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Loss aversion fails to replicate in the coronavirus pandemic: Evidence from an online experiment

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ABSTRACT

Loss aversion is a foundational bias and is a natural choice for interventions encouraging compliance during COVID-19. We compare the effectiveness of loss and gain messages and find no difference in the intention to comply with guidance or lockdown beliefs.

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1. Introduction

First introduced in Tversky and Kahneman's (1979) paper on prospect theory, the concept of loss aversion is one of the oldest and most robust findings in behavioural science. Loss aversion refers to the fact that, when making judgements, prospective losses are felt more negatively than equivalent prospective gains, which are felt positively. Tversky and Kahneman (1979) found that individuals were more willing to take greater risks to avoid certain loss, but would avoid risk if the alternative was an equivalent certain gain. Small changes in the choice architecture such as the framing of loss have been shown to influence judgements in health (e.g. Farrell et al., 2001), finance (e.g. Haigh and List, 2005) and environmental sustainability (e.g. Segev et al., 2015). Framing the current COVID-19 pandemic in terms of the potential loss of life from taking (or failing to take) some actions may inadvertently lead to loss aversion, which could motivate the very behaviours policymakers want to prevent (van Bavel et al., 2020). This paper aims to explore the effect of gain and loss messaging on individuals' support for extended lockdowns and their intention to adhere to public health guidelines in this context. It

is hoped that in doing so a greater understanding of how such nudges[1] differ in times of public crisis can be determined.

Hameleers (2020) examined gain and loss framing on hypothetical COVID-19 policy preferences and emotional responses, finding that loss framed messages increase favour for a risk-seeking policy intervention, with a message framed as lives saved (gain) resulting in a more risk-averse approach.

Prior research on loss aversion in the health domain has focused on relatively certain outcomes (e.g. quitting smoking *will* improve health). However, the measures taken by the UK government (and others) in the current pandemic are arguably less certain with an ongoing debate as to whether lockdown has substantially improved outcomes. Indeed, Rothman and Salovey (1997) suggest that frames vary in effectiveness depending on the certainty of the outcome. They posit that loss-framed messages are more effective when advocating for behaviour associated with greater uncertainty (e.g. STI testing) compared to advocating for certain outcomes (e.g. condom use) which is more effective with a gain-frame message. It may therefore mean that the uncertainty of the lockdown's effectiveness results in people paying more attention to negative-frame messages as they seek to minimise uncertain losses.

To date, research on the effect of loss and gain messaging in a global health crisis was based on hypothetical interventions prior

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[1] Nudges are interventions which alter behaviour in a predictable direction without a significant change to the options available nor the economic incentives.

to the introduction of lockdowns (Hameleers, 2020). Therefore, in this study, we explore how loss and gain messages about the novel coronavirus influence the desire to remain in, or reduce, the current lockdown policies currently in place in the UK and elsewhere. Given the robust findings of loss aversion, it is expected that: a message framed as a gain (saving lives) will result in a preference for curtailment of current lockdown compared to a message which is loss framed (loss of life), and a message framed as a loss will result in greater intentions to adhere to health guidelines compared to a gain-framed message. We registered these hypotheses with the Centre for Open Science[2] prior to commencing data collection.

This research aims to test a hypothesis that many behavioural scientists, and the politicians they may advise, hold to be true: that they are able to 'nudge' behaviour, and in so doing improve outcomes, by their choice of a gain or loss frame. As will be seen, this need not be the case.

2. Methods

2.1. Sample

We recruited 500 participants from Prolific (on 18 and 19 May 2020). In the first wave, an open call for participants resident in the UK was issued, up to a total of 300 participants. When this wave was completed, we inspected only the demographics of the participants, and identified that our sample over-represented women and participants under the age of 35. Two separate additional calls were opened the same day, one seeking to recruit 150 men over the age of 35, and the other seeking to recruit 50 women over the age of 35, to increase representativeness.

The final sample contained 47.2% males with a mean age of 41, with a standard deviation of 12 years. The youngest participant was 18 years old; the oldest was 80.

2.2. Design

Participants were randomly allocated between two conditions: a gain-frame and a loss-frame. In both scenarios, participants were shown estimates of the number of lives that could be saved through extension of the lockdown, or conversely, lost from ending it too soon:[3]

Gain: As many as 100,000 people could be saved by a well-managed extension to the lockdown.

Loss: As many as 100,000 people could die without a well-managed extension to the lockdown.

They were then asked to make a series of judgements about when different elements of society should be opened up, and their intentions to comply with the government's guidelines.

2.3. Data

We collected participants' age and gender, as well as responses to a series of questions relating to the COVID-19 outbreak and how quickly the lockdown in the UK should be eased. Participants' views were solicited about the date (indicated on a calendar) on which the following should occur: opening schools; opening hairdressers; permitting large gatherings; relaxing social distancing rules; office workers going back to work; international travel restrictions being eased; and the end of the government's furlough scheme. These questions were aggregated for analysis into a single measure of average days to guidelines being relaxed.

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2 https://osf.io/pjbm8.

3 Figures based on estimates from epidemiologist Neil Ferguson (Lay, 2020).

Table 1
Main regression analysis.

	(1)	(2)	(3)
	Compliance	Average Wait	Overall
Treatment	−0.302	−2.685	0.0610
	[0.214]	[6.074]	[0.153]
Female	0.226	6.722	0.0710
	[0.216]	[6.140]	[0.155]
Age	0.00394	−0.0804	−0.00370
	[0.00841]	[0.239]	[0.00604]
Constant	5.109***	123.5***	3.950***
	[0.408]	[11.56]	[0.293]
N	495	478	497

Standard errors in brackets
*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

Table 2
Answers to "How long should (restrictions on) X continue, in days".

	Gain Frame	Loss Frame	Difference
Schools	77.51	87.53*	+10.002
Restaurants	76.05	71.29	−4.71
Hairdressers	68.95	67.38	−1.57
Furlough	127.43	119.87	−7.56
Large Gatherings	164.44	168.77	+4.33
Social Distancing	180.87	173.32	−7.55
Offices	125.93	121.52	−14.41
International Travel	154.72	162.90	+8.18

Figures in dates. * = $p < 0.05$.

Participants were asked also about how long (in weeks) they felt that pandemic response measures in general should continue, and a series of questions relating to their intention to comply with existing guidance. A full survey can be found in the appendices.

3. Results

We analyse our data using linear regressions, in which each of our outcomes is regressed on the loss-frame treatment, and on participants' gender and age. Our main results use aggregated scores from our compliance questions and average wait to relax restrictions questions; and the single-item measure of overall how long the lockdown should continue — see Table 1.

Differing from the established literature, we find no significant impacts of loss aversion on any of our three outcome measures. With two of these outcomes, compliance and average duration, participants seeing the loss frame are slightly (but not significantly) more in favour of faster easing, and less likely to comply.

Given the size of our sample, and the historically strong effects within this literature, we do not consider our analyses to be underpowered.

If we split aggregated questions (on compliance and waiting), into individual items, the pattern does not change. Participants seeing the loss-framed message significantly ($p = 0.036$) favoured opening schools later than participants who saw the gain-framed message, but this difference was comparatively modest — fewer than 10 calendar days on average, and given the number of tests conducted, could well be spurious.

Table 2 contains the average number of days until participants believe that a series of relaxation so the lockdown should be made, split by gain and loss groups.

4. Discussion

Loss aversion did not affect peoples' preferences about lockdown nor their intention to adhere to public health guidelines as prospect theory suggests. One explanation for this departure is that this may be a similar scenario to that in Hallsworth et al. (2017), which finds that in the case of tax liabilities, loss and gain frames are equally effective messages emphasising the public good.

However, the different context of the present study may also contribute. The predicted death rate for COVID-19 is ubiquitous in the media and it is therefore likely that participants were familiar with anticipated death toll expected both with and without lockdown measures.

Alternatively, the findings may depart from previous research including that of Hameleers (2020) as he examined loss aversion prior to, or very early on in the lockdown of the US and Netherlands, and so participants' knowledge about the pandemic, and their emotional state may have been very different. Similarly, in a UK context in which more than 34,796 people had died already (May 19, 2020), among the highest totals in the world, participants were effectively choosing between two very large losses, rather than a loss or a gain. This suggests that in some sense, participants are not updating their reference point immediately or completely with each additional death. This is consistent with Baucells et al. (2011), who find that reference points update more gradually, with the initial reference point (in this case, 0 deaths), and the most recent (34,796 deaths) weighing more heavily, so that any number of additional deaths is a very substantial increase above their reference point.

The present study also used an unusual (but we argue appropriate given the circumstances) measure of loss aversion, taking a continuous measure of the days until lockdown should be lifted. Typically, studies on loss aversion use unipolar or bipolar scales and McGraw et al. (2010) suggest that the measurement of loss aversion is sensitive to the scale used, with those that remove the opportunity for gain–loss comparison eliminating loss aversion (although this is disputed by Mukherjee et al., 2017).

Finally, the present study only referred to the anticipated greater loss to life as a result of not extending the lockdown and not the economic and social consequences which would be exacerbated by an extension. While the ultimate goal may be to 'save lives and protect the NHS', people must also consider their own economic situation and mental and social well-being, both of which may have been negatively impacted already (e.g. Adams-Prassl et al., 2020; Layard et al., 2020). Overall, the present study adds to the understanding of loss aversions in the context of a public health crisis and the boundaries within which gain and loss messaging may be effective.

Declaration of competing interest

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Appendix A. Views on lockdown: Questions asked to participants

Participants were asked to answer the below questions with the UK lockdown in mind, indicating their response on a calendar:

When do you think schools should re-open? Enter a date:

- When do you think schools should re-open? Enter a date:
- When do you think restaurants and cafes should re-open? Enter a date:
- When do you think hairdressers and beauty salons should re-open? Enter a date:
- How long do you think the government's furlough scheme, which pays 80% of staff's wages for those who cannot work due to COVID-19, should be continued for? Enter a date:
- When do you think large gatherings (e.g. football matches, theatres) should begin? Enter a date:
- How long do you think social distancing of 2 metres should continue until? Enter a date:
- When do you think that office workers currently working from home should return to the workplace by? Enter a date:
- When do you think the restrictions on international travel should be lifted? Enter a date:

Participants were also asked the below question about the lockdown:

- Overall, how long do you think the current social distancing and public health guidelines (i.e. not being allowed to leave the house for certain reasons, and shops and restaurants closed) will be in place for?

  o Up to another week
  o Between 1 and 3 weeks
  o Between 4 and 8 weeks
  o Between 9 and 12 weeks
  o More than 13 weeks but less than 6 months
  o More than 6 months
  o I do not know

Appendix B. Intention to adhere to public health guidelines: Questions asked to participants

Participants were asked to answer the below questions regarding their intention to adhere to the public health guidelines; all responses were on a 7-point scale from (1) 'Never' to (7) 'Always' with an additional option to select 'N/A or I do not know':

- Using the NHS for non-critical illnesses.
- Working from home unless essential to do otherwise.

- Following hygiene precautions like washing your hands for 20 s.
- Social distancing from others apart from those in your household.
- Volunteering from the NHS.
- Staying home as much as possible.
- Stockpiling food and other household goods.
- Travelling to see friends and family.
- Wash hands more frequently and for longer than normal.
- Inform others if I develop symptoms of COVID-19, no matter how mild.
- Spend time in public, sunbathing, sitting or picnicking.
- Disinfect frequently touched objects and surfaces.
- Meet with a person from another household.
- Go to a garden centre.
- Use outdoor sports facilities and courts.

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