DISCUSSION PAPER SERIES

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ABSTRACT

Framing the Predicted Impacts of COVID-19 Prophylactic Measures in Terms of Lives Saved Rather Than Deaths Is More Effective for Older People

This paper contributes to the literature on public health communication by studying how the framing of a message relaying the forecast impact of COVID-19 prevention measures affects compliance behaviour amongst both the young and old. A representative sample of survey respondents in the UK and US, along with selected respondents in Italy, were presented with forecasts for the number of deaths from COVID-19 in their countries with and without public adherence to various preventive behaviours. We experimentally varied whether this information was presented in terms of likely deaths or lives saved. The lives saved frame increases reported protective behaviours, but only amongst older respondents. We present evidence consistent with the hypothesis that framing is likelier to affect decisions whose consequences are felt by oneself (i.e. protective behaviours by the elderly) rather than solely others (i.e. protective behaviours amongst the young).

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1. Introduction

Over the course of the 2020 COVID-19 pandemic, much attention has been paid to governments' communication strategies and recommendations to their citizens about behaviours which might prevent the spread of the disease. Effective communication about what measures are effective, and the severity of the public health crisis is essential for the collective action problem of containing the virus's spread. Behavioural decision research can therefore inform policy responses using generalised knowledge about how people respond to messaging in order to save lives in a way that is essentially cost-free.

A significant focus of behavioural research on communication is whether different scenarios should be described in terms of gains or losses relative to a baseline scenario or "reference point". Although decision makers who are purely consequentialist should ignore reference points, a robust body of evidence has accumulated showing that people do consider reference points when making decisions, and that the human brain is adapted to reference-dependent thinking.

In order to investigate the possibility for using gain/loss framed messages to induce differential protective behaviours around global pandemics such as COVID-19, we conducted a survey presenting respondents with projections of hypothetical outcomes where consequences of mass adherence to social distancing measures was presented in terms of either lives lost or deaths averted. The presentation was randomised between subjects.

We find that older respondents are more likely to report intentions to adhere to safety measures when the projection associated with adherence is presented in terms of lives saved. Younger respondents on the other hand, display equal intentions of adhering to social distancing regardless of how the scenarios are presented.

In line with the widespread perception that COVID-19 is a greater threat to older people, we find support for the hypothesis that gain/loss framing is more powerful when consequences are felt by oneself rather than other people. Corroborating evidence from the literature is in line with this hypothesis, and furthermore, we document differential adherence patterns by how socially-oriented respondents are (i.e. whether they are willing to cooperate for others' benefit).

The rest of the paper is laid out as follows. Section 2 surveys the literature on communication framing with a particular focus on public health messaging. Section 3 describes our experiment. Section 4 presents summary statistics about the sample we collected. Results are shown in Section 5. Possible explanations for our observed findings are explored in Section 6, and a concluding discussion is provided in Section 7.

2. Related literature

The language of framing as well as the interpretation of it in the wider context of people's life that impacts decision making regarding health and risks (Jones 2016). In linguistics and communication studies, frames are understood as mental structures that shape peoples' perceptions of the world, goals, actions and what counts as good or bad outcomes (Lakoff, 2004). As cognitive structures, frames cannot be consciously accessed, yet they become manifest in the language that it used to produce them. When we hear a word, a frame associated with it springs to mind (Lakoff gives the example of 'Don't think of an elephant', which is impossible once the word 'elephant' is uttered).

The kind of language used to convey health and risk messages is fundamental in shaping people's perception of the message and their attitude towards it. Metaphors in particular have been found to have an impact on reasoning and social action. For example, in an experimental study, Thibodeau and Boroditsky (2011) presented the participants with two different scenarios of crime and asked them to propose solutions to crime prevention; each scenario was framed with different metaphors. The first presented crime as a wild beast an the second as a virus. The two different metaphorical representations induced consistently two different responses; participants who were presented with the mapping 'crime is a beast' proposed solutions similar to the way one would use to fend off an attack of a wild animal, whereas participants who were shown the scenario based on the metaphorical frame 'crime is a viral infection', proposed measures based on the investigation of root causes of the problem. The authors concluded that although not consciously recognised, metaphors tend to prime peoples' reasoning and responses. But not all metaphorical mappings are equally powerful. In follow-up studies, Thibodeau et al. (2017) have shown that the more abstract the target domain the stronger the effects of metaphors are. Also, metaphors that refer to shared embodied or cultural experiences are more powerful that those known to a smaller group of people. Not only the use of linguistic framing devices such metaphors influences the way how health or other messages are interpreted and reacted to. The pragmatic intent of the message is also key. Whether a message is framed as a request, threat or appeal impacts the way people respond. The now vast body of research on public health campaigns have shown that evoking fear or threats are always effective to change people's behaviour regarding their health habits; While fear appears have some effects especially if they present a significant and relevant threat and outline effective responses that appear easy to accomplish (White and Allen, 2000), more often than not, fears and warnings can trigger people's defensive mechanisms such as avoidance or denial (Ruiter et al. 2001). They often lead to counterarguing, that is, when confronted with a threat that is perceived as an encroachment on personal freedom, people come up with counterarguments to resist the persuasion. This can be counterproductive when it comes to preventative health messages; good examples are no-smoking and HIV/AIDS preventative campaigns. The notion of counterargument is consistent with Petty and Cacioppo 1979), who argued that people do not like being told what to do and, in reaction, they resist. It also consonant with the Persuasion Knowledge Model proposed by Friestad and Wright (1994), which explains that the more people recognise that the purpose of a message is to persuade them to do something, the less likely they are to be persuaded by it.

How people respond to public health messages is influenced by the way in which they interpret the messages in the wider context of their life, specifically how the message positions them and what kind of social identities it ascribes to them. Changing habit's or reducing risky behaviours is not simply a matter of giving people more knowledge information in the hope that they, as autonomous and 'rational' decision makers', will take it on board and follow. Unfortunately, as most of the public health campaigns have shown this is not the case, and more knowledge does not necessarily translate into 'better' decisions. This is because decisions are not taken just on the basis of the information provided but involve complex social relationships in social contexts (Jones 2013). The rationality of the health provider/promoter may not simply be compatible with the 'situated rationality' of actual social actors (Bloor, 1995; Parsons and Atkinson, 1992). Whether people follow or do not follow certain messages has to do with how people discursively manage the message, 'what they are doing' with it and 'who they are being' at this point of time (Burke). When people account for their actions in retrospect, they are always faced with the task of framing those actions and positioning themselves in relation to them in ways that rhetorically assign responsibility to one or more aspects of the situation, whether it be their own intentions, the actions of the people with whom they were acting, or the environment or circumstances in which the actions took place. For example, Jones et al. (2000) have shown that non-

compliance with taking medicine in the case of HIV patients had to do with the fact that these medicines (and quite a lot of them) had to be taken at meal times which were often social occasions with friends and family and patients had to find ways to conceal the fact that they were taking antiviral drugs and often delayed or skipped the dose.

Gain/loss framing

It has long been known to social scientists that framing decisions in terms of gains or losses relative to some baseline can have a noticeable impact on many important decisions. The domain of personal health is no exception, and in this age of global pandemics those choices can have significant external consequences. In one of their seminal papers on the framing of decisions, Tversky and Kahneman (1981) introduced the "Asian Disease Problem":

> Imagine that the U.S. is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimate of the consequences of the programs are as follows: If Program A is adopted, 200 people will be saved. If Program B is adopted, there is 1/3 probability that 600 people will be saved, and 2/3 probability that no people will be saved. [gain frame] If Program C is adopted 400 people will die. If Program D is adopted there is 1/3 probability that nobody will die, and 2/3 probability that 600 people will die. [loss frame]

in which a majority of respondents choose to be risk averse when saving lives but choose to take risks in avoiding deaths.

This finding has been interpreted by Tversky and Kahneman, as well as other scholars, in light of their Prospect Theory (Kahneman and Tversky, 1979) for decision making under uncertainty. Prospect theory has a number of key features. Firstly, its value function for outcomes supposes that people a) have diminishing marginal utility for gains from a reference outcome but increasing marginal utility for avoiding losses relative to the reference and b) dislike losses much more than they like comparable gains. The other key feature of Prospect Theory is its probability weighting function, which increases the importance of small probabilities in decision making while diminishing the importance of near-certain outcomes.

It is therefore not quite straightforward in theory to predict what effect loss vs. gain framing will have on decision making. One way to summarise Prospect Theory's predictions is with the Fourfold Pattern of Risk Preferences: People are Risk averse over large expected gains and small expected losses but risk seeking over large expected losses and small expected gains (Markowitz, 1952; Scholten and Read, 2014).

Things get even more complicated in the domain of social decision making. Most of the protective behaviours against the coronavirus have positive externalities as they protect both oneself and others. A number of findings in the experimental economics literature point to conflicting impacts that social correlation of risks has on gain/loss framing. When decisions are taken on behalf of a third party people have been found to become both less risk averse (Chakravarty et al., 2011; Polman and Wu, 2020; though Reynolds et al., 2009 find large stakes seem to make them more risk-seeking) and less loss averse (Andersson et al., 2014; Mengarelli et al., 2014) though more prone to nonlinear probability weighting (Vieider et al., 2016). Füllbrunn and Luhan (2017) temper this picture in finding that decisions made for oneself differ significantly from those made only for others, but not from those in which the consequences to self and others are shared. Barrafrem and Hausfeld (2020) suggest that less deliberative effort is made for decisions which only impact others, and that this may explain

differences in risk-taking. Batteux et al. (2019) find that decisions made for others in the medical domain tend to be more risk-averse than for the self, which in turn are known to be more risk-averse than financial decisions made for the self (Galizzi et al. 2016; Nebout, et al., 2018).

Few studies have interacted both gain/loss framing and a social (own vs. other) dimension but two studies in this literature are contradictory. Pahlke et al. (2015) find that when people make decisions for others the Fourfold Pattern of Risk Preferences is intensified whereas Sun et al. (2020) find that it is lessened. Zhang et al. (2017) do not explore the effect of probability weighting but find that decisions made on behalf of others are on average less risk averse in the gain domain and less risk seeking in the loss domain than they are for oneself. Zhang et al. (2019) replicate those differences in the loss domain only and explore their neural correlates. It should be noted that subjects in Pahlke et al.'s study bore the consequences of the decisions they made for others whereas those in Sun et al.'s study did not face the consequences of the decisions they made for others.

Coronavirus is likelier to affect older people. Therefore the decisions taken by older people are likely to affect their own health to a greater extent than for young people. Pornpattananangkul et al., (2018) find that older people make less of a distinction between themselves and others when taking financial risks – i.e. the consequences of risk happening to other people is more likely to change the behaviour of the young.

Our study is also related to the field of risk communication. Armstrong et al. (2002) present subjects (mean age 43) with either death or survival rates for a disease and find interest in preventative surgery is higher among those presented with survival rates. Nan (2012) studies gain vs. loss framing on the decision to get the HPV vaccine in young adults. Those participants with a present-focused mindset were more responsive to the loss framing while those with a future-oriented personality were not influenced by the framing of information. O'Keefe and Nan (2012) in a metanalysis of the effect of gain-loss framing on vaccination intentions find no robust differences for own behaviour but that parents are likelier to vaccinate their children when given loss-framed information. Penţa and Băban (2018) also find inconsistent effects though Yu and Shen (2013) specifically examine the interaction of gain/loss framing with own/other consequences and find that gains motivate individual behaviour whereas losses motivate behaviour on behalf of others. The review of Rothman et al. (2006) states that "Gain-framed appeals are more effective when targeting behaviours that prevent the onset of disease, whereas loss-framed appeals are more effective when targeting behaviours that detect the presence of a disease".

In a different field Marti et al. (2018) find homeowners are more willing to take preventive measures when risk is perceived as high and prevention's effects are framed as gains. In the domain of bear attack prevention, Lu et al. (2018) show that messages framed in the loss domain are more effective when combined when highlighting dangers to one's family, whereas gain framing appears more effective when emphasising the harms suffered by the bears themselves.

COVID-19 and framing

Initial evidence from the COVID-19 pandemic and public health responses to it have yielded a number of reasons to believe that gain/ loss framing would impact the prophylactic measures that citizens' take to protect themselves and others from the infection. Framing could affect respondent's views about the effectiveness of their actions. Akesson, et al. (2020) document lower willingness to comply with protective measures among survey respondents presented with higher death estimates, which they term the "fatalism effect". Citizens' willingness to comply with mandates to engage in protective behaviours may also depend on their confidence in the government and fellow citizens

(Fetzer, et al. 2020). The UK, US, and Italy featured widespread perceptions that their governments were not doing enough to prevent the spread of the virus. Framing may affect expectations about the number of other people complying, which could thereby influence behaviour where people are reciprocal (Jehiel, 2005; Dufwenberg, et al., 2011). Müller and Rau (2020) find compliance with COVID-19 distancing policies to be correlated with social, risk and time preferences at the individual level while Alfaro, et al. (2020) show that regional social preference measures fit infection rates in SIR models. Communication of COVID-19 social distancing measures may also affect compliance by conveying information about the likely costs to individuals of distancing. Briscese, et al. (2020) find that compliance in a representative sample of Italian respondents is lower among those who expected the measures to last for less time. It must be emphasised that people's ability to engage in protective behaviours depends on many other factors, such as ability to work from home (Chiou and Tucker, 2020)

3. Study design

We conducted a study of life in lockdown aimed at understanding how daily routine has been modified, how the division of labour within the household has changed, and how personal wellbeing, family tension, beliefs and aspirations, risk attitudes, and the willingness to cooperate within and outside of the household have been during lockdown.[1] Among the questions we asked were respondents' compliance with 9 different protective behaviours: hand washing, mask wearing, refraining from shaking hands, keeping a safe distance from others, refraining from going to crowded places, shopping as seldom as possible, refraining from meeting with friends, refraining from meeting with relatives, and refraining from leaving home except in an emergency. This question was prefaced with projections[2] from epidemiologists working at Imperial College London about counterfactual COVID-19 death projections with full social distancing orders in place vs. the status quo ex ante. Projections were tailored to each country's population size:

> *Researchers at Imperial College London predict that upwards of [...] people in [...] [will die / can be saved] if [no] mitigation measures like social distancing and home quarantining are adhered to, relative to the case where [no] mitigation measures are taken. Which of these everyday behaviours will you adopt or have you already adopted to prevent contagion?*

Respondents received either the lives lost or saved framing of this question, and not the other, on a randomised basis in a between subjects design. All other questions on the survey were the same within each country. Our purpose was to analyse the number of prophylactic behaviours subjects intended to comply with in response to this information and its differential presentation.

4. Sample characteristics

We collected data from a total of 3,155 adults (18-83) in the USA, the UK and Italy over the period 11-19 April, when our respondents had been in lockdown for between 5-6 weeks in Italy, 2-3 in UK, and 1-4 in the USA depending on the respondent's state. These countries are the three OECD countries

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[1] Another study using this data, focusing on the patterns of family life and household labour, can be found at https://www.iza.org/publications/dp/13398

[2] See https://doi.org/10.25561/77482 for details.

worst affected by COVID-19 in both reported COVID-19 deaths per capita, excess mortality over the pandemic and, according to recent OECD projections in economic terms too.

The participants in the US (949) and UK (1,001) were recruited using an online survey collection tool which stratifies samples across age, sex, and ethnicity. The participants in Italy (1,205) were recruited primarily through social media and thus cannot be expected to constitute as representative a sample as those of the US and UK.

A total of 1,532 respondents received the lives lost frame (554 in Italy, 510 in the UK, and 468 in the US) whereas 1,623 respondents (651 in Italy, 491 in the UK, and 481 in the US) received the lives saved frame. The average age of all our respondents was 45, with 1,709 respondents this age or younger and 1,446 respondents older.

5. Results

Our outcome measure of interest is the sum of the number of protective behaviours (out of the 9 asked) observed by each survey respondent. Figure 1 breaks down this measure across the three studied countries in the gain and loss framings. In all groups a very high number of protective behaviours were observed, ranging from close to 8/9 in Italy to just under 7.5 in the US. Overall the gain framing elicited more reported protective behaviours than the loss frame (7.33 vs. 7.25, $p < .07$) according to a ranksum test. This pattern is however much stronger amongst the over-45 subsample

(7.35 vs. 7.18, p=.04) than amongst the 45 and unders (7.30 vs. 7.29, p=.52), though the result for over-45s is mostly driven by the UK.

We also observed a gender dimension to protective behaviours that is evidenced in Figure 2. Women report significantly more protective behaviours than men (7.47 vs. 6.97, p<.001), though there is no difference in response to gain/loss framing between genders.

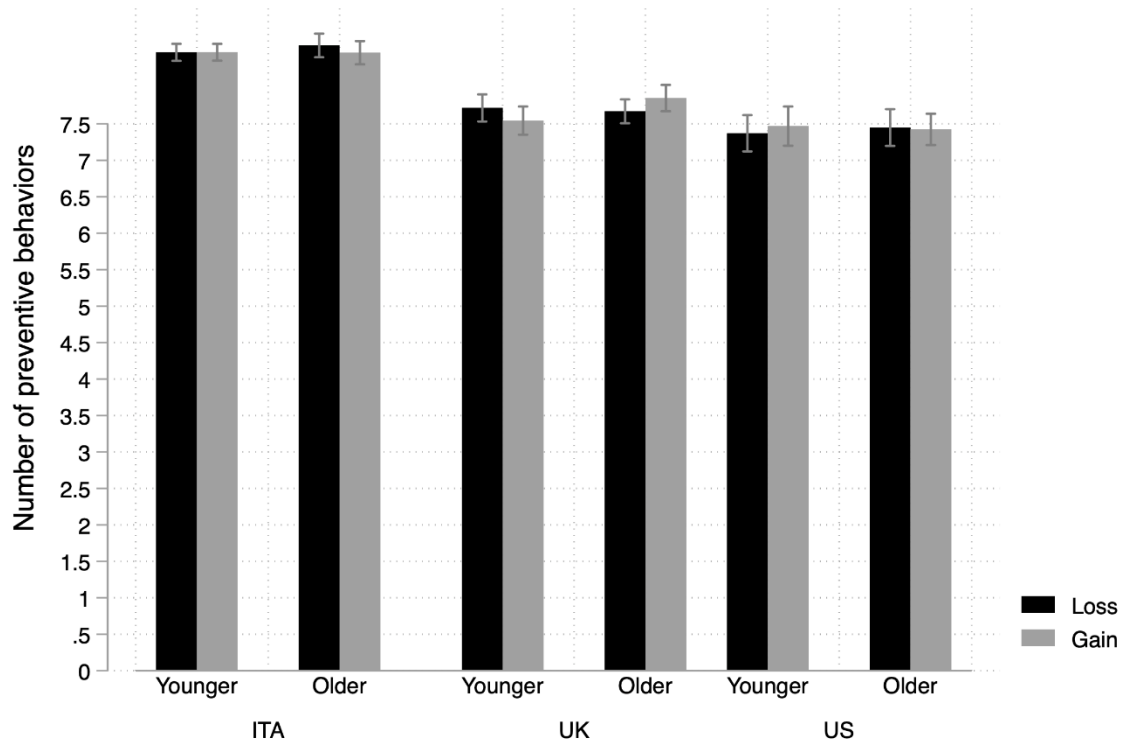Figure 1: Preventive behaviours by age across Italy, the UK and US

Table 1: Sum of preventive behaviours predicted by framing and demographic factors

	Coefficient (robust std. er.)
gain	.208 (.138)
young	.077 (.143)
female	.512*** (.130)
gain X young	-.181 (.200)
fem. X young	.021 (.178)
gain X fem.	-.063 (.177)
gain X fem. X young	.027 (.249)
constant	6.88 (.010)

Table 1 displays the results of a linear regression of protective behaviours on various sample demographic characteristics (young vs. old, male vs. female) as well as gain/loss framing in a full factorial specification. We see again that the gain framing has a slight edge, but only amongst the old and that women are more likely to report COVID-protective behaviours than men. There are also no

discernible differences between young and old men and women, nor between gender/age and response to framing.

Figure 2: Preventive behaviours by gender and age
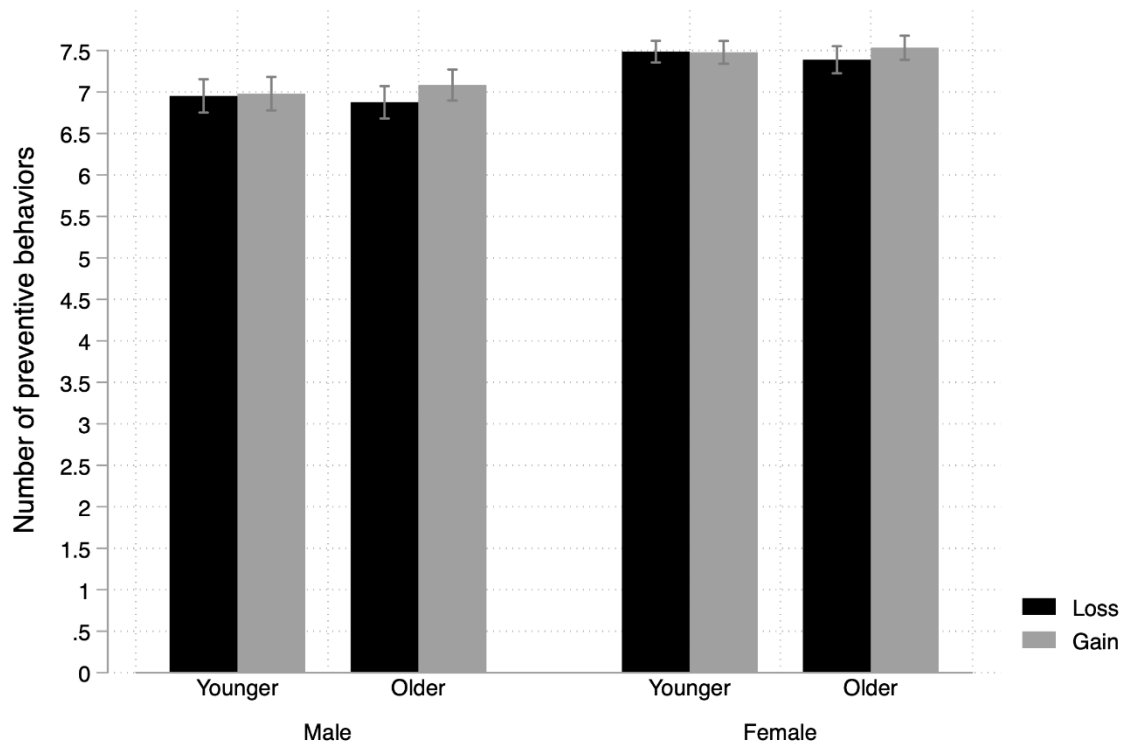
6. Potential explanations

We found in our literature review that reaction to gain/loss framing may be more pronounced when the consequences of the decision are more likely to affect oneself in addition to others. This does not appear to be a driving mechanism behind our results however. Though a slightly higher proportion of our over-45 subsample knew someone affected by COVID-19 or had been affected themselves (13.4%) than the younger subsample (12.9%, p=.69), those affected by COVID display almost identical behaviours under the gain (7.43) and loss (7.44) framings.

We also investigated the relationship between social preferences and protective behaviours. On our survey we presented people with a simple Prisoner's dilemma, where one person per country was picked to receive an Amazon voucher of differing amounts based on their responses. Respondents were given the opportunity to condition their responses in the Prisoner's dilemma on whether their partner – another survey respondent – was observing social distancing. We term as *reciprocal* those who agreed to cooperate with someone who was observing all protective behaviours while refraining from cooperation with those who did not observe one or more. On this basis 1,719 respondents could be categorised as reciprocal whereas 1,436 were not reciprocal.

Table 2

	Old coef. (std. err.)	Young coef. (std. err.)
gain	.102 (.147)	.032 (.128)
recip.	.323** (.132)	.250** (.115)

gain X recip.	.116 (.180)	-.041 (.164)
constant	7.01 (.106)	7.16 (.092)

Table 2 shows the results of linear regressions, amongst both the old and young, of protective behaviours on gain/loss frame and its interaction between the respondent's social preferences. For both young and old, reciprocators reported significantly more protective behaviours than non-reciprocators (.25 more amongst the young, .323 more amongst the old, both at p<.05). Amongst elderly reciprocators .218 more behaviours are reported in the gain frame than in the loss frame – this is significant at p<.04 but elderly non-reciprocators are not significantly more likely to respond to the gain frame (p=.49). Young people on the other hand do not respond to framing whether or not they are reciprocators. While these results indicate that social preferences do mediate somewhat the response to framing, they do not explain young-old differences in this response nor do they support the hypothesis that those 46 and older respond to the gain frame because they are likelier to be affected. It is rather more plausible that the gain frame increases confidence amongst the elderly that others will comply with social distancing measures.

7. Concluding discussion

The COVID-19 pandemic has brought issues of public health messaging to increased prominence. We have seen the need for governments to issue guidance to their citizens which must be followed on very large scales and which authorities have very little practical ability to enforce. As the crisis moves into its long tail the importance of measures like mask wearing and requests to isolate will carry on being important in preventing new flare ups. Public buy-in to these policies is therefore essential. We have highlighted how messaging may improve public compliance with these measures by framing the potential outcomes, and also how targeting different populations with tailored messages can increase effective communication. We hope that these results will help policymakers and media in the fight.

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