The usual suspects: Do risk tolerance, altruism, and health predict the response to COVID-19?

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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 primary preferences and characteristics 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 those with preexisting health conditions may not voluntarily comply, resulting in higher health care congestion than otherwise expected.

Keywords: COVID-19, risk, altruism, health

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

1 Introduction

In response to the COVID-19 pandemic, Americans are being encouraged – and in many states ordered – to socially distance and stay at home.[1,2] Yet, there are concerns that many people are failing to comply and there is growing pressure to relax requirements, both of which have important efficiency implications for these policies.[3] 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 protect individuals from harm and reduce the transmission to others, this paper examines whether primary preferences and characteristics that align with these objectives are predictive of compliance. Specifically, whether preexisting health factors, risk aversion, 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 at greater risk of severe consequences from an infection, or more risk averse, will be more likely to comply. Likewise, those who are more altruistic should also have higher compliance because this reduces the likelihood of infecting others.

Following a registered pre-analysis plan[4] 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 preexisting health factors, risk aversion, nor altruism predicted compliance with social distancing. This is despite the fact that both existing health conditions and risk aversion have been shown to increase preventative health behaviors, and altruism has been shown to affect similar decisions in the context of communicable diseases (Anderson and Mellor, 2008; Schmitz and Wubker, 2010; Hurley and Mentzakis, 2013).

[1] 42 states have statewide orders 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, except for essential activities such as food, health care, and employment.

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

[4] AEARCTR-0005612

Current stay-at-home orders are minimally enforced, and are increasingly being lifted, such that individuals mostly self-select into compliance. 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 benefits and costs, then self-enforcement will reduce welfare (Allcott et al., 2020; Barrios and Hochberg, 2020). Our findings support the latter, as variation in compliance does not reflect differences in underlying preferences or primary conditions that affect illness severity.

Our findings also inform research on the optimal public policy response to the pandemic, which has generally assumed that compliance with social distancing should increase with the severity of the health risk faced by an individual (Rampini, 2020; Chudik and Rebucci, 2020; Glover and Rios-Rull, 2020). Our results highlight that this may not be true for policies that rely on self-selection into preventative behaviors.[5] Since hospitalization rates are higher among these vulnerable individuals, a consequence is that minimal enforcement may result in greater health care congestion than is assumed in current policy analyses.

Beyond academic research, public commentary on the pandemic has made similar assumptions. Contrary to our findings, many assume that preferences and health risks drive the response to stay-at-home orders. Those who violate social distancing guidelines are accused of being less altruistic (i.e., selfish) (BBC, 2020). Likewise, those who argue against the orders claim that risk aversion (i.e., cowardice) is resulting in an overreaction to the pandemic, and that those with greater health risks will naturally continue to socially distance even if restrictions were relaxed (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.

Our findings also suggest that highlighting personal risk and reduced transmission to others may be ineffective at improving compliance, at least at this stage of the pandemic. And that as social distancing requirements continue, compliance is unlikely to alter the

[5]This is similar to lack of selective recruitment found in seat-belt adoption among youth (Cohen and Einav, 2003).

composition of the voting electorate to be more risk-loving, less altruistic, or healthier.

These findings contribute to the literature identifying how demographics and risk perceptions affect the response to health policy 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 that people are poor at assessing their actual risk. Indeed, risk perception of COVID-19 and social distancing is affected by partisan leanings (Barrios and Hochberg, 2020; Allcott et al., 2020). Chiou and Tucker (2020) do find that Internet access predicts staying at home. Our findings are generally consistent with this nascent literature, which cautions that the decision to socially distance may not reflect one's true marginal benefit from doing so.

We also contribute to the broader literature explaining individual health care decisions. Our focus on risk tolerance, altruism, and health conditions is guided by a literature that explores these factors in the adoption of preventative health behaviors (Anderson and Mellor, 2008; Hurley and Mentzakis, 2013; Schmitz and Wubker, 2010), and the much larger literature that explores risk and altruism preferences in decision making (e.g., Kolm and Ythier (2006)). We also contribute to the literature exploring 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 administer two survey instruments to 338 undergraduate economics students at a large California university between March 26th and April 7th, 2020, six days after California's stay-at-home order went into effect. Both surveys asked about compliance with the order in the previous 24 hours: 1) whether subjects left their home (*Left Home*), and 2) whether subjects were within six feet of another person, excluding people living in their home, for purposes 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 occurred outside the context of paid employment (*Socialized, Not Work*). We observe two to six responses per subject, as a subset of subjects were recruited to complete the surveys more than once.

We also elicit risk and altruism preferences using standard 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), respectively (Dohmen et al., 2011; Falk et al., 2018, 2016).[6] Subjects were also asked whether they, or those they were living with, have conditions that the Centers for Disease Control report are associated with increased severity of COVID-19 (i.e., *High Risk*) (CDC, 2020). The Appendix provides detail on the construction and validation of these measures, additional control variables, and sample summary statistics.

The second survey instrument was implemented a few days after the first survey instrument. We therefore assume that these characteristics, asked in only one survey instrument, are time-invariant for our primary analysis.[7] Subjects were informed that their responses would be anonymous. Subjects in multiple recruited courses were invited to complete a survey more than once. We therefore calculate subject means across all surveys in our primary analysis.

3 Results

Though many subjects are in compliance with California's stay-at-home order, we find a large minority are not. Strikingly, nine days after the order was issued and while over 1,000 *new* cases were being reported daily in California, 25 percent of subjects violated the stay-at-home order and socially interacted with others for non-essential, non-work purposes. Even more continued to leave their homes and socially interact, violating recommendations that

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

[7]Our results are robust to relaxing this assumption.

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
	(0.00730)	(0.00777)	(0.00814)	(0.00846)	(0.00805)	(0.00855)
Altruism	0.00787	0.0279	0.0197	0.0155	0.0147	0.00490
	(0.0236)	(0.0245)	(0.0245)	(0.0245)	(0.0236)	(0.0242)
High Risk	0.0371	0.0391	0.0453	0.0306	0.0607	0.0550
	(0.0437)	(0.0447)	(0.0463)	(0.0465)	(0.0482)	(0.0480)
Observations	333	333	333	333	333	333
Controls	No	Yes	No	Yes	No	Yes
Mean Dep. Var	.51	.51	.35	.35	.23	.23

Notes: Observations are individuals that completed both survey instruments 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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

accompany the order. Over the previous 24 hours, we find the rate of leaving home was 51 percent, and the rate of socially interacting (for purposes other than food, health care, and banking services) was 35 percent. 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 instrument, which occurs further into the stay-at-home order, we continued to find significant non-compliance: 52 percent left home and 33 percent were in social proximity to others, only eight percentage points of which was due to paid employment.

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

We find that those with higher risk tolerance are both more likely to leave their home and to interact socially. But surprisingly, when focusing on social interactions unrelated to essential services or paid employment, risk tolerance is not associated with non-compliance. This suggests that risk preferences affect the decision to engage in 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 they are no more responsive to the positive externalities associated with the recommendations. The point estimates are positive and close to zero, and robust to using either underlying measure of altruism. This lack of responsiveness to primary preferences regarding uncertainty (i.e., risk preference) and consideration for others (i.e., altruism) persists even when controlling for potential correlates of preferences that also reduce the risk of COVID-19 severity (i.e., gender, age, and health status).

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

One explanation is that factors correlated with pre-existing health have opposing effects on the decision to socially distance. For example, these individuals may be employed in sectors requiring social contact, or more reliant on extended social networks. While this is an explanation for *why* 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 social distancing may be misguided.

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

4 Discussion and Conclusion

We find that primary preferences and health 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 produce the expected efficiency gains from greater selective compliance by those who experience greater benefits, including by those most at risk for severe illness from COVID-19. The results also suggest that inferences of other people's preferences based on whether they socially distance may be mistaken.

One explanation is that uncertainty about the consequence of the pandemic makes it difficult for individuals to accurately assess their best response. However, recent polling suggests that information about prevention, transmission, and risk of coronavirus is well understood (Hamel et al., 2020), suggesting that lack of information about COVID-19 by itself is not a barrier. However, how best to respond to the threat may still be unclear. Learning over time may result in people becoming increasingly responsive to COVID-19 based on their own underlying preferences and risk factors, as expected. But at least in the initial stages of a pandemic, our findings caution against policies that rely on the assumption that individuals will respond based on their true marginal benefit from doing so.

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