidence from a choice experiment. *Journal of Health Economics* **32**: 671–681.

Ibuka Y, Chapman GB, Meyers LA, Li M, Galvani AP. 2010. The dynamics of risk perceptions and precautionary behavior in response to 2009 (H1N1) pandemic influenza. *BMC Infectious Diseases* **10**: 296.

Korinek A, Bethune Z. 2020. Covid-19 infection externalities: Trading off lives vs. livelihoods. *NBER Working Paper* **27009**.

Mervosh S, Lu D, Swales V. 2020. See which states and cities have told residents to stay at home. *New York Times* .

Murdoch J. 2020. Mobile phone location data of Florida beachgoers during spring break tracked to show potential coronavirus spread. *Newsweek* .

Schmitz H, Wubker A. 2010. What determines influenza vaccination take-up of elderly Europeans? *Health Economics* **20**.

Tversky A, Kahneman D. 1979. Prospect theory: An analysis of decision under risk. *Econometrica* **47**: 263–291.

Williams A. 2020. Take courage: Most of us will contract coronavirus, and that's a good thing. *Fox 11 News* .

Wise T, Zbozinek T, Michelini G, Hagan CC, Mobbs D. 2020. Changes in risk perception and protective behavior during the first week of the covid-19 pandemic in the United States. *Working Paper* .

A Online Appendix

A.1 Recruitment and Sample

We recruited 525 subjects to participate in responding to two survey instruments in seven undergraduate economic courses at a University of California campus, a large public university in California. All enrolled students, over the age of 18, were invited to participate. We consider our main sample to be those who completed both survey instruments (338 students). An additional 59 students completed only one survey instrument, and we confirm our main results are robust to the inclusion of these subjects.

We began recruitment on March 26th, 2020. We collect responses to the first survey instrument from March 26th to April 3rd. We collect responses to the second survey instrument from March 29th to April 7th.

A.2 Key Measures

Both survey instruments asked subjects about their compliance with different aspects of California's stay-at-home order, implemented on March 19th, 2020, using a 24-hour recall period. To improve honesty in responses, the surveys were confidential - subjects were informed that their responses would not be observed with any identifying information, even by the researchers. The surveys were confidential based on the standard definitions used by the Institutional Review Board, the surveys were confidential. However, the researchers implemented a process in which identifying information was not observed when connecting individuals to their responses on the survey, thereby making them essentially anonymous from the perspective of the subjects. This information was related to the subjects.

In the first survey instrument, subjects were asked standard questions eliciting altruism preferences, and a randomly assigned subset were given information on the benefits of social distancing.[10]

[10]We randomly assigned subjects to receive no additional information, a 15 minute lecture on the reduced

In the second survey instrument, we ask additional questions on subjects' demographic characteristics (e.g., gender, age), characteristics that increase the risk of severity from a COVID-19 infection (i.e., whether they or someone they are living suffer from conditions that make them a high-risk population for COVID-19), risk preference, and beliefs on the effectiveness of social distancing and consequences of COVID-19.

A.2.1 Compliance

We use two primary measures for compliance with social distancing, with a 24 hour recall period: 1) whether subjects left their home (*Left Home*), and 2) whether they were within six feet of another person, excluding people living in their home, for any purpose other than obtaining food, health care, or banking services (*Socialized*). In the second survey instrument, we additionally ask whether an affirmative to the latter question was for work-related reasons (*Socialized, Not Work*). We observe at least two responses to both social distancing measures per subject.

A.2.2 Risk Preference (*Risk Tolerant*)

We employ a commonly used validated measure of self-reported risk preference. Using an 11-point scale, subjects were asked "how willing or unwilling are you to take risks, using a scale from 0 to 10" that increased in the willingness to take risks. In a large representative sample, Dohmen et al. (2011) shows that this general self-reported measure is predictive of incentivized experimental measures of risk preference (i.e., paid lottery experiments) and of risky behaviors, such as holding stocks, being-self-employed, participating in sports, and smoking. The measure is also a significant component of the risk measure in Falk et al. (2018), in which they confirm that their risk preference measures are predictive of risky behaviors across 76 countries.

personal risks from social distancing, or a 15 minute lecture on the benefits to others by social distancing. We do not find support for this variation in information changing social distancing compliance.

A.2.3 Altruism

In measuring altruism, we follow Falk et al. (2016) and construct a measure which takes the weighted average of two questions on altruism. The first question asks about a donation amount: "Today you unexpectedly received 1,600 USD. How much of this amount would you donate to a good cause?" The second question uses an 11-point scale, asking subjects "how willing are you to give to good causes without expecting anything in return?", using a scale from 0 to 10 that increases in the willingness to give. This measure has been validated across 76 countries, and is predictive of a broad range of altruistic behaviors, including donating, volunteering time, helping strangers, or sending money or goods to other people in need (Falk et al., 2018). Falk et al. (2018) finds that a one standard deviation in the measure is associated with a 15 to 20 percent increase in engaging in prosocial activities, and that the measure predictive of altruistic behaviors globally and holds in most of the 76 countries surveyed, including the United States.

To create the measure, we normalize each underlying measure and create the weighted composite at the unit of subject per survey response. We then estimate each subject's mean over all survey responses.

A.2.4 High Risk

We ask our subjects whether they, or anyone they are living with, has characteristics that increase their likelihood for more severe illness from COVID-19.

We use the characteristics reported by the Center for Disease Control (CDC) to identify what conditions increase the potential severity of a COVID-19 infection. The CDC reports that based on current information, that people with the following factors are at higher risk for severe illness from COVID-19: 1) 65 years and older, 2) chronic lung disease, 3) moderate to severe asthma, 4) immunocompromised, 5) Severe Obesity (body mass index above 40), 6) diabetes, 7) chronic kidney disease undergoing dialysis, and 8) liver disease. We ask for each of these conditions separately, and then create a composite indicator variable for each of these risks. Our main variable, *High Risk*, is an indicator for not having any of these factors, but results are generally similar when considering each condition separately.

In our survey instrument, we ask about "renal failure" rather than "chronic kidney disease undergoing dialysis". We also note only one of the several examples the CDC lists that are included in immunocompromised ("immonocompromised, including cancer treatment").

We additional ask about pregnancy, as it was unclear at the time of the survey whether pregnancy should be treated as a vulnerable population, and serious health conditions in general. We do not include these in our *High Risk* variable as they are no longer listed by the CDC, though results are robust to their inclusion. Finally, the CDC also warns that those with serious heart conditions are also at increased risk for severe illness, but we did not ask about this specific condition in our survey instrument.

Additional Measures Used as Controls We ask subjects whether they, or anyone they are currently living with, experienced symptoms of COVID-19 over the previous 7 days (i.e., fever, cough, shortness of breath). This variable is refered to as *Covid19 Symptom*.

Using Likert questions (on a scale of 1 to 5), we ask subjects of their opinion on 1) how serious a COVID-19 infection is for younger healthy adults (*Serious*), 2) how effective social distancing is at slowing down the spread of COVID-19 (*Health Effective*), and 3) How effective is social distancing at improving the economic impact from COVID-19 (*Econ Effective*. We also ask subjects to predict the unemployment rate in June 2020 (*Unemployment*).

We also ask subjects a series of questions about COVID-19 that were based on the information provided to random subset of students in the initial surveys. We ask subjects whether mispercerption of low personal risk and externalities would result in less than efficient adoption of social distancing (*Low SD, Misperception* and Low SD, Externalities). We also ask them what is the hospitalization rate of younger adults infected with COVID-19 in the United States (*Hosp. Rate*), and the number of people that would become infected with a pass rate of 3 persons after 10 social links (*Potential Spread*). These latter two questions provided four multiple choice options.

A.3 Additional Details on Variable Calculation

Given the short time duration between both survey instruments, we assume all characteristics to be time-invariant. We confirm that our results are robust to relaxing this assumption. We do so by using only observations in which both the outcome behavior (i.e., social distancing) and the characteristic (i.e., risk preference) were asked. For example, we would use only a student's second survey response on social distancing to see if risk preference, asked only in the second survey, predicted behaviors. These results are reported as Appendix Tables A4, A5, and A6.

Due to recruiting through courses, some subjects were invited to complete a survey more than once. We therefore calculate subject means across all surveys for all variables and outcomes in our primary analysis. For example, if a student completed the risk preference question more than once, we use their mean reported risk preference). For social distancing behaviors, each student will have at least two observations underlying their behavior. We use student level means to confirm that each student is equally weighted in our analysis.

The surveys were part of a planned RCT, and so were pre-registered in the AEA registry. In our preanalysis plan, we pre-specify whether risk preferences, personal health risks, and altruism would predict social distancing compliance.

A.4 Sample Description

Appendix Table A1, reports summary statistics for our analysis sample. 54 percent of the sample is male, and the majority of our sample is aged 19 to 21 (reflecting their undergraduate status). We find that in 26 percent of the seven day recall period, subjects reported experiencing at least one symptom associated with COVID-19 (i.e., fever, cough, and shortness of breath). The mean reported risk preference is 4.96. Subjects reported a self-reported altruism measure of 7.14, and on average were willing to donate USD 271 to a hypothetical good cause (from an unexpected USD 1,600 received).[11] Using a Likert scale, reducing from 1 to 5, subjects report a mean of 2.59 of the seriousness of a COVID-19 infection in younger healthy adults, a mean of 1.89 of the effectiveness of social distancing at slowing the spread of COVID-19, and a mean of 2.83 of the effectiveness of social distancing at improving the economic impact from COVID-19. The mean estimate for the unemployment rate in June was 32 percent.

Hosp. Rate reports subjects estimates of the current hospitalization rate for younger COVID-19 patients (on a scale of 1 to 4, increasing in the hospitalization rate). Similarly, *Potential Spread* reports subjects estimates of the transmission of the virus through a social network by an infected person (on a scale of 1 to 4, increasing in the number of others affected). Both these questions did have a correct answer and was information provided to some students in their initial survey, and so may reflect attentiveness or academic inclination. The former's correct range corresponded to 2, and the latter's correct range corresponded to 4. Similarly, *Low social distancing (SD), Misperceptions* and *Low SD, Externalities* reflect correctly responding that mis-perception of low personal risk and positive externalities will result in inefficiently low levels of socially distancing.

A.5 Analysis and Robustness

We control for all covariates listed in Appendix Table A1 in our main analysis, when noted, except for *Hosp.Rate* and *Potential Spread*. We exclude these latter two variables because these questions were not answered by 9 subjects. Results are robust to including them in our main specification.

In Appendix Table A2, we maintain the same observations in Table I, but do not include any covariates. In Appendix Table A3 we do not limit observations to only subjects that responded to both survey instruments.

[11] We do not report our main altruism because the measure is based on a weighted measure of the two altruism measures after being normalized into a z-score.

Table A1: Summary Statistics

	mean	sd	min	max
Male	0.54	0.50	0.00	1.00
Age 19	0.20	0.40	0.00	1.00
Age 20	0.27	0.45	0.00	1.00
Age 21	0.27	0.44	0.00	1.00
Age above 21	0.17	0.38	0.00	1.00
Covid19 Symptom	0.26	0.43	0.00	1.00
Risk Tolerant	4.96	2.72	0.00	10.00
Altruism Donation	271.20	385.62	0.00	1600.00
Altruism Scale	7.14	2.77	0.00	10.00
High Risk	0.38	0.48	0.00	1.00
Serious	2.59	1.03	1.00	5.00
Health Effective	1.89	0.89	1.00	5.00
Econ Effective	2.83	1.36	1.00	5.00
Unemployment	32.15	20.52	2.48	100.00
Low SD, Misperception	0.28	0.23	0.00	0.50
Low SD, Externalities	0.31	0.22	0.00	0.50
Hosp. Rate	1.77	0.82	1.00	4.00
Potential Spread	3.09	1.09	1.00	4.00
Observations	333			

Notes: Observations are individual subjects in our primary analysis. If subjects completed multiple responses, we provide the mean over all surveys for the subject. Male and Age variables are indicators of of the given characteristic. COVID-19 Symptom is an indicator variable for whether the subject, or anyone with which they are living with, experienced shortness of breathe, cough, or fever in the previous seven days. Risk Tolerant is a self-reported preference of risk on an 11-point scale, increasing in risk tolerance. Altruism Donation is the amount of an unexpected USD 1600 that one would donate to a good cause, and is an underlying measure in our main altruism measure. Altruism Scale is a self-reported preference of the willingness to give on an 11-point scale, increasing in altruism, and is an underlying measure in our main altruism measure. High Risk is an indicator for whether the subject, or anyone they are living with, has a characteristic associated with increased likelihood of severe illness from COVID-19. Serious, Health Effective, and Econ Effective are 5-point scales that reduce in the belief of how serious a COVID-19 infection is for younger healthy adults, how effective social distancing is at reducing the spread of the virus, and how effective social distancing is at reducing the economic impact from the virus, respectively. Unemployment is the expected unemployment rate in June 2020. Low SD, Misperceptions, Low SD, Externalities, Hosp. Rate, and Potential Spread are responses to questions that are based on factual information provided in initial surveys, as described in the Online Appendix.

Table A2: Robustness to Excluding Covariates

Dependent Variable:	Left Home			Socialized			Socialized, Not Work		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Risk Tolerant	0.0440***			0.0137*			0.00664		
	(0.00723)			(0.00811)			(0.00810)		
Altruism		0.0153			0.0218			0.0155	
		(0.0255)			(0.0245)			(0.0234)	
High Risk			0.0363			0.0448			0.0604
			(0.0458)			(0.0464)			(0.0481)
Observations	333	333	333	333	333	333	333	333	333
Controls	No	No	No	No	No	No	No	No	No

Notes: Observations are individuals that completed both surveys at least once. Subject means across all surveys are used for independent and dependent variables. Using a 24 hour recall period, Left Home is an indicator that the subject left home, Socialized is an indicator that the subject socially interacted within six feet of people not living with them and not for the purposes of food, health care, or banking services; Socialized, Not Work additionally excludes social interaction for paid employment purposes. Risk Tolerant is increasing in risk tolerance, Altruism is increasing in altruism, and High Risk is an indicator for whether the subject, or anyone they are living with, has a factor that increases the risk of a severe illness from a COVID-19 infection. This tables excludes additional covariates to confirm robustness to Table I. Robust standard errors are in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A3: Robustness to Restricting Sample

Dependent Variable:	Left Home			Socialized			Socialized, Not Work		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Risk Tolerant	0.0466***			0.0173**			0.00573		
	(0.00706)			(0.00801)			(0.00797)		
Altruism		0.0167			0.0187			0.0155	
		(0.0250)			(0.0247)			(0.0234)	
High Risk			0.0222			0.0244			0.0702
			(0.0445)			(0.0448)			(0.0458)
Observations	367	362	367	367	362	367	367	333	367
Controls	No	No	No	No	No	No	No	No	No

Notes: Observations are individuals that completed any survey. Subject means across all surveys are used for independent and dependent variables. Using a 24 hour recall period, Left Home is an indicator that the subject left home, Socialized is an indicator that the subject socially interacted within six feet of people not living with them and not for the purposes of food, health care, or banking services; Socialized, Not Work additionally excludes social interaction for paid employment purposes. Risk Tolerant is increasing in risk tolerance, Altruism is increasing in altruism, and High Risk is an indicator for whether the subject, or anyone they are living with, has a factor that increases the risk of a severe illness from a COVID-19 infection. This tables excludes additional covariates and does not restrict the sample to subjects who completed both surveys to confirm robustness to Table I. Robust standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A4: Robustness to Time-Invariant Assumption: Left Home

Dependent Variable:	Left Home		
	(1)	(2)	(3)
Risk Tolerant	0.0579***		
	(0.00815)		
Altruism		-0.00388	
		(0.0318)	
High Risk			0.00634
			(0.0553)
Observations	333	333	333
Other Controls	No	No	No

Notes: Observations are individuals that completed both surveys. Subject means across all surveys that collect information on Risk Tolerance, Altruism, and High Risk are used, respectively; that is, no assumption is made that independent variables are time-invariant, and dependent variables are calculated using only surveys in which the independent variable is collected. Using a 24 hour recall period, Left Home is an indicator that the subject left home. Risk Tolerant is increasing in risk tolerance, Altruism is increasing in altruism, and High Risk is an indicator for whether the subject, or anyone they are living with, has a factor that increases the risk of a severe illness from a COVID-19 infection. This tables excludes additional covariates and does not assume independent variables are time-invariant to confirm robustness to Table I. Robust standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A5: Robustness to Time-Invariant Assumption: Socialized

Dependent Variable:	Socialized		
	(1)	(2)	(3)
Risk Tolerant	0.0133		
	(0.00887)		
Altruism		0.0376	
		(0.0310)	
High Risk			0.0712
			(0.0521)
Observations	333	333	333
Other Controls	No	No	No

Notes: Observations are individuals that completed both surveys. Subject means across all surveys that collect information on Risk Tolerant, Altruism, and High Risk are used, respectively; that is, no assumption is made that independent variables are time-invariant, and dependent variables are calculated using only surveys in which the independent variable is collected. Using a 24 hour recall period, Socialized is an indicator that the subject socially interacted within six feet of people not living with them and not for the purposes of food, health care, or banking services. Risk Tolerant is increasing in risk tolerance, Altruism is increasing in altruism, and High Risk is an indicator for whether the subject, or anyone they are living with, has a factor that increases the risk of a severe illness from a COVID-19 infection. This tables excludes additional covariates and does not assume independent variables are time-invariant to confirm robustness to Table I. Robust standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A6: Robustness to Time-Invariant Assumption: Socialized, Not Work

Dependent Variable:	Socialized, Not Work		
	(1)	(2)	(3)
Risk Tolerant	0.00664		
	(0.00810)		
Altruism		N/A	
High Risk			0.0604
			(0.0481)
Observations	333	0	333
Other Controls	No	No	No

Notes: Observations are individuals that completed both surveys. Subject means across all surveys that collect information on Risk Tolerant, Altruism, and High Risk are used, respectively; that is, no assumption is made that independent variables are time-invariant, and dependent variables are calculated using only surveys in which the independent variable is collected. Using a 24 hour recall period, Socialized Not Work is an indicator that the subject socially interacted within six feet of people not living with them and not for the purposes of food, health care, banking services, or paid employment. Risk Tolerant is increasing in risk tolerance, Altruism is increasing in altruism, and High Risk is an indicator for whether the subject, or anyone they are living with, has a factor that increases the risk of a severe illness from a COVID-19 infection. This tables excludes additional covariates and does not assume independent variables are time-invariant to confirm robustness to Table I. Robust standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$