

Models of moral decision making

Theory and empirical applications in various domains

Chorus, Caspar G.; Liebe, Ulf; Meyerhoff, Jürgen

DOI

[10.1016/j.jocm.2021.100280](https://doi.org/10.1016/j.jocm.2021.100280)

Publication date

2021

Document Version

Accepted author manuscript

Published in

Journal of Choice Modelling

Citation (APA)

Chorus, C. G., Liebe, U., & Meyerhoff, J. (2021). Models of moral decision making: Theory and empirical applications in various domains. *Journal of Choice Modelling*, 39, Article 100280.
<https://doi.org/10.1016/j.jocm.2021.100280>

Important note

To cite this publication, please use the final published version (if applicable).
Please check the document version above.

Copyright

Other than for strictly personal use, it is not permitted to download, forward or distribute the text or part of it, without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license such as Creative Commons.

Takedown policy

Please contact us and provide details if you believe this document breaches copyrights.
We will remove access to the work immediately and investigate your claim.

Models of Moral Decision Making: Theory and Empirical Applications in Various Domains

Caspar Chorus, Ulf Liebe, Jürgen Meyerhoff

Discrete choice theory provides a mathematically rigorous framework to analyse and predict choice behaviour; since being introduced forty-five years ago, it has enabled sophisticated empirical analysis of decision making in fields as diverse as Transport (Small & Rosen, 1981; Ben-Akiva and Lerman, 1985), Energy & Environment (Carson & Groves, 2007; Mariel et al., 2021), Sociology (Bruch and Feinberg, 2017; Liebe et al., 2021), Health (Lancsar & Louvière, 2008; de Bekker-Grob et al., 2012), Marketing (Kanninen, 2002; Kivetz et al., 2004), and the Political Sciences (Glasgow, 2011; Stubager et al., 2018). Gradually, a field in itself has emerged over the years, with a conference series, textbooks (Train, 2009), handbooks (Hess and Daily, 2014) and a journal devoted to choice modelling. In fact, since the introduction of the Journal of Choice Modelling in 2008 (Hess and Rose, 2013), many of the recently made contributions to the field have been published in its pages, often after having been presented in a session of the International Choice Modelling Conference.

Notwithstanding these great accomplishments, we feel that there is one type of choice behaviour that has not received the attention it deserves, within our field: moral decisions (Chorus 2015). Following the neoclassical school of thought in micro-economics and micro-econometrics, our field's theories and models were originally designed to analyse choices that are *optimal* given one's 'consumer' preferences and budget constraints, rather than choices that are *right*, given one's moral preferences and constraints in the form of social norms and legal regulations. This neglect of the morality of choice is striking, in light of the fact that many of the most important choices people make, have a moral dimension; and also in light of the fact that many fields adjacent to ours, devote considerable attention to aspects of moral decision making, such as:

- Norm formation, moral motives and their effect on behaviour (e.g., Hechter and Opp, 2001; Haidt, 2007);

- Altruistic and pro-social behaviour (e.g., Hitlin and Vaisey, 2013; Simpson and Willer, 2015);
- Anti-social behaviour, deceit, obfuscation, taboos (Tetlock et al., 2000; Chorus et al. 2021);
- Guilt, shame, remorse as determinants of choice behaviour (Krettenauer et al., 2011; Bagozzi et al., 2018);
- Decision-making in moral dilemmas (Greene & Haidt, 2002; Kahane, 2013);
- Moral satisficing and related heuristics (Sunstein, 2005; Gigerenzer, 2010);
- Social Context effects on moral choice behaviour (e.g., Beyer and Liebe, 2015; Bruch and Feinberg, 2017).

The focus of choice modellers on consumer – as opposed to moral – preferences is perfectly understandable when considering that of all adjacent fields, choice modellers tend to feel most strongly connected to the field of Econom(etr)ics and particularly its neo-classical incarnation. While it is good to remember that Adam Smith, one of Economics' founding fathers, wrote extensively about the role of morality (1761), in the second half of the 20th Century morality research started to gradually disappear from the pages of the most reputed Economics journals (of course, with notable exceptions such as recently Elías et al., 2019). And when topics related to morality were covered by leading neo-classical economists, they usually relied on the toolbox developed for fully rational decision making, e.g. analysing violations of the law and acts of altruism using expected utility models (Harsanyi, 1955; Becker, 1968; Becker & Stigler, 1974; Arrow, 2016). Although the distinction between neo-classical and behavioural economics is not always easy to make, the increased attention to human behaviours in the Economics discipline has over the years proved to be a relatively fertile ground for research into moral choice behaviour, as exemplified by high impact contributions on fairness and different forms of altruism (Andreoni, 1989; Kahneman & Knetsch, 1992; Fehr & Schmidt, 1999).

When it comes to moral decision making, and also more generally, we believe it is a good thing that in recent times our field is increasingly looking beyond (neo-classical) Econom(etr)ics for inspiration – see a recent special issue in this journal, devoted to the broadening of the scope of choice modelling (Liebe and Meyerhoff, 2021). As illustrated with the references given above, in fields such as (moral) psychology and (empirical) ethics, moral

decision making has been a topic of heated debate and great scientific activity and progress. With such disciplines, choice modellers can build very fruitful collaborations, by translating their behavioural theories into tractable mathematical (econometric) models and putting them to the empirical test using the rigorous techniques available to us. Since recently, neuroscience has come up as another promising discipline that could help to gain further insights into moral decision making (Greene et al., 2001; FeldmanHal et al., 2012; Hutcherson et al., 2015; Sawe 2017).

Indeed, in recent years choice modellers have been using a variety of models and data-types to study moral decision making in various contexts with a clear moral dimension such as: welcoming (or not) refugees into one's neighbourhood (Liebe et al., 2018), allocating scarce healthcare resources to patients (Koonal et al., 2015), giving to charity (Langen, 2011), contributing to a sustainable energy transition (Ek and Söderholm, 2008) or animal welfare (Reithmayer et al. 2020), participating in environmentally friendly activities (Massarutto et al., 2019) or social routing schemes (van Essen et al., 2020), etc. Inspired by these developments, this special issue aims to help further propel the study of moral decision making in our field by proposing and empirically testing (new) mathematical models that aim to capture human decision-making behaviour in moral choice situations. What better place to publish such a special issue than in the pages of the Journal of Choice Modelling?

The journey of this special issue started with a call for abstracts in the context of the 2019 International Choice Modelling Conference held in Kobe. The result of this call was a double special session on Moral Choice Models (six papers presented in total); besides, several other papers on moral decision making were presented at the conference. After the conference a new call for papers was sent out, aiming for a special issue. Out of six submitted papers, four were selected after a rigorous review process.

They cover a wide range of topics and choice modelling-techniques, each in their own way contributing to our empirical knowledge regarding moral decision making and/or to our understanding of how to model such choices. Hancock et al. (2020) show how quantum choice models – inspired by ‘spooky action at a distance’ Quantum Theory – can be used to analyse and predict human decision making and changes in perspective in the face of taboo trade-offs (Tetlock et al., 2000; Chorus et al., 2018) and when considering intra-household altruism; this offers a whole new perspective to the modelling of moral choices. Also, Olivier

Chanel and co-authors (2021) study inter-family altruism: their economic models distinguish between different forms of altruism, and using a clever survey design they are able to disentangle which forms are particularly important in the context of air pollution reduction measures. Indeed, health related choice contexts offer fertile ground for the study of moral decision making, as is also shown in the paper by Lu and co-authors (2021), who study funding preferences for the national (collective) healthcare scheme which is one of the United Kingdom's most proud achievements. Their analysis, based on stated choice experiments, suggest clearly that respondents prefer a collective rather than an individualistic approach to raise such funds, and they also have a preference for progressive systems. Such moral sentiments and preferences are also echoed in the study by Smith and co-authors (2021), who use a carefully crafted survey and a variety of choice models to reveal a willingness to pay amongst consumers to improve the rather precarious labour conditions of workers in the so-called 'gig economy'. Before getting too excited about this result, it is good to note that the authors explain that "at the same time [...] their willingness to pay would unlikely result in a sustained improvement in working conditions".

Were it not for Covid-19, this special issue would have been published much earlier; we originally aimed for publication in the Summer of 2020. However, when most of us were confronted with lockdowns and other inconveniences (or worse) related to the pandemic, it quickly became clear that the original schedule had to be adjusted to give authors, reviewers and ourselves time to adjust to the new situation, take care of our family and loved ones, and get more urgent work-related tasks done. And with hindsight, we feel that this delay is not necessarily a bad thing: as with all disasters, great and small, the Covid-19 pandemic has reminded us very clearly that moral decisions are a topic of great societal relevance: from the hoarding of toilet paper, the flouting of social distancing rules to heroic acts of care and courage in hospitals and care homes, and the necessity to allocate scarce resources involving even the nightmare of triage at the gates of ICUs. Morality is simply everywhere, these days and papers using choice models to describe (or: make sense of?) our behaviours under Covid-19 conditions are already starting to find their way into the archives of academia (Jonker et al., 2020; Chorus et al. 2020; Genie et al. 2020; Reed et al., 2020).

We hope that this special issue helps encourage the choice modelling community to increasingly devote attention to moral decision making and to maintain a cross-disciplinary view that takes on board progress in fields as diverse as (experimental) ethics and moral

psychology, in addition to insights from the economics discipline. Moral decision making is a worthy topic indeed, and one which is likely to become even more relevant in years to come, as moral choice models are becoming an obvious candidate to equip artificial agents with a human-inspired moral compass (Noothigattu et al., 2018; Feier et al. 2021; Martinho et al., 2021).

Acknowledgements

We would like to thank the authors of papers submitted to the special issue for their efforts, as well as the reviewers who kindly helped us evaluate the papers. We thank the organisers of the ICMC-2017 conference and attendees and presenters at the double special session on Modelling moral decisions for kick-starting this special issue. Funding was received from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (grant agreement No. 724431). See <http://behave.tbm.tudelft.nl/> for more information about this project which develops moral discrete choice models.

References

- Andreoni, J. (1989). Giving with impure altruism: Applications to charity and Ricardian equivalence. *Journal of political Economy*, 97(6), 1447-1458.
- Arrow, K. J. (2016). *On Ethics and Economics: Conversations with Kenneth J. Arrow*. Routledge.
- Bagozzi, R. P., Sekerka, L. E., & Sguera, F. (2018). Understanding the consequences of pride and shame: How self-evaluations guide moral decision making in business. *Journal of Business Research*, 84, 271-284.
- Becker, G. S. (1968). Crime and punishment: An economic approach. In *The economic dimensions of crime* (pp. 13-68). Palgrave Macmillan, London.
- Becker, G. S., & Stigler, G. J. (1974). Law enforcement, malfeasance, and compensation of enforcers. *The Journal of Legal Studies*, 3(1), 1-18.
- de Bekker-Grob, E. W., Ryan, M., & Gerard, K. (2012). Discrete choice experiments in health economics: a review of the literature. *Health economics*, 21(2), 145-172.

Ben-Akiva, M., & Lerman, S. R. (2018). Discrete choice analysis: theory and application to travel demand. MIT Press, Cambridge, MA, USA

Beyer, H., Liebe, U., 2015. Three Experimental Approaches to Measure the Social Context Dependence of Prejudice Communication and Discriminatory Behavior. *Social Science Research* 49, 343-355.

Bruch, E., Feinberg, F., 2017. Decision-Making Processes in Social Contexts. *Annual Review of Sociology* 43, 207-227.

Carson, R. T., & Groves, T. (2007). Incentive and informational properties of preference questions. *Environmental and resource economics*, 37(1), 181-210.

Chorus, C., van Cranenburgh, S., Daniel, A.M., Sandorf, E.D., Sobhani, A., Szép, T., 2021. Obfuscation maximization-based decision-making: Theory, methodology and first empirical evidence. *Mathematical Social Sciences* 109, 28-44.

Chorus, C., Sandorf, E.D., Mouter, N., 2020. Diabolical dilemmas of COVID-19: An empirical study into Dutch society's trade-offs between health impacts and other effects of the lockdown. *PLoS One* 15, e0238683.

Chorus, C.G., Pudāne, B., Mouter, N., Campbell, D., 2018. Taboo trade-off aversion: A discrete choice model and empirical analysis. *Journal of Choice Modelling* 27, 37-49.

Chorus, C.G., 2015. Models of moral decision making: Literature review and research agenda for discrete choice analysis. *Journal of Choice Modelling* 16, 69-85.

Ek, K., Söderholm, P., 2008. Norms and economic motivation in the Swedish green electricity market. *Ecological Economics* 68, 169-182.

Elías, Julio J., Nicola Lacetera, and Mario Macis. 2019. Paying for Kidneys? A Randomized Survey and Choice Experiment. *American Economic Review*, 109 (8): 2855-88.

van Essen, M., Thomas, T., van Berkum, E., & Chorus, C. (2020). Travelers' compliance with social routing advice: evidence from SP and RP experiments. *Transportation*, 47(3), 1047-1070.

Fehr, E., & Schmidt, K. M. (1999). A theory of fairness, competition, and cooperation. *The Quarterly Journal of Economics*, 114(3), 817-868.

Feier, T., Gogoll, J., Uhl, M. 2021. Hiding behind machines: When blame is shifted to artificial agents. [arXiv:2101.11465](https://arxiv.org/abs/2101.11465)

FeldmanHall, O., Mobbs, D., Evans, D., Hiscox, L., Navrady, L., Dalgleish, T., 2012. What we say and what we do: the relationship between real and hypothetical moral choices. *Cognition* 123, 434-441.

Genie, M.G., Loria-Rebolledo, L.E., Paranjothy, S., Powell, D., Ryan, M., Sakowsky, R.A., Watson, V., 2020. Understanding public preferences and trade-offs for government responses during a pandemic: a protocol for a discrete choice experiment in the UK. *BMJ Open* 10, e043477.

Gigerenzer, G. (2010). Moral satisficing: Rethinking moral behavior as bounded rationality. *Topics in cognitive science*, 2(3), 528-554.

Glasgow, G., 2011. Introduction to the virtual issue: recent advances in discrete choice methods in Political Science. *Political Analysis* 19, 1–3.

Greene, J. D., Sommerville, R. B., Nystrom, L. E., Darley, J. M., & Cohen, J. D. (2001). An fMRI investigation of emotional engagement in moral judgment. *Science*, 293(5537), 2105-2108.

Greene, J., & Haidt, J. (2002). How (and where) does moral judgment work?. *Trends in cognitive sciences*, 6(12), 517-523.

Haidt, J., 2007. The New Synthesis in Moral Psychology. *Science* 316, 998-1001.

Hancock, T.O., Broekaert, J., Hess, S., Choudhury, C.F., 2020. Quantum choice models: A flexible new approach for understanding moral decision-making. *Journal of Choice Modelling* 37.

Harsanyi, J. C. (1955). Cardinal welfare, individualistic ethics, and interpersonal comparisons of utility. *Journal of political economy*, 63(4), 309-321.

Hechter, M., Opp, K.-D. (Eds.), 2001. *Social Norms*. New York: Russel Sage Foundation.

- Hess, S., Rose, J. Editorial. *The Journal of Choice Modelling* 6 (2013) iii–iv
- Hess, S., & Daly, A. (Eds.). (2014). *Handbook of choice modelling*. Edward Elgar Publishing.
- Hitlin, S., Vaisey, S., 2013. The New Sociology of Morality. *Annual Review of Sociology* 39, 51–68.
- Hutcherson, C. A., Bushong, B., Rangel, A., 2015. A Neurocomputational Model of Altruistic Choice and Its Implications. *Neuron* 87, 451-462.
- Jonker, M., de Bekker-Grob, E., Veldwijk, J., Goossens, L., Bour, S., & Rutten-Van Mölken, M. (2020). COVID-19 Contact Tracing Apps: Predicted Uptake in the Netherlands Based on a Discrete Choice Experiment. *JMIR mHealth and uHealth*, 8(10), e20741.
- Kahane, G. (2013). The armchair and the trolley: an argument for experimental ethics. *Philosophical studies*, 162(2), 421-445.
- Kahneman, D., & Knetsch, J. L. (1992). Valuing public goods: the purchase of moral satisfaction. *Journal of environmental economics and management*, 22(1), 57-70.
- Kanninen, B. J. (2002). Optimal design for multinomial choice experiments. *Journal of Marketing Research*, 39(2), 214-227.
- Kivetz, R., Netzer, O., & Srinivasan, V. (2004). Alternative models for capturing the compromise effect. *Journal of marketing research*, 41(3), 237-257.
- Koonal K., Shah, K. K., Tsuchiya, A., Wailoob, A. J., 2015. Valuing health at the end of life: A stated preference discrete choice experiment. *Social Science & Medicine* 124, 48-56.
- Krettenauer, T., Jia, F., & Mosleh, M. (2011). The role of emotion expectancies in adolescents' moral decision making. *Journal of experimental child psychology*, 108(2), 358-370.
- Lancsar, E., & Louviere, J. (2008). Conducting discrete choice experiments to inform healthcare decision making. *Pharmacoeconomics*, 26(8), 661-677.
- Langen, N. (2011). Are ethical consumption and charitable giving substitutes or not? Insights into consumers' coffee choice. *Food Quality and preference*, 22(5), 412-421.

Liebe, U., Meyerhoff, J., 2021. Mapping potentials and challenges of choice modelling for social science research. *Journal of Choice Modelling* 38, 100270.

Liebe, U., Mariel, P., Beyer, H., Meyerhoff, J., 2021. Uncovering the nexus between attitudes, preferences and behavior in sociological applications of stated choice experiments. *Sociological Methods & Research* 50 (1), 310–347.

Liebe, U., Meyerhoff, J., Kroesen, M., Chorus, C., Glenk, K., 2018. From welcome culture to welcome limits? Uncovering preference changes over time for sheltering refugees in Germany. *PloS One* 13(8), e0199923.

Lu, H., Burge, P., Sussex, J., 2021. Measuring public preferences between health and social care funding options. *Journal of Choice Modelling* 38.

Mariel, P., Hoyos, D., Meyerhoff, J., Czajkowski, M., Dekker, T., Glenk, K., ... & Thiene, M. (2021). *Environmental Valuation with Discrete Choice Experiments: Guidance on Design, Implementation and Data Analysis* (p. 129). Springer Nature.

Massarutto, A., Marangon, F., Troiano, S., Favot, M., 2019. Moral duty, warm glow or self-interest? A choice experiment study on motivations for domestic garbage sorting in Italy. *Journal of Cleaner Production* 208, 916-923.

Martinho, A., Kroesen, M., & Chorus, C. (2021). Computer says “I don’t know”: An Empirical Approach to Capture Moral Uncertainty in AI. *Minds and Machines*, forthcoming

Noothigattu, R., Gaikwad, S., Awad, E., Dsouza, S., Rahwan, I., Ravikumar, P., & Procaccia, A. (2018, April). A voting-based system for ethical decision making. In *Proceedings of the AAAI Conference on Artificial Intelligence* (Vol. 32, No. 1).

Reed, S., Gonzalez, J. M., & Johnson, F. R. (2020). Willingness to accept trade-offs among COVID-19 cases, Social-Distancing restrictions, and economic impact: a nationwide US study. *Value in Health*, 23(11), 1438-1443.

Reithmayer, C., Mußhoff, O., Danne, M. (2020), Alternatives to culling male chicks – the consumer perspective, *British Food Journal*, Vol. 122 No. 3, pp. 753-765.

<https://doi.org/10.1108/BFJ-05-2019-0356>

Sawe, N., 2017. Using neuroeconomics to understand environmental valuation. *Ecological Economics* 135, 1-9.

Small, K. A., & Rosen, H. S. (1981). Applied welfare economics with discrete choice models. *Econometrica: Journal of the Econometric Society*, 105-130.

Simpson, B., Willer, R., 2015. Beyond Altruism: Sociological Foundations of Cooperation and Prosocial Behavior. *Annual Review of Sociology* 41, 43–63.

Smith, A. 1761. *The theory of moral sentiments*. London

Smith, B., Goods, C., Barratt, T., Veen, A., 2021. Consumer ‘app-etite’ for workers' rights in the Australian ‘gig’ economy. *Journal of Choice Modelling* 38, doi: 10.1016/j.jocm.2020.100254.

Stubager, R., Bech Seeberg, H., F. So, 2018. One size doesn't fit all: Voter decision criteria heterogeneity and vote choice. *Electoral Studies* 52, 1-10.

Sunstein, C. R. (2005). Moral heuristics. *Behavioral and brain sciences*, 28(4), 531-541.

Tetlock, P. E., Kristel, O. V., Elson, S. B., Green, M. C., & Lerner, J. S. (2000). The psychology of the unthinkable: taboo trade-offs, forbidden base rates, and heretical counterfactuals. *Journal of personality and social psychology*, 78(5), 853.

Train, K., 2009. *Discrete Choice Methods with Simulation*. Cambridge University Press, Cambridge