Long Title:

**Studying the prominence effect amid the COVID-19 crisis:
implications for public health policy decision-making.**

Short title:

Studying the prominence effect amid the COVID-19 crisis

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Supporting Information:

S1 Dataset: The data that support the findings of this study are openly available at

https://osf.io/vh2r6/?view_only=42c180392c5c4e0c959141d214d844a0

Abstract

Background:

The novel COVID-19 has brought upon crucial policy- and decision-making situations, especially when making judgments between economic and health concerns. One particularly relevant decision-making phenomenon is the prominence effect, where decision-makers base their decisions on the most prominent attribute of the object at hand (e.g., health concerns) rather than weigh all the attributes together. This bias diminishes when the decision-making mode inhibits heuristic processes. In this study, we tested the prominence of health vs. economic concerns across two decision-making modes - choice (prone to heuristics) and matching (mitigates heuristics) - during the peak of the COVID-19 in the UK using Tversky et al.'s classic experimental paradigm. We added to the classic experimental design a priming condition.

Methods and Findings:

Four hundred twenty participants from the UK were recruited via a crowd-working platform. They were presented with two casualty-minimization programs, differing in lives saved and costs: program X would save 100 lives at the cost of 55-million-pound sterling, whereas program Y would save 30 lives at the cost of 12-million-pound sterling. Half of the participants were required to choose between the programs (choice condition). The other half were not given the cost of program X and were asked to determine what the cost should be to make it as equally attractive as the program Y. Participants in both groups were primed for either: a) economic concerns; b) health concerns; or c) control (no priming). Results showed that in the choice condition, unless primed for economic concerns, health concerns are more prominent (only under economic priming was there a significant preference for program Y,

$p < 0.001$). In the matching condition, on the other hand, the prominence of health concerns did not affect decision-makers, as they all “preferred” the cheaper option.

Conclusions:

These results add further support to the practical relevance of using the proper decision-making modes in times of consequential crises where multiple concerns, interests, and parties are involved.

Introduction

In just a few months since COVID-19 was first reported in China, the virus has spread globally, infecting millions, killing hundreds of thousands, and undermining economies [1]. Soon after, the World Health Organization announced a global emergency, and governments across the globe have taken numerous measures to fight the virus. Some of the most common measures include isolation, quarantine, and social distancing [2].

While these measures have clear advantages health-wise, their effect on economies has been disastrous [3]. An example is the total shut down of the multi-trillion-dollar traveling industry [4]. This tension between health and economic interests has led to numerous debates among political leaders worldwide (e.g., UK, US, or Brazil). These debates present an essential question, namely: how do decision-makers judge different alternatives (e.g., two different programs to fight the pandemic), when these alternatives vary across more than one criterion (e.g., their death toll vs. their financial impact)?

Research in behavioral decision-making has long shown that decision-makers diverge significantly from the rational “homo-economicus” of classic economics [5]. It was suggested that uncertainty is a breeding ground for irrational or biased judgments that are based on intuition, emotions, stereotypes, or heuristics [6]. Such patterns are prevalent even when decisions are crucial (e.g., health issues [7]) or made by professionals (e.g., courtroom judges [8]).

A relevant behavior is people’s tendency to overly focus on a single dominant attribute of objects they judge [9]. One particularly apt bias is the *prominence* effect - people’s tendency to focus on the most prominent attribute of judged objects instead of weighing all criteria [10]. Tversky et al. (1988) presented decision-makers a

problem where health and economic considerations were mixed, a paradigm aptly suitable for research into our current situation. Using two modes of decision (i.e., choice vs. matching), they were able to show that people tend to overly focus on the more salient attribute of casualties rather than costs. As detailed below, we used the same scenario with British subjects amid the COVID-19 crisis with the following changes: the virus instead of traffic accidents, a town in the UK instead of Israel, and pound sterling instead of dollars.

We hypothesized that unless decision mode (i.e., matching) or a priming manipulation [11] deliberately made participants pay more attention to the economic criterion, they would overly emphasize casualties over costs.

Method

Participants.

Participants from the United Kingdom (129 males and 291 females, all adults above 18 years of age) were recruited through a crowd-working platform and were paid to answer an online questionnaire.

Procedure.

Scenario. Tightly based on one of Tversky et al.'s (1987) scenarios, participants were presented with a scenario regarding the predicted number of COVID-19 related casualties (600) over the next year in a small town in the UK. They were then required to consider two programs (program X and program Y), described in terms of yearly costs to the economy (in millions of Pound Sterling) and the number of casualties. Participants were asked to imagine themselves as either: 1. Policymakers in the Ministry of Treasury; 2. Policymakers in the Ministry of Health; 3. Control group participants were not given a role.

Decision measure. Half of the participants were required to choose between the two programs (choice condition): program X would lower casualties to 500 at the cost of 55-million-pound sterling, and program Y would lower casualties to 570 at the cost of 12-million-pound sterling.

The other half received the same information except that program X's price was missing. They were required to determine a cost that would make it as equally attractive as program Y (matching condition). To do so, they were first asked whether 55-million-pound sterling was the right number, and were then asked to type their appropriate cost.

Results and discussion

Choice condition. A binomial test indicated that the proportion of participants in the treasury group who chose program Y (69.4%) over program X (30.6%) was significantly greater than 50% (chance value), $p = .001$ (2-sided; see figure 1). There was no significant difference in these proportions for participants in both the health (Y= 59.4%, X= 40.6%) and the control groups (Y= 52.9%, X= 47.1%). Two chi-square tests were performed to examine the relationship between role and program-choice proportions. Whereas the proportions of health and control groups did not differ significantly, treasury and control groups were significantly different: $\chi^2 (1, N = 142) = 4.11, p = .043$ (see figure 1).

At first glance, these results seem to diverge from Tversky et al.'s prominence effect. There, participants – who were not given any roles (i.e., treasury vs. health) - had significantly preferred program X (higher costs, fewer casualties), which implied the prominence of saving lives over costs. Although our results do not show a significant preference for program X in the control group, 50% of participants still chose it – despite its disproportionate cost to the lives-saved ratio. This finding, coinciding with

the beginning of the lockdown in the UK (which made the economic issues much more salient and relevant), lends support to the claim that health issues were still the most prominent. To claim that the financial matters were more salient (which might have been expected given the timing), we would see a significant preference for program Y. Nevertheless, only economic priming yielded this result. Coupled with the results of the matching condition below, a strong case could be made for the prominence of health issues over economic issues in the choice condition.

Figure 1: Program Choice Percentage

Note. Figure depicting the percentage of participants who chose each program within each role. * $p < .001$, † $p < .05$

Matching condition. A binomial test indicated that the proportions of participants in the treasury (95%), health (97%), and control (98%) groups who thought that 55-million-pound sterling was too high a price were significantly greater than 50% (chance value), $p < .001$ (2-sided).

Triangulating lives saved (in comparison to the 600 that would die without any program in place) with the cost of program Y, resulted in the appropriate cost of program X being 40-million-pound sterling. Thus, three single sample t-tests were performed with 40 million pounds as the criterion. The analysis show that this was indeed the case in the treasury ($M = 15.87$, $SD = 9.44$), health ($M = 16.43$, $SD = 7.65$), and control ($M = 16.19$, $SD = 9.73$) groups: $t(65) = -20.74$, $p < 0.001$; $t(67) = -25.38$, $p < 0.001$; and $t(60) = -19.10$, $p < 0.001$ respectively. The same analysis using 20 as a stricter criterion yielded similar results in the treasury ($t(65) = -3.54$, $p = 0.001$), health ($t(67) = -3.84$, $p < 0.001$), and control ($t(60) = -3.05$, $p = 0.003$) groups.

In other words, when asked to do matching instead of choosing, participants overwhelmingly preferred the more economical program. Indeed, they thought 55-million-pound sterling was too high of a matching price. Additionally, their proposed matching price, regardless of role priming, significantly lower than 40 and even 20. Comparing these results to the *choice* condition patterns suggests that *lives saved* (and not costs) were the more prominent attribute for participants who chose program X (approximately 50%).

Indeed, only when priming for economic concerns did we see a difference in choice favoring the more economical program, indicating the prominence effect.

Taken together, our results support Tversky et al.'s (1987) prominence effect study and lend further support to the claim that to optimize these all-too-familiar types of

decision-making situations, decision-makers should *match* the options instead of choosing between them.

Conclusion

Given the highly consequential decisions policymakers must make in times of crisis, it is crucial to understand which decision-making paradigms might lead to better, less biased decisions. The prominence of health over economic issues may lead to irrational differences between choosing versus matching. Thus, changing the decision-making paradigm from simply choosing alternatives to a matching paradigm can aid policymakers to better weigh all attributes.

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