



ScienceDirect

Contents lists available at sciencedirect.com
Journal homepage: www.elsevier.com/locate/jval

Methodology

For Me or for My Relatives? Approximating Self-Protection and Local Altruistic Motivations Underlying Preferences for Public Health Policies Using Risk Perception Metrics



Aemiro Melkamu Daniel, PhD, Niek Mouter, PhD, Caspar G. Chorus, PhD

ABSTRACT

Objectives: Research efforts evaluating the role of altruistic motivations behind health policy support are usually based on direct preference elicitation procedures, which may be biased. We propose an indirect measurement approach to approximate self-protection-related and altruistic motivations underlying preferences for public health policies.

Methods: Our new approach relies on associations between on the one hand decision makers' perceived health risk for themselves and for close relatives and on the other hand their observed preferences for health policies that reduce such risks. The approach allows to make a rough distinction between health-related self-protection and local altruistic motives behind preferences for health policies. We illustrate our approach using data obtained from a discrete choice experiment in the context of policies to relax coronavirus-related lockdown measures in The Netherlands.

Results: Our results show that the approach is able to uncover that (1) people who think they have a high chance of experiencing health risks from a COVID-19 infection are more willing to accept a societal or personal sacrifice, (2) people with a higher health risk perception for their relatives have a higher willingness to accept sacrifices than people with a higher health risk perception for themselves, and (3) people who perceive that they have a high risk of dying of COVID-19 have a higher willingness to accept sacrifices than those anticipating less severe consequences of COVID-19.

Conclusions: Our method offers a useful proxy metric to distinguish health-related self-protection and local altruism as drivers of citizens' responses to healthcare policies.

Keywords: discrete choice, health policy, local altruism, risk perception, self-protection.

VALUE HEALTH. 2023; 26(1):99–103

Introduction

Many public health-related decisions that people make involve combinations of, and trade-offs between, individual self-protection and collective wellbeing, the wearing (or not) of face masks and the (un)willingness to receive a COVID-19 vaccine being 2 highly salient recent examples. Public health interventions routinely emphasize altruistic (moral) values to motivate people to make decisions that promote long-term collective interests. Studies show that alluding to altruistic values, for example, increases support for a healthcare financing plan that promotes welfare of others¹ and encourages people to accept vaccination against influenza.² Quite recently, local and national governments worldwide have started to use public messages that underline the need to protect others, to encourage people to adopt desired coronavirus safety behaviors. In particular, the use of public messages that highlight protecting close relatives or family members has been suggested to increase compliance with mandated coronavirus protective measures.³

The evidence suggesting the important role of altruistic motivations in encouraging actions that advance public health is commonly based on direct elicitation mechanisms such as asking people directly whether such motivations, such as self-protection or local altruism, played a role in their decision making and to what extent (eg, van den Broek-Altenburg and Atherly⁴). Despite advances in incentive-compatible preference elicitation procedures,⁵ direct approaches to measure the relative importance of altruistic compared with self-protection motivations may be problematic at least for the following reasons. First, to avoid judgment from others or obtain social approval, people tend to suppress their own self-interest and respond to questions about moral motivations in a way they consider to be morally correct⁶; alternatively, they may attempt to obfuscate their true moral intentions.⁷ Second, people may consider the sacrifice that is required to not behave selfishly to be negligible if asked directly,⁸ leading to an overstated weight for altruistic motivations in their decisions, mainly when the choice environment is hypothetical, which is often the case in public health studies. Finally, many of

the moral judgments and choices people make occur spontaneously,⁹ without a strong conscious awareness of the underlying decision processes.¹⁰ Therefore, the use of explicit questioning approaches to uncover morally sensitive behavioral phenomena such as a preference for self-protection or altruistic motivations is likely to produce inaccurate responses.

To avoid these pitfalls associated with the direct measurement of moral motivations behind people's (stated) responses to public health policies, we propose an indirect inquiry approach to measure the degree of health-related self-protection and local altruistic motivations (ie, desire to protect relatives). Our approach relies on the notion that an individual's perceived risk of being negatively affected by some negative health event, via a desire for self-protection, could increase their acceptance of health policies aimed at reducing such risks for society at large. Similarly, the extent of an individual's health-related local altruism can be approximated by associating their perceived risk of close relatives being negatively affected by the health hazard, with their support for related public health policies. In case the individual does not perceive themselves nor their relatives or friends to be at any health risk, then any support for the health policy would presumably be driven by a variety of other motivations including, but not limited to, global altruism (health benefits of society at large). At a sample level, this implies that strong statistical associations between health risk perceptions (personal and for close relatives) and preferences for public health policies that reduce such risks are indicative of a significant degree of health-related self-protection and local altruism motivations in the sample.

The contribution of this article lies in putting forward this indirect approach to approximate self-health and relatives' health protection-related motivations and in providing an empirical proof of concept related to measuring public support for health policies.

Section 2 presents methods (data and econometric analysis framework), section 3 presents results, and section 4 provides conclusions and discussion.

Methods

Data

To illustrate our approach, we use a discrete choice experiment (DCE) survey, which was administered to investigate Dutch

society's preferences for coronavirus-related policies. The details of the DCE and the results of the original study are published in¹¹ to which we direct interested readers. Briefly, the DCE asked participants to make a series of choices between alternative scenarios that represent the effects of policies to relax the coronavirus lockdown imposed on Dutch society on March 16, 2020, by the Dutch government. The data were gathered on April 22, the day after a press conference by Prime Minister Mark Rutte during which he announced that primary schools will be opened as of May 11 and in which he further emphasized that the other lockdown policies and regulations would remain in place until further notice. The relaxation of this lockdown measure was possible because the number of (intensive care unit) hospitalizations started to decrease because of the lockdown measures. The research team made some minor adaptations in the DCE after the press conference to ensure that the policy scenarios matched the real-life policy context. Policy scenarios vary along 7 policy impact dimensions. These include numerical impacts in terms of (1) increase in deaths and (2) increase in lasting physical injuries directly or indirectly related to the coronavirus, coronavirus-related and potentially lasting (3) increase in mental injuries and (4) increase in the number of children with educational disadvantages, coronavirus-related (5) increase in the number of households with net income loss of >15% for a period of >3 years, (6) one-off corona tax per household in 2023, and (7) health sector work pressure. Note that, of these dimensions, only the corona tax is sure to (hypothetically) affect the participants themselves, given that it would fall on all households. The other dimensions concern societal sacrifices, for which we do not know whether specific participants believed that they themselves would be affected by them (eg, educational disadvantages do not directly affect households with no school going children). This should be taken into account when interpreting results.

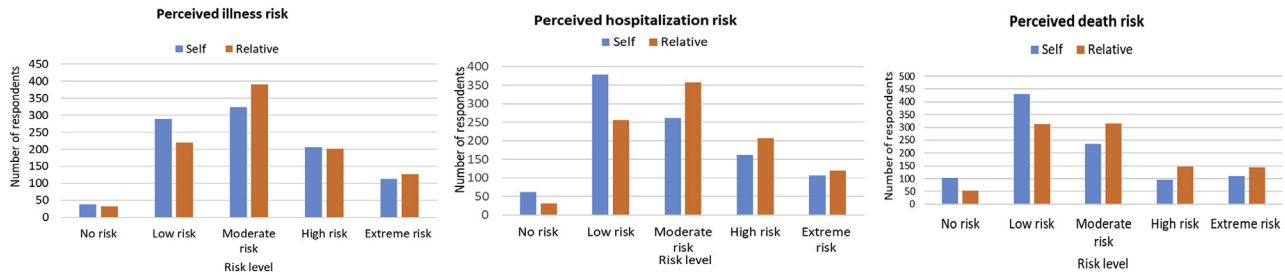
In addition, the survey contains basic sociodemographic information and—crucially for our study—statements in which respondents indicate their perceptions of becoming ill, hospitalized, or even dying because of the coronavirus. The same questions were asked for their relatives (a complete description of each policy impact dimension is provided in [Appendix A in Supplemental Materials](#) found at <https://dx.doi.org/10.1016/j.jval.2022.05.017>. For an example of the actual choice task, see [Appendix B in Supplemental Materials](#) found at <https://dx.doi.org/10.1016/j.jval.2022.05.017>).

Table 1. Sample and census comparison for gender, age, and educational attainment.

Person characteristics	Sample, %	Census, %	Test statistic
Male	49.4	49.5	Chi-square 0.004 df = 1
Female	50.6	50.5	
Age 18-25 years	11.4	14.7	Chi-square 4.2408 df = 5
Age 26-35 years	15.1	15.3	
Age 36-45 years	14.8	14.1	
Age 46-55 years	19.0	16.9	
Age 56-65 years	17.9	16.3	
Age 66-75 years	13.5	13.3	
Older than 75 years	8.3	9.4	
Education low	16.3	30.6	Chi-square 119.66 df = 2*
Education middle	37.9	37.4	
Education high	45.8	32.0	

*Significant at the 1% level.

Figure 1. Distribution of levels of perceived illness (left), hospitalization (center), and death (right) risks.



jval.2022.05.017. The risk perception questions asked to the respondents are also given in Appendix C in Supplemental Materials found at <https://dx.doi.org/10.1016/j.jval.2022.05.017>. Since the survey was administered in Dutch, Appendices A-C in Supplemental Materials found at <https://dx.doi.org/10.1016/j.jval.2022.05.017> are English translations). The data were collected in April 2020 from 1009 respondents who were sampled from the online Kantar Public panel and who were representative of the Dutch adult population in terms of age and gender, but unbalanced in terms of education (see Table 1). The analysis in this article is based on valid responses from 971 respondents.

Econometric Approach

Theoretical model

Our analytical approach is grounded in the random utility maximization model framework, which is based on the assumption that decision makers aim to maximize utility. Consider a decision maker n ($n = 1, \dots, N$) facing a choice among J policy alternatives in choice occasion t ($t = 1, \dots, T$). The utility that decision maker n derives from alternative j ($j = 1, \dots, J$) in situation t is denoted by U_{njt} , which is composed of an observable component, V_{njt} , and a component that is unobservable (to the researcher), ϵ_{njt} .

$$U_{njt} = V_{njt} + \epsilon_{njt}, \tag{1}$$

where ϵ_{njt} is an extreme value type I independently and identically distributed error term with a zero mean and a constant variance of $\pi^2/6$. The observable part of utility the decision maker obtains from alternative j , V_{nj} is a function of attribute (in our case policy impact dimension) values defining j , x_{nj} and characteristics of the decision maker on which the researcher has data (such as risk perception levels in our case), s_n . That is, $V_{nj} = V(x_{nj}, s_n)$. The functional form for V_{nj} is assumed to be linear in parameters; that is, $V_{nj} = (x_{nj}, s_n)' \beta$, where β is a vector of parameters to be estimated.

In any choice occasion, the decision maker is assumed choose alternative i over alternative j if and only if $U_{ni} > U_{nj} \forall j \neq i; i, j \in J$. Given that the error terms, ϵ_{nj} , are not known for all j , the researcher can make only probabilistic statements regarding the decision maker's choice. The probability that decision maker n chooses alternative i is described as

$$Pr_{ni} = Pr(U_{ni} > U_{nj}, \forall j \neq i) = Pr(\epsilon_{nj} - \epsilon_{ni} < V_{ni} - V_{nj} \forall j \neq i) \tag{2}$$

Empirical model

We estimate participants' willingness to accept a certain sacrifice (eg, a one-off corona tax) per avoided fatality because of the coronavirus, on the combined DCE and health risk perception

data. We do this for each policy impact dimension mentioned earlier. A convenient way to do this estimation is to express the utility of policy alternatives in so-called willingness-to-pay space,¹² which enables us to directly obtain the implied willingness to make a sacrifice to avoid a single coronavirus-related fatality. See model specification details in Appendix D in Supplemental Materials found at <https://dx.doi.org/10.1016/j.jval.2022.05.017>.

To test to what extent willingness to sacrifice is related to a respondent's perceived health risk for themselves (implying self-protection) or for relatives (implying local altruism), we interacted indicators of coronavirus-related risk perception scores with the level of each policy impact dimension. The significance, signs, and relative magnitudes of these interaction effects indicate whether and to what extent health-related selfishness or local altruism helps explain respondents' willingness to accept sacrifices with respect to that dimension. We put forward this indirect approach as an alternative to the direct elicitation approach, which is commonly used and which in the context of our empirical context would be operationalized in terms of survey questions of the form: "to what extent is your support for coronavirus-related lockdown measures driven by a wish to protect yourself (your family) from the virus?" As argued in the Introduction, such direct questions are unlikely to lead to unbiased estimates of the role of self-protection and local altruism.

Results

A Descriptive Analysis on Perceived Risk Levels

We examine the distributions of responses on perceived risk for the 3 types of coronavirus-related risks namely, illness, hospitalization, and death. We observe that responses on risk perception have reasonable spread across different levels of risk, implying sufficient variation to allow statistical identification of effects. Figure 1 also shows that the number of respondents with a moderate to extreme perceived risk for relatives is larger than the number of respondents having such levels of perceived risk for themselves. This result holds for all types of coronavirus-related risks.

Estimation Results

Before presenting and discussing the estimation results, it is crucial to emphasize that an individual's choice of a health policy may be driven by various factors unrelated to the decision maker's (or their close relatives') health. For example, an individual with no or low perceived health risk for himself or for his relatives may support a health policy to protect his own nonhealth benefits such as his job or education of his children, nonhealth benefits of his

Table 2. Health-(un)related factors and motivations for health policy choice.

Factors	Motivations		
	Self-protection	Local altruism (protecting relatives)	Global altruism (protecting society)
Health related	✓	✓	×
Health unrelated	×	×	×

relatives including their jobs or education of their children, and the health and nonhealth benefits of people in general. Our approach is useful to uncover motivations associated to self-health protection and protection of relatives' health. Nevertheless, our approach has limitations to capture the effects of health-unrelated (own, relatives', or global) motivations to support or oppose a policy, which are likely to present. To summarize the motivations that our proposed approach is or is not capable to approximate, we present a decision factor-motivation matrix in [Table 2](#).

Having made this distinction, we summarize the main results in [Table 3](#) and provide the detailed estimation results in [Appendix E](#) in [Supplemental Materials](#) found at <https://dx.doi.org/10.1016/j.jval.2022.05.017>. First, we observe that health risk perception is significantly and positively associated with willingness to accept societal sacrifices per avoided corona-fatality. This is indicated by the “+” sign in [Table 3](#), and it holds regardless of health risk severity level (ie, for illness, hospitalization, and death). The result shows that people with a strong perception of health risk are more willing to accept a societal (eg, an increase in the number of disadvantaged children) or personal (eg, corona tax) sacrifice per avoided fatality, presumably because they believe that they themselves or one of their relatives could be one of the hypothetical patients or fatalities. To illustrate the relative size of this effect, people with an average level of perception of illness risk for themselves (for their relatives) are willing to accept a 23% (35%) (These figures are calculated as percent changes in willingness to accept a single fatality in terms of number of households with a long-term loss in net income associated with the mean perception score and zero perception score for a given risk. For example, the figure related to illness risk for self is calculated as $((-0.085 \times \bar{s}) / (-0.605)) \times 100$, where -0.605 and -0.085 , respectively, are estimates for “income loss” and “risk-income loss” interaction given in [Appendix Table E1](#) in [Appendix E](#) in [Supplemental Materials](#) found at <https://dx.doi.org/10.1016/j.jval.2022.05.017>, and \bar{s} denotes the mean illness perception score for self) higher number of households with a long-term loss in net income to avoid a single fatality than people who do not foresee any illness risk (or have a zero illness risk perception score). The corresponding figure associated with the average level of perception of hospitalization risk for oneself (for relatives) is 22% (39%) whereas, for death risk for oneself (for relatives), this amounts to 29% (33%).

Our second result indicates that perceived health risks for close relatives have a higher influence on people's willingness to accept sacrifices than perceived health risks for themselves. For instance, the increase in willingness to accept an increase in the number of households with a long-term loss in net income, per avoided fatality, that is associated with the average level of illness risk perception for oneself is 23% whereas it is 35% for the corresponding level of perceived risk for relatives. The corresponding figures associated with hospitalization risk for oneself are 22% and for relatives 39%. Similarly, the increase in willingness to accept such sacrifices associated with death risk for oneself is 29% whereas it stands at 33% for relatives. This suggests that, among other factors, responses to coronavirus-related health policies are driven more by health-related local altruism than by self-protection.

Third, we find that when the severity level (we consider death as more severe than hospitalization which in turn is considered more severe than illness) of perceived health risk for oneself increases, willingness to accept societal sacrifices to avoid coronavirus-related fatalities increases. As an example, the increase in willingness to accept an increase in the number of households with a long-term loss in net income, per avoided fatality, changes from 23% to 29% when the severity level of perceived health risk for oneself changes from illness to death. Nevertheless, this result does not hold when the risk is perceived to apply for relatives.

Discussion

Contrary to the conventional practice of directly asking people to explicate the moral motivations behind their responses to health policies (eg, self-protection and local altruism), we propose an indirect approach to elicit and explain such motivations. More specifically, we use decision makers' stated health risk perceptions for themselves and for close relatives, to explain the societal and personal sacrifices they would be willing to make to avoid a single COVID-19 fatality. This association between risk perception and policy preferences is then used to approximate levels of health-related self-protection and local altruism.

Our empirical analysis suggests that our indirect approach to approximate health-related rational and moral motivations behind responses to public health policies provides intuitive results. This offers a first degree of face validity to the proposed measurement tool. Nevertheless, follow-up research is certainly needed, to confirm (or reject) the usefulness of the presented approach. We believe that it would be particularly interesting to repeat the research in later stages of a pandemic that allows for investigating the extent to which citizens are willing to make the same sacrifices when individuals have the opportunity to reduce the risk for themselves through vaccination and when people already made sacrifices for a longer period of time. In further research projects, we recommend to also include other factors—such as the extent to which citizens perceive the lockdown measures as breaches of (constitutional) rights and (bodily) integrity to investigate how including such factors affect the usefulness of our approach. We note that the survey used to illustrate our approach did not directly ask respondents about the motivations behind their preferences for health policy. Future research can contribute to the subject by comparing results based on our approach with results obtained through a direct inquiry procedure. In addition, useful insight may be uncovered by performing our analysis on responses from people of different, for example, educational backgrounds.

Second, our findings provide empirical support to the growing practice of moral framing of health interventions emphasizing the protecting of significant others, to increase compliance with public health safety behaviors. The empirical analysis we performed suggests that people with a higher health risk perception for their relatives have a higher willingness to accept sacrifices than people with a higher health risk perception for themselves. The

Table 3. Effect of risk perception on willingness to accept societal or personal sacrifices to avoid coronavirus-related fatalities.

Policy impact dimension ↓	Risk perception for self			Risk perception for relatives		
	Illness	Hospitalization	Death	Illness	Hospitalization	Death
Physical injuries (per 100 000 cases)	NS	NS	NS	(+)*	(+)†	(+)‡
Mental injuries (per 100 000 cases)	NS	NS	(+)*	NS	NS	NS
Educational disadvantage (per 100 000 children)	(+)*	NS	(+)‡	(+)†	(+)†	(+)‡
Income loss (per 1 000 000 households)	(+)*	(+)†	(+)‡	(+)†	(+)‡	(+)‡
Tax increase (per 1000 euro)	NS	NS	NS	(+)†	(+)†	(+)†
Increase in working pressure (health sector)	(+)*	NS	NS	(+)‡	(+)‡	(+)‡

(+) indicates that the effect is positive; NS, not significant.

*The effect is significant at the 10% level.

†The effect is significant at the 5% level.

‡The effect is significant at the 1% level.

implication of this finding for welfare evaluation depends on whether the sacrifices are considered as paternalistic, which is likely in the health domain,¹³ or purely altruistic.^{14,15}

Finally, the finding that people who perceive health risk for themselves as being severe have a higher willingness to accept sacrifices implies that people are more likely to engage in behaviors promoting collective interests when risks for themselves are severe. This observation lends support to the idea that focusing on worst-case scenarios in framing public health messages might encourage people to make sacrifices that could also benefit others.³

We believe that, in general, policy makers will be able to design better and more acceptable (to the general public) policy interventions when they are able to calibrate them toward the moral motivations of the public. Our approach to uncovering these motivations (by proxy) enables policy makers to tailor their policies such that they are embraced or at least accepted by the general public. For example, to the extent that policy acceptance is driven by self-protection motivations or in contrast, by local or global altruism, the policy itself or the messaging surrounding it may be adapted toward aligning with such motivations; think of a vaccination campaign being marketed to the public as an act of societal altruism or commonsense self-protection (or both).

Supplemental Materials

Supplementary data associated with this article can be found in the online version at <https://dx.doi.org/10.1016/j.jval.2022.05.017>.

Article and Author Information

Accepted for Publication: May 30, 2022

Published Online: July 18, 2022

doi: <https://doi.org/10.1016/j.jval.2022.05.017>

Author Affiliations: Department of Engineering Systems and Services, Delft University of Technology, Delft, The Netherlands (Daniel, Mouter, Chorus).

Correspondence: Caspar G. Chorus, PhD, Department of Engineering Systems and Services, Delft University of Technology, Jaffalaan 5, 2628 BX Delft, The Netherlands. Email: c.g.chorus@tudelft.nl

Author Contributions: *Concept and design:* Daniel, Mouter, Chorus

Acquisition of data: Mouter, Chorus

Analysis and interpretation of data: Daniel, Chorus

Drafting of the manuscript: Daniel, Chorus

Critical revision of the paper for important intellectual content: Daniel, Mouter, Chorus

Statistical analysis: Daniel, Chorus

Obtaining funding: Mouter, Chorus

Supervision: Chorus

Conflict of Interest Disclosures: The authors reported no conflicts of interest.

Funding/Support: This study received funding from the European Research Council under the European Union's Horizon 2020 research and innovation program (grant agreement number 724431) and from the TU Delft COVID-19 Response Fund.

Role of the Funder/Sponsor: The funder had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

REFERENCES

- Shiell A, Seymour J. Preferences for public health insurance: egotism or altruism? *Int J Soc Econ*. 2002;29(5):356–369.
- Shim E, Chapman GB, Townsend JP, Galvani AP. The influence of altruism on influenza vaccination decisions. *J R Soc Interface*. 2012;9(74):2234–2243.
- Bavel JJV, Baicker K, Boggio PS, et al. Using social and behavioural science to support COVID-19 pandemic response. *Nat Hum Behav*. 2020;4(5):460–471.
- van den Broek-Altenburg E, Atherly A. Adherence to COVID-19 policy measures: behavioral insights from The Netherlands and Belgium. *PLoS One*. 2021;16(5):e0250302.
- Jacquemet N, Joule RV, Luchini S, Shogren JF. Preference elicitation under oath. *J Environ Econ Manage*. 2013;65(1):110–132.
- Cialdini RB, Goldstein NJ. Social influence: compliance and conformity. *Annu Rev Psychol*. 2004;55(1):591–621.
- Chorus C, van Cranenburgh S, Daniel AM, Sandorf ED, Sobhani A, Szép T. Obfuscation maximization-based decision-making: theory, methodology and first empirical evidence. *Math Soc Sci*. 2021;109:28–44.
- Chanel O, Luchini S, Shogren JF. Does charity begin at home for air pollution reductions? Unraveling intra familial altruism. *J Choice Modell*. 2021;38:100268.
- Haidt J. The emotional dog and its rational tail: a social intuitionist approach to moral judgment. *Psychol Rev*. 2001;108(4):814.
- Nisbett RE, Wilson TD. Telling more than we can know: verbal reports on mental processes. *Psychol Rev*. 1977;84(3):231–259.
- Chorus C, Sandorf ED, Mouter N. Diaboliical dilemmas of COVID-19: an empirical study into Dutch society's trade-offs between health impacts and other effects of the lockdown. *PLoS One*. 2020;15(9):e0238683.
- Train K, Weeks M. Discrete choice models in preference space and willingness-to-pay space. The Economics of Non-Market Goods and Resources. In: Scarpa R, Alberini A, eds. *Applications of Simulation Methods in Environmental and Resource Economics*. Vol 6. Dordrecht, The Netherlands: Springer; 2005:1–16.
- Jacobsson F, Johannesson M, Borgquist L. Is altruism paternalistic? *Econ J*. 2007;117(520):761–781.
- Bergstrom TC. Benefit-cost in a benevolent society. *Am Econ Rev*. 2006;96(1):339–351.
- Jones-Lee MW. Altruism and the value of other people's safety. *J Risk Uncertain*. 1991;4(2):213–219.