

Patients, doctors and risk attitudes

Nicholas Makins 

Philosophy, King's College
London, London, UK

Correspondence to

Dr Nicholas Makins, Department
of Philosophy, King's College
London, London, WC2R 2LS, UK;
ndmakins@gmail.com

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ABSTRACT

A lively topic of debate in decision theory over recent years concerns our understanding of the different risk attitudes exhibited by decision makers. There is ample evidence that risk-averse and risk-seeking behaviours are widespread, and a growing consensus that such behaviour is rationally permissible. In the context of clinical medicine, this matter is complicated by the fact that healthcare professionals must often make choices for the benefit of their patients, but the norms of rational choice are conventionally grounded in a decision maker's own desires, beliefs and actions. The presence of both doctor and patient raises the question of whose risk attitude matters for the choice at hand and what to do when these diverge. Must doctors make risky choices when treating risk-seeking patients? Ought they to be risk averse in general when choosing on behalf of others? In this paper, I will argue that healthcare professionals ought to adopt a deferential approach, whereby it is the risk attitude of the patient that matters in medical decision making. I will show how familiar arguments for widely held anti-paternalistic views about medicine can be straightforwardly extended to include not only patients' evaluations of possible health states, but also their attitudes to risk. However, I will also show that this deferential view needs further refinement: patients' higher-order attitudes towards their risk attitudes must be considered in order to avoid some counterexamples and to accommodate different views about what sort of attitudes risk attitudes actually are.

INTRODUCTION

Healthcare professionals make choices on behalf of their patients on a daily basis. Many of these decisions must be made while there is uncertainty about which outcomes will result from which options. For example, suppose a doctor is uncertain about whether their patient has examplitis or caseopathy. Examplitis is a mostly benign, asymptomatic condition. Caseopathy, meanwhile, is a severe and disabling disease. There is a treatment available that is effective in curing caseopathy, but not examplitis, and produces unpleasant side effects in all who take it.

There are two options, between which the doctor must choose: to give the treatment or to withhold it. There are two possible states of the world, about which they are uncertain: the patient has examplitis or they have caseopathy. Each option produces a particular outcome in each state of the world. If the patient has examplitis, then it would be better to withhold the treatment, since it will produce side effects without having any therapeutic benefit. If they have caseopathy, then it would be better to give the treatment, since the symptoms of the disease are worse than the side effects of the treatment. Since neither option is best in all possible states, whether

the doctor should give the treatment depends on how likely the possible states are and how good or bad the possible outcomes are. For example, expected utility theory—the orthodox account of rational choice under uncertainty—recommends choosing the option whose possible outcomes have highest probability-weighted average utility. This approach provides the fundamental basis for the tools of medical decision analysis, such as decision trees, Markov models and the threshold approach to clinical choices.^{1–11} However, recent years have seen a growing number of theorists argue that rational choice depends on more than just the desirability and likelihood of the outcomes, because an agent's attitude to risk is also relevant. For example, a risk-averse individual may prefer to give rather than withhold the treatment, in part because it is the less risky option.

In the context of clinical medicine, this matter is complicated by a tension between the need for healthcare professionals to make choices for the benefit of their patients, and the fact that the norms of rational choice are conventionally grounded in the agent's own desires and beliefs. The presence of both doctor and patient raises the question of whose risk attitude matters for the choice at hand. Must doctors make risky choices when treating risk-seeking patients? Ought they to be risk averse in general when choosing on behalf of others? In this paper, I will show how familiar arguments for widely held anti-paternalistic views about medicine can be extended to include not only patients' evaluations of possible health states, but also their attitudes to risk.

DEFERENCE TO PATIENT VALUES

When it comes to evaluating the different possible outcomes of a choice, it is widely agreed that it is the patient's values that matter. While the doctor may play a crucial role in identifying and describing the relevant outcomes, they should defer to their patients' evaluation of how desirable or undesirable these outcomes are. Call this the deference principle. This idea has become widespread since the concepts and practices of informed consent emerged in the early to mid-20th century.^{12–15} Although this view is fairly uncontroversial, it will be instructive to consider its philosophical basis, as I will return to these arguments throughout this paper.

There are two main arguments for the primacy of patient values in medical decision making. The first stems from the idea of individual autonomy. In virtue of individuals' right to autonomy, they should

¹For a critique of the application of expected utility theory to medicine.⁷⁴



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be free to make decisions for themselves wherever possible. Even if a particular choice is to be made on behalf of a patient, rather than directly by them, decision makers can still demonstrate a respect for their autonomy by being guided by their values and preferences. This is why, for example, advance directives carry significant legal weight in choices concerning the care of individuals who lack the capacity to decide for themselves, even if the preferences expressed in such documents seem unwise or imprudent.¹⁶

The second argument for guiding choices by the values of patients stems from the principle of beneficence. This is the idea that healthcare professionals should promote the well-being, or best interests, of their patients. Consider two contrasting views on the relation between individual preferences and well-being. First, the 'constitutive view' states that a persons' well-being consists in the satisfaction of their preferences.^{17–21} The more of their preferences that are satisfied, the better off they are, whatever particular preferences they happen to have. Second, the 'evidential view' states that what a person wants and what is good for them can come apart, but a person's preferences still provide good evidence of what will promote their well-being, since they are in the best position to judge what will make them better or worse off.^{22,23} Exactly what well-being consists in is left open on this account, but preference satisfaction is taken to be a reliable guide to well-being nonetheless, because people generally prefer that which is good for them.ⁱⁱ On either the constitutive or evidential view, there is a close connection between an agent's well-being and the satisfaction of their preferences. Therefore, medical choices that aim to promote the well-being of a patient, as per the principle of beneficence, ought to be guided by that patient's own preferences.ⁱⁱⁱ

So, considerations of both autonomy and beneficence support deference to patients' preferences over outcomes. However, it is not only patients' evaluations of outcomes that are relevant to decision making under uncertainty; there is also their attitude to risk.

RISK ATTITUDES AND DEFERENCE

Consider a simple example of choice under uncertainty, in which the options differ in their degree of risk. Suppose an agent is offered a gamble on the toss of a fair coin. They will win £100 if the coin lands heads, they will lose £100 if the coin lands tails, and they can choose to accept or reject the bet. Given that the probability of either outcome is 0.5, the expected monetary value of accepting the bet is $EV(\text{accept}) = 0.5 (\text{£}100) + 0.5 (-\text{£}100) = \text{£}0$. The expected value of rejecting the bet is also £0. Although these options have the same expected value, they differ in the degree of spread or variance in the values of their possible outcomes. Accepting the bet is the riskier option: the agent stands to win more if the bet comes in, but will lose more if not. If the agent prefers the option with the less spread out possible outcomes, they are said to be risk averse. If they prefer the option with the more spread out possible outcomes, they are said to be risk seeking. In this example, the agent may be risk averse, risk seeking or risk neutral with respect to money. But agents can have risk attitudes with respect to any other goods,

or indeed towards their all-things-considered evaluations of outcomes.

Note that this description of risk attitudes is stated only in terms of the resultant preferences, but there is ongoing debate about exactly what sort of attitude risk attitudes are, and how to model these in theories of rational choice (see Thoma²⁴ for a helpful overview). I will remain neutral on these contentious matters here, as I intend for the arguments herein to apply to different conceptions and formal representations of risk attitudes. The central feature of risk attitudes that matters for current purposes is that they are an additional factor, over and above the values of outcomes and the probabilities of states of the world, that contribute to an agent's preferences, making them sensitive to the 'probability distribution of psychological values around their mean' (p. 10).²⁵

In the treatment choice above, about examplitis and caseopathy, withholding the treatment has the best possible outcome (no side effects and no symptoms) and the worst possible outcome (no side effects and severe symptoms). In contrast, giving the treatment will definitely give rise to an outcome (side effects and no symptoms) that is neither as good as the best possible outcome, nor as bad as the worst. Thus, withholding the treatment is riskier than giving the treatment, in the sense that the possible values of the outcomes are more spread out.

There is a wealth of empirical research demonstrating that individual decision makers deviate from risk neutrality in much of their conduct.^{26–32} Moreover, there is ample evidence that individuals exhibit a range of risk attitudes when making choices specifically about their health and medical treatment.^{33–39} This is typically identified as a problem for certain ways of measuring the utility of health states, such as the standard gamble technique, rather than as a challenge for making decisions that reflect a patient's preferences.^{35,40–43} Some have suggested that patients' risk attitudes should affect choices about their medical care, but stop short of providing a systematic argument for this view.^{36,39,44,45} In contrast to this suggestion, numerous studies have shown that doctors' own risk attitudes, rather than those of their patients, affect the clinical decisions they make.^{46–48} Meanwhile, in a parallel body of emerging literature about making risky decisions on behalf of others, which is not specific to medical contexts, philosophers adopt a range of positions about what risk attitude ought to be adopted.^{24,49–56}

This poses a challenge to the simple model of medical decision making presented above: we must now determine what risk attitude should be adopted when making medical decisions under uncertainty. To meet this challenge, we might return to the deference principle and its justifications. This principle, whether justified by reference to autonomy or beneficence, states that when healthcare professionals make choices for their patients, they should be guided by what those patients value. But, as the literature on risk attitudes suggests, it is not only outcomes that patients care about; they also have preferences that are sensitive to the risk involved in the options under consideration. So, if we want medical choices to be guided by patients' values and preferences, we might also need to think about what risks they would and would not want to take.

Recall the two types of justification for deference. The idea behind the autonomy justification was that, even when a patient is not making a decision for themselves, healthcare professionals can still exercise respect for their right to autonomy by trying to approximate the decisions that the patient would make. And, as should now be clear, patients' risk attitudes are a key factor in determining the choices that they make. So, if we are to approximate the choices that a patient would make, we will have to

ⁱⁱFor a critical discussion of this view.⁷⁵

ⁱⁱⁱAn additional reason to think that choices guided by patient values are beneficial is that they may further promote good clinical outcomes by, for example, strengthening the doctor-patient relationship, reinforcing trust, improving adherence to treatment regimes, and making patients feel listened to and empowered.

defer to their risk attitude, as well as their evaluations of the possible outcomes.

The beneficence justification emphasised the close link between individuals' preferences and their well-being. The extent to which one's preferences are satisfied is taken to be good evidence for, or constitutive of, one's level of well-being. Again, patients have preferences over the risks that they are exposed to and there seems to be no reason to treat these differently from their preferences over the possible outcomes of their choices. Simply put, the fact that an individual prefers to receive less risky options either makes it the case, or makes it highly likely, that it will be good for them to receive less risky options.

An important caveat to note at this point is that some risk attitudes give rise to particular patterns of preference that are considered to be irrational by many people.⁵⁷ This raises two further questions. First, are these patterns of preference indeed irrational? Second, if so, ought we to defer to an individual's preferences when making choices on their behalf, if those preferences are irrational? The former question is a highly contentious issue in decision theory^{57–60} and I will not weight in on it here. With respect to the second question, it is generally accepted that individuals have the right to make healthcare choices for themselves that others consider unwise or irrational.^{61 62} However, establishing whether this should be extended to contexts in which the decision is being made on behalf of the individual concerned, rather than directly by them, will require arguments beyond those considered in this paper. One may conclude that healthcare professionals ought to defer to such preferences either if one considers them to be rational, or one considers certain irrational preferences to have the requisite connection to autonomy or well-being, but I do not claim to have established either of these points here.

Of course, there also remains the challenge of finding out what risk attitudes patients actually have. However, there exist an array of methods for measuring risk attitudes across various other professional domains, including financial planning,⁶³ management consultancy⁶⁴ and public policy,⁶⁵ so there is good reason to think that something like this should be possible in healthcare.⁶⁶

So it seems clear that if we are going to adopt a deferential approach with respect to evaluations of outcomes, which we are well justified in doing, then we ought to adopt a deferential approach with respect to risk attitudes as well. The arguments that support the former can be straightforwardly extended to support the latter. However, this is not the end of the story just yet. There is a need for a further refinement to the deference principle.

REFINING THE DEFERENCE PRINCIPLE

The need to refine this approach further can be highlighted by considering two possible objections to the reasoning presented in the previous section. First, some have argued that risk attitudes do not reflect agents' values or desires in the way that their preferences over outcomes do. For example, Buchak's 'risk-weighted expected utility theory' models agents with a probability function, a utility function and a risk function. Their probability function is taken to represent their belief-like attitudes, which describe how they think the world is. Their utility function is taken to represent their desire-like attitudes, which describe how they want the world to be. But, according to Buchak, risk attitudes are neither an attempt to describe how the world is, nor how one wants the world to be. The risk function, therefore, is taken to represent something that is neither a desire

nor a belief, but a purely instrumental feature of one's decision making. A property of the way in which one organises one's means to achieve one's ends.^{iv}

This interpretation of risk attitudes poses a challenge to the deferential approach presented above: if risk attitudes are not a particular kind of desire or value, then why should healthcare professionals defer to them in the way that they ought to defer to patients' values? Perhaps risk attitudes are like other features of individuals' decision making that we do not expect healthcare professionals to defer to. For example, some people make decisions quickly and resolutely, while others agonise and vacillate over them. Some people make choices by writing a list of pros and cons, while others go on gut instinct. These are clearly features of the ways in which different people make choices, but they are not the sort of thing that we ought to expect healthcare professionals to emulate when making choices for their patients. If risk attitudes are more like these sorts of properties, then we should not extend the deference principle to include them.

A second objection to extending the deference principle to include risk attitudes is that it is open to some troubling counterexamples. Consider two different individuals: the first always makes risk-averse health choices, but dislikes this feature of their behaviour, because they recognise that they are never willing to take the risks that are required in order to secure certain benefits. They always prefer to play it safe when a choice presents itself, but they wish that they were different. The second is a habitual risk-seeker who likes gambling and other risky activities, but does not endorse this feature of their personality. They consistently opt for riskier options across a range of contexts, including healthcare, but would prefer to have different preferences. One views themselves as overly cautious, the other views themselves as foolhardy, but these traits are persistent features of their personalities nonetheless. Both of these individuals have distinctive risk attitudes, but it would seem deeply mistaken to claim that healthcare professionals ought to defer to these risk attitudes when making medical choices on their behalf.

These counterexamples hint at what is wrong with simply deferring to patients' risk attitudes and how this problem might be avoided. What matters in these cases is not that the choice that would be made by deferring to the patients' risk attitudes would be bad simpliciter. What matters is that they would be bad choices by the lights of the patient concerned. When making choices on behalf of another, we should not simply try to make the choices that they would make, because they may not want choices to be made in this way. It is not just the desires that happen to rise up in them that matter, nor the ways they happen to go about making choices, but rather the desires that individuals endorse within themselves on reflection. In other words, we ought to consider individuals' higher-order attitudes towards their preferences. Not simply what they want, but what they want themselves to want.

Making choices on the basis of patients' higher-order desires avoids the counterintuitive conclusion that we ought to defer to the risk attitudes of the two individuals in the examples above. This is because those individuals themselves do not endorse the risk attitudes they exhibit. Moreover, this shift will also provide a way around the first objection to the deference

^{iv}For a critique of this view of risk attitudes.⁶⁰

principle. Even if risk attitudes are not a kind of desire, individuals can still have desires about them. So, paying proper attention to what a person wants—including, crucially, their desires about their risk attitudes—may determine how risky choices ought to be made on their behalf.

In addition to resolving the aforementioned objections, this amendment to the deferential approach is also supported by the principles of autonomy and beneficence that motivated deference in the first place. Take autonomy. Numerous philosophers have argued that the notion of autonomy that is morally relevant is not simply the ability to act in accordance with whatever first-order desires one happens to have. Rather, it is the ability to reflect on one's evaluative attitudes and to choose courses of action on the basis of those desires that one endorses, or identifies with.^{67–71} That is to say, the desires that one desires to have. Dworkin, for example, states that,

autonomy is conceived of as a second-order capacity of persons to reflect critically upon their first-order preferences, desires, wishes, and so forth and the capacity to accept or attempt to change these in light of high-order preferences and values (p. 20).⁶⁷

On this view, respecting a patient's right to autonomy requires that healthcare professionals' choices are guided by patients' attitudes that are aligned with their higher-order desires. And, as noted above, this includes the risk attitudes that an individual endorses, identifies with, or desires to have, so this way of thinking about autonomy supports this refined deferential approach.

Now, consider the justification for deference from the principle of beneficence. The way in which this consideration supports deference depends on whether the satisfaction of an individual's preferences is understood as evidence for, or constitutive of, their well-being. Take the evidential view first. The idea here is that people are good judges of what is in their best interests, so their preferences tend to be a reliable guide to what is good for them. However, first-order desires are not always based on people's insights into their own well-being. On the other hand, when somebody critically appraises their first-order desires and comes to a judgement about whether they want to hold them or not, they are actively drawing on their self-knowledge and epistemically privileged perspective on matters concerning their interests, which strengthens the evidential link between their preferences and their well-being. Of course, there may be cases in which the desires that one desires to have are imperfect evidence of what is in one's best interests. But the claim is not that a person's higher-order desires provide infallible knowledge of what is good for them. Rather, the idea is that if we are going to take preferences as evidence of well-being, then those preferences that have been reflected on and endorsed seem to provide at least as reliable evidence as unreflective, first-order desires. If an individual's attitude to risky choices is taken to provide evidence for what risks would be good or bad for them to take, then surely the risk attitudes that they desire to have on further reflection provide better evidence. Therefore, this view supports deference to the risk attitudes that patients reflectively endorse, rather than the risk attitudes that they happen to exhibit.

Next, the constitutive view. This says that well-being consists in having one's preferences satisfied, so if an individual prefers a riskier option, then it is good for them to receive that risky option. A well-known problem with this view of the relation between desire and well-being is that it cannot make sense of cases in which it appears possible for an individual to desire something that is bad for them. Think, for example, of a smoker

who is trying to quit but, at that moment, has the strong desire for a cigarette. It does not seem as though this person's desires are aligned with their best interests. A standard response to this objection is that it is not the satisfaction of just any first-order desires that determines a person's well-being, but rather those desires that they desire to have.^{72,73} Railton, for example, states that,

it does not do much to explain to myself or others the worthwhileness or point of what I have done with my life to say that I have simply acted upon whatever desire happened to be most urgent at the moment. [...] The proposal I would make, then, is the following: an individual's good consists in what he would want himself to want, or to pursue (p. 16).⁷³

So, if healthcare professionals are to make choices in the best interests of their patients, they will need to consider their higher-order attitudes. When it comes to risk attitudes, it is not simply the risk attitudes that an individual happens to have that are relevant for best interests decisions; it is the risk attitude that they would endorse within themselves.

CONCLUSION

In summary, the main arguments that underlie widespread anti-paternalistic views about medical decision making can be straightforwardly extended to support a deferential approach to risk attitudes in medical choices under uncertainty. While it is generally accepted that healthcare professionals should defer to their patients' views on the desirability of possible health outcomes, I have argued that they should also defer to their patients' attitudes to risk. Crucially, however, it is not simple first-order values and risk attitudes that are relevant for medical decision making. Instead, it is the attitudes that individuals desire to have—the attitudes that they identify with or endorse within themselves—to which decision makers should defer. Whether deference in medical decision making is justified by considerations of autonomy or beneficence, it should include the risk attitudes that a patient endorses.

Twitter Nicholas Makins @NickMakins

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ORCID iD

Nicholas Makins <http://orcid.org/0000-0001-8935-6940>

REFERENCES

- 1 Pauker SG, Kassirer JP. The threshold approach to clinical decision making. *N Engl J Med* 1980;302:1109–17.
- 2 Djulbegovic B, Elqayam S. Many faces of rationality: implications of the great rationality debate for clinical decision-making. *J Eval Clin Pract* 2017;23:915–22.
- 3 Sonnenberg FA, Beck JR. Markov models in medical decision making: a practical guide. *Med Decis Making* 1993;13:322–38.

[†]For a critique of this view.¹⁷

- 4 Djulbegovic B, Elqayam S, Reljic T, *et al.* How do physicians decide to treat: an empirical evaluation of the threshold model. *BMC Med Inform Decis Mak* 2014;14:1–10.
- 5 Djulbegovic B, van den Ende J, Hamm RM, *et al.* When is rational to order a diagnostic test, or prescribe treatment: the threshold model as an explanation of practice variation. *Eur J Clin Invest* 2015;45:485–93.
- 6 Djulbegovic B, Elqayam S, Dale W. Rational decision making in medicine: implications for overuse and underuse. *J Eval Clin Pract* 2018;24:655–65.
- 7 Djulbegovic B, Hozo I, Mayrhofer T, *et al.* The threshold model revisited. *J Eval Clin Pract* 2019;25:186–95.
- 8 Djulbegovic B. Ethics of uncertainty. *Patient Educ Couns* 2021;104:2628–34.
- 9 Stegenga J. Measuring effectiveness. *Stud Hist Philos Biol Biomed Sci* 2015;54:62–71.
- 10 Sprenger J, Stegenga J. Three arguments for absolute outcome measures. *Philos of Sci* 2017;84:840–52.
- 11 Jäntgen I. n.d. How to measure effect sizes for rational decision-making. *Philos Sci*:1–17.
- 12 Faden RR, Beauchamp TL, King NMP. *A history and theory of informed consent*. Oxford: Oxford University Press, 1986.
- 13 Saad TC. The history of autonomy in medicine from antiquity to principlism. *Med Health Care Philos* 2018;21:125–37.
- 14 Will JF. A brief historical and theoretical perspective on patient autonomy and medical decision making: Part II: the autonomy model. *Chest* 2011;139:1491–7.
- 15 Will JF. A brief historical and theoretical perspective on patient autonomy and medical decision making: Part I: the beneficence model. *Chest* 2011;139:669–73.
- 16 Mental capacity act. 2005. Available: www.legislation.gov.uk/ukpga/2005/9/contents
- 17 Qizilbash M. The concept of well-being. *Econ Philos* 1998;14:51–73.
- 18 Harsanyi JC. Cardinal welfare, individualistic ethics, and interpersonal comparisons of utility. *J Political Econ* 1955;63:309–21.
- 19 Goodin RE. *Utilitarianism as a public philosophy*. Cambridge: Cambridge University Press, 1995.
- 20 Griffin J. *Well-being: its meaning, measurement, and moral importance*. Oxford: Clarendon Press, 1986.
- 21 Arneson RJ. Equality and equal opportunity for welfare. *Philos Stud* 1989;56:77–93.
- 22 Hausman DM. *Preference, value, choice, and welfare*. Cambridge: Cambridge University Press, 2011.
- 23 Hausman DM, McPherson MS. Preference satisfaction and welfare economics. *Econ Philos* 2009;25:1–25.
- 24 Thoma J. Taking risks on behalf of another. *Philos Compass* 2023.
- 25 Allais M. An outline of my main contributions to economic science. *Theor Decis* 1991;30:1–26.
- 26 Kahneman D, Tversky A. Prospect theory: an analysis of decision under risk. *Econometrica* 1979;47:263.
- 27 Tversky A, Kahneman D. The framing of decisions and the psychology of choice. *Science* 1981;211:453–8.
- 28 Tversky A, Kahneman D. Advances in prospect theory: cumulative representation of uncertainty. *J Risk Uncertainty* 1992;5:297–323.
- 29 Tversky A, Wakker P. Risk attitudes and decision weights. *Econometrica* 1995;63:1255.
- 30 Cohen M, Jaffray JY. Certainty effect versus probability distortion: an experimental analysis of decision making under risk. *J Exp Psychol Hum Percept Perform* 1988;14:554–60.
- 31 Cohen H, Maril A, Bleicher S, *et al.* Attitudes toward risk are complicated: experimental evidence for the re-individuation approach to risk-attitudes. *Philos Stud* 2022;179:2553–77.
- 32 Fishburn PC, Kochenberger GA. Two-piece von neumann-morgenstern utility functions. *Decision Sciences* 1979;10:503–18.
- 33 Rutten-van Mölken MP, Bakker CH, van Doorslaer EK, *et al.* Methodological issues of patient utility measurement. experience from two clinical trials. *Med Care* 1995;33:922–37.
- 34 Khanna D, Ahmed M, Furst DE, *et al.* Health values of patients with systemic sclerosis. *Arthritis Rheum* 2007;57:86–93.
- 35 Llewellyn-Thomas H, Sutherland HJ, Tibshirani R, *et al.* The measurement of patients' values in medicine. *Med Decis Making* 1982;2:449–62.
- 36 Verhoef LC, de Haan AF, van Daal WA. Risk attitude in gambles with years of life: empirical support for prospect theory. *Med Decis Making* 1994;14:194–200.
- 37 Rosen AB, Tsai JS, Downs SM. Variations in risk attitude across race, gender, and education. *Med Decis Making* 2003;23:511–7.
- 38 Hellinger FJ. Expected utility theory and risky choices with health outcomes. *Med Care* 1989;27:273–9.
- 39 McNeil BJ, Weichselbaum R, Pauker SG. Fallacy of the five-year survival in lung cancer. *N Engl J Med* 1978;299:1397–401.
- 40 Wakker P, Stiggelbout A. Explaining distortions in utility elicitation through the rank-dependent model for risky choices. *Med Decis Making* 1995;15:180–6.
- 41 van Osch SMC, Wakker PP, van den Hout WB, *et al.* Correcting biases in standard gamble and time tradeoff utilities. *Med Decis Making* 2004;24:511–7.
- 42 Bleichrodt H. A new explanation for the difference between time trade-off utilities and standard gamble utilities. *Health Econ* 2002;11:447–56.
- 43 Stiggelbout AM, Kiebert GM, Kievit J, *et al.* Utility assessment in cancer patients: adjustment of time tradeoff scores for the utility of life years and comparison with standard gamble scores. *Med Decis Making* 1994;14:82–90.
- 44 Prosser LA, Kuntz KM, Bar-Or A, *et al.* The relationship between risk attitude and treatment choice in patients with relapsing-remitting multiple sclerosis. *Med Decis Making* 2002;22:506–13.
- 45 Deber RB, Goel V. Using explicit decision rules to manage issues of justice, risk, and ethics in decision analysis: when is it not rational to maximize expected utility? *Med Decis Making* 1990;10:181–94.
- 46 Nakata Y, Okuno-Fujiwara M, Goto T, *et al.* Risk attitudes of anesthesiologists and surgeons in clinical decision making with expected years of life. *J Clin Anesth* 2000;12:146–50.
- 47 Eeckhoudt L, Lebrun T, Saille JC. Risk-aversion and physicians' medical decision-making. *J Health Econ* 1985;4:273–81.
- 48 Holtgrave DR, Lawler F, Spann SJ. Physicians' risk attitudes, laboratory usage, and referral decisions: the case of an academic family practice center. *Med Decis Making* 1991;11:125–30.
- 49 Bovens L. The ethics of making risky decisions for others. In: White MD, ed. *Oxford Handbook of Ethics and Economics*. Oxford: Oxford University Press, 2019: 446–73.
- 50 Bovens L. Concerns for the poorly off in ordering risky prospects. *Econ Philos* 2015;31:397–429.
- 51 Hansson SO. Ethical criteria of risk acceptance. *Erkenntnis* 2003;59:291–309.
- 52 Zhao M. Ignore risk; maximize expected moral value. *Noûs* 2021;1–18.
- 53 Buchak L. Taking risks behind the veil of ignorance. *Ethics* 2017;127:610–44.
- 54 Buchak L. Why high-risk, non-expected-utility-maximising gambles can be rational and beneficial: the case of HIV cure studies. *J Med Ethics* 2017;43:90–5.
- 55 Jonker J. Risk and asymmetry in development ethics. *AJOBE* 2020;14:23–41.
- 56 Nissan-Rozen I. Weighing and aggregating reasons under uncertainty: a trilemma. *Philos Stud* 2021;178:2853–71.
- 57 Allais M. The foundations of a positive theory of choice involving risk and a criticism of the postulates and axioms of the american school. In: Allais M, Hagen O, eds. *Expected Utility Hypotheses and the Allais Paradox*. Dordrecht: Springer, 1979: 27–145.
- 58 Bradley R, Stefánsson HO. Counterfactual desirability. *Br J Philos Sci* 2017;68:485–533.
- 59 Stefánsson HO, Bradley R. What is risk aversion? *Br J Philos Sci* 2019;70:77–102.
- 60 Buchak L. *Risk and rationality*. Oxford: Oxford University Press, 2013.
- 61 Bogg D, Chamberlain S. *Mental capacity act 2005 in practice: learning materials for social workers*. Department of Health, 2015. Available: www.gov.uk/government/publications/learning-resources-mental-capacity-act-2005-mca-in-social-work
- 62 Department of Health. Explanatory notes to mental capacity act 2005. 2005. Available: www.legislation.gov.uk/ukpga/2005/9/notes
- 63 Wohlner R. Tips for assessing a client's risk tolerance [Investopedia]. 2022. Available: www.investopedia.com/articles/financial-advisors/051915/tips-assessing-clients-risk-tolerance.asp
- 64 Deloitte. *Risk appetite frameworks: how to spot the genuine article*. Deloitte Touche Tohmatsu Limited, 2014.
- 65 Treasury HM. Orange book: management of risk - principles and concepts. 2020. Available: www.gov.uk/government/publications/orange-book
- 66 Birch J, Creel KA, Jha AK, *et al.* Clinical decisions using AI must consider patient values. *Nat Med* 2022;28:229–32.
- 67 Dworkin G. *The theory and practice of autonomy*. Cambridge: Cambridge University Press, 1988.
- 68 Frankfurt HG. Freedom of the will and the concept of a person. *J Philos* 1971;68:5.
- 69 Andersson AKM, Johansson KA. Substituted decision making and the dispositional choice account. *J Med Ethics* 2018;44:703–9.
- 70 Christman J. Autonomy: a defense of the split-level self. *South J Philos* 1987;25:281–93.
- 71 Bratman ME. Autonomy and hierarchy. *Soc Phil Pol* 2003;20:156–76.
- 72 Smith M, Lewis D, Johnston M. Dispositional theories of value. *Aristot Soc Suppl Vol* 1989;63:89–174.
- 73 Railton P, University of Arkansas Press. Facts and values. *Philosophical Topics* 1986;14:5–31.
- 74 Cohen BJ. Is expected utility theory normative for medical decision making? *Med Decis Making* 1996;16:1–6.
- 75 Sarch AF. Hausman and McPherson on welfare economics and preference satisfaction theories of welfare: a critical note. *Economics and Philosophy* 2015;31:141–59.