Global Discourse • vol 13 • no 3–4 • 323–343 • © Authors 2023
Online ISSN 2043-7897 • https://doi.org/10.1332/20437897Y2023D000000008
Accepted for publication 13 September 2023 • First published online 20 October 2023

Special Issue: Cooperation and Social Policy: Integrating Evidence into Practice - Part 2

REPLY

Exploring the nuances of cooperation in public health – a critical reflection on default policies and reputation effects: a reply to 'Nurturing, nudging and navigating the increasingly precarious nature of cooperation in public health: the cases of vaccination and organ donation' by Heidi J. Larson and Alexander H. Toledo

Eamonn Ferguson[1], *eamonn.ferguson@nottingham.ac.uk*
Richard Mills, *Richard.Mills2@nottingham.ac.uk*
University of Nottingham and National Institute for Health and Care Research Blood and Transplant Research Unit in Donor Health and Behaviour, UK

Key words cooperation • organ and blood donation • vaccination • reciprocity • default policies

To cite this article: Ferguson, E. and Mills, R. (2023) Exploring the nuances of cooperation in public health – a critical reflection on default policies and reputation effects: a reply to 'Nurturing, nudging and navigating the increasingly precarious nature of cooperation in public health: the cases of vaccination and organ donation' by Heidi J. Larson and Alexander H. Toledo, *Global Discourse*, 13(3–4): 323–343, DOI: 10.1332/20437897Y2023D000000008

Introduction

Few would deny that cooperation plays a critical role in resolving global challenges, with its significance permeating a wide variety of issues, such as climate change, global public health, war and nuclear weapon non-proliferation, food and water security, and the emerging threats posed by artificial intelligence, to name but a few (Bavel et al, 2020; van Lange and Rand, 2022). In each of these areas, the decisions to act for the common good may be at odds with self-interest, creating complex social dilemmas that require deliberate collaboration to overcome.

Larson and Toledo (2023) provide a compelling discussion of the role played by cooperation to support successful public health policies, with a particular focus on organ donation and vaccination. Their insights shed light on the cooperation-dependent nature of the major public health crises the world has faced, is facing and will undoubtedly face in the future, including viral, bacterial and fungal infections, as well as the continual need for organs and blood donation. As pointed out by Larson and Toledo (2023), the COVID-19 pandemic is a clear illustration of the need for sustained cooperation. People had to change their behaviour to protect themselves and others around them by wearing masks when mandated to do so (unless exempt), socially distancing, keeping within 'bubbles' and ensuring they tested when they had symptoms, reporting both positive and negative tests, and taking appropriate self-isolation actions when testing positive. Once a vaccine was produced and ready for use, the cooperative behavioural shift was towards vaccination.

Cooperation of this type represents a social dilemma involving the individual having to decide between what is good for them versus what is good for others through the provision of a public good (Rand and Nowak, 2013). Benefiting others, however, can come at a personal cost, as well as the uncertainty that others will free-ride on the goodwill of the cooperator (Nowak, 2006). Although cooperation does not always have to be at a cost (that is, altruism), it can involve personal and mutual benefits (West et al, 2007; 2011; Ent et al, 2020). These benefits can be derived through such mechanisms as 'warm glow' (Andreoni, 1990) or the good 'reputation' that comes from signalling good deeds (Nowak and Sigmund, 2005; Milinski, 2016). These mechanisms and others help sustain cooperation in the face of free-riding (Nowak, 2006).

A central and important tenet of Larson and Toledo's (2023) article is the fragility of cooperation. Given its significance to public health, we need to consider ways to enhance, support and stabilise cooperation. In this commentary, we scrutinise some of these mechanisms, examining their potential to counteract the fragility of cooperation within the sphere of public health. In particular, we focus on the nuanced role specific mechanisms can play in bolstering cooperation: (1) default policies are not always the panacea they are made out to be; (2) observability can foster cooperative behaviour in varying ways; (3) inequalities in public health are important (a one-size-fits-all approach will not work, especially as populations around the world become increasingly more diverse); and (4) the focus on individual cognition and behaviours has often shifted attention away from the bigger picture, such as the environment in which they operate.

Public health cooperation

One key aspect of any public health provision is the donation of substances of human origin (SoHO) (Hyde et al, 2022; Ferguson, 2022). This is not just organs for transplantation but a whole variety of substances for transfusion (for example, whole blood, plasma, milk, stem cells, eggs, faeces, sperm and so on). These are all essential for public health and healthcare delivery. Indeed, whole blood and its products are so essential to modern healthcare that the World Health Organization (WHO) designates it as an essential medicine (WHO, 2021). Whole blood and its products are used to treat and manage a wide variety of conditions, not only trauma, haemorrhage, childbirth and surgery but also cancer, anaemia, infections, burns and

inherited blood conditions (for example, sickle-cell and thalassemia), where repeated transfusions are required. Thus, without whole blood, modern healthcare would not be feasible. Similarly, there is a substantial supply–demand gap for organ donation, with 100,000 people on the organ donor waiting list in the US and 150,000 in Europe. In the UK, more than 7,000 people are on the transplant waiting list, and last year, 430 people died due to a lack of available organs (see NHSBT, 2022a). This situation is considerably worse in the Global South (Sterri et al, 2022). Finally, for vaccination, the uptake rarely reaches levels to ensure herd immunity, with global inequalities (Nabaggala et al, 2022; Tatar et al, 2022).

This commentary focuses on blood, organs and vaccination, but it should be acknowledged that cooperation in healthcare and public health goes well beyond this scope. For example, an army of volunteers works in hospitals to visit patients, show people where to go, run cafes and staff hospital radio stations. Outside the hospital, there are volunteer drives for patients, motorcyclists to transport blood, people fundraising to keep centres open and buy equipment, and individuals volunteering for clinical trials, not to mention a sizeable charitable sector.

Opt-out default policies: not always a panacea

One strategy used to counter the fragility of cooperation at a societal level discussed by Larson and Toledo (2023) is the use of opt-in versus opt-out defaults. Under opt-in policies, the default is not to contribute and everyone is considered a non-contributor (donor or being vaccinated) unless they actively opt in. Under an opt-out policy, the default is to be a contributor, and everyone is 'presumed' to be a contributor unless they actively opt out (Johnson and Goldstein, 2003; Ebeling and Lotz, 2015). The opt-in system requires people actively to take a decision (explicit consent), and the opt-out system operates on deemed/presumed consent so long as people do not opt out (Ferguson, 2022). In terms of deceased organ donation, policymakers often advocate for the use of the opt-out default (BMA, 2021). This is premised on the 'power' of the opt-out default to increase the number of potential donors, driven by status-quo biases, resulting in more lives being saved (Johnson and Goldstein, 2003). Indeed, several experimental (Chapman et al, 2010; Lehmann et al, 2016) and observational (Rithalia et al, 2009; Shepherd et al, 2014) studies have shown an opt-out advantage. Yet, the long-term efficacy of this system in fostering cooperation is not as clear (Arshad et al, 2019; Ferguson et al, 2019a; Etheredge, 2021; Molina-Pérez et al, 2022). Despite the promise of the opt-out policy, evidence suggests that it does not alleviate organ shortages. Countries with opt-in systems sometimes observe higher donation rates than their opt-out counterparts (Ferguson et al, 2019a; Jou et al, 2023). Even in Spain, boasting one of the world's most successful opt-out organ donation systems, shortages persist.

Larson and Toledo (2023) identify considerations of morality (Curry et al, 2019a; 2019b) and fairness (Fehr and Fischbacher, 2004) as two important precursors to sustained cooperation. Given the widespread and recommended use of opt-out policies to bolster cooperation (Thaler and Sunstein, 2008), an important question yet to be answered is how such policies are judged in terms of their perceived fairness and morality. If an opt-out system supports a sense of solidarity (for example, volunteering as part of a collective community to share the cost of helping others) (Shaw, 2019; Martínez-López et al, 2022) and of cooperation through maintaining an established

public good (Ferguson, 2022), then more people might be expected to perceive it as fair and moral compared to an opt-in system. However, common objections to opt-out policies are often based on concerns surrounding personal autonomy and the state ownership of organs (Van Dalen and Henkens, 2014; Moseley and Stoker, 2015; MacKay and Robinson, 2016), negative spillovers (fewer living organs are donated under an opt out system) (Shepherd et al, 2014), and the 'lone wolf' effect, whereby people are more likely to opt out if they see others opting out (see Shepherd et al, 2014; Ferguson et al, 2019a; 2020; Ferguson, 2022).

Another interesting question concerns how the public's perceptions of fairness and morality in the context of defaults for organ donation compare with those for vaccination. There are similarities and differences between these health behaviours. Both require sufficient numbers to be successful: vaccination in terms of reaching herd immunity; and deceased donation with regard to a sufficient supply of organs to meet demand. There are, however, differences in terms of costs. The cost to the donor for deceased organ donation is lower than vaccination, as the donor is deceased (this is not to say that there are not psychological costs to relatives and friends). However, for the vaccinator, there are immediate costs in terms of lost time, pain and anxiety associated with an injection, as well as long-term costs regarding potential side effects (Ferguson et al, 2019b).

To shed light on these questions, we analysed data from a small online pilot experiment conducted between October and November 2020. The experiment employed a two (default: opt in versus opt out) by two (policy focus: deceased organs versus vaccination) within-subjects design. People read the four scenarios (see Table 1) derived from crossing default by policy focus and responded to questions on behavioural intentions, fairness and morality (for the full survey, see Appendix 1). We sampled 235 people via social media (that is, Facebook) with a mean age of 28.60 years (SD = 10.05); 162 identified as female (68.9 per cent) and 68 as male (28.9 per cent), while two preferred not to answer (0.9 per cent), one stated 'other' (0.4 per cent) and two were missing data (0.9 per cent). In terms of ethnic background, 53 (22.6 per cent) self-classified as Asian, 25 (10.6 per cent) as Black, 13 (5.5 per cent) as Mixed, seven (3.0 per cent) as Other and 134 (57.0 per cent) as White, with two (0.9 per cent) preferring not to say and one (0.4 per cent) with data missing.

The results from this study are provided in Panel A of Figure 1 (for further plots confirming the main findings, see Appendix 2). We ran a series of logistic regression models, with standard errors clustered on the individual to account for the repeated measures. They show that regarding behavioural intentions to cooperate (donate or vaccinate), there was no significant effect for default (OR = 0.846, SE = 0.116, p = 0.224), policy focus (OR = 1.210, SE = 0.199, p = 0.247) or the interaction of the two (OR = 0.985, SE = 0235, p = 0.951) (for full logistic regressions, see Models 1 and 2 of Table A4 in Appendix 3).

In terms of perceived fairness (see Panel B [left] of Figure 1) (for further plots confirming the main findings, see Appendix 2), there was a significant effect for default (OR = 0.313, SE = 0.061, $p < 0.001$) but no significant effects for either policy focus (OR = 1.222, SE = 0.165, $p = 0.138$), or the interaction of the two (OR = 1.496, SE = 0.492, $p = 0.221$) (see Models 3 and 4 of Table A4 in Appendix 3). The significant default effect indicates that a significantly larger proportion of people perceive the opt-out system as less fair than the opt-in system, regardless of focus (donation or vaccination).

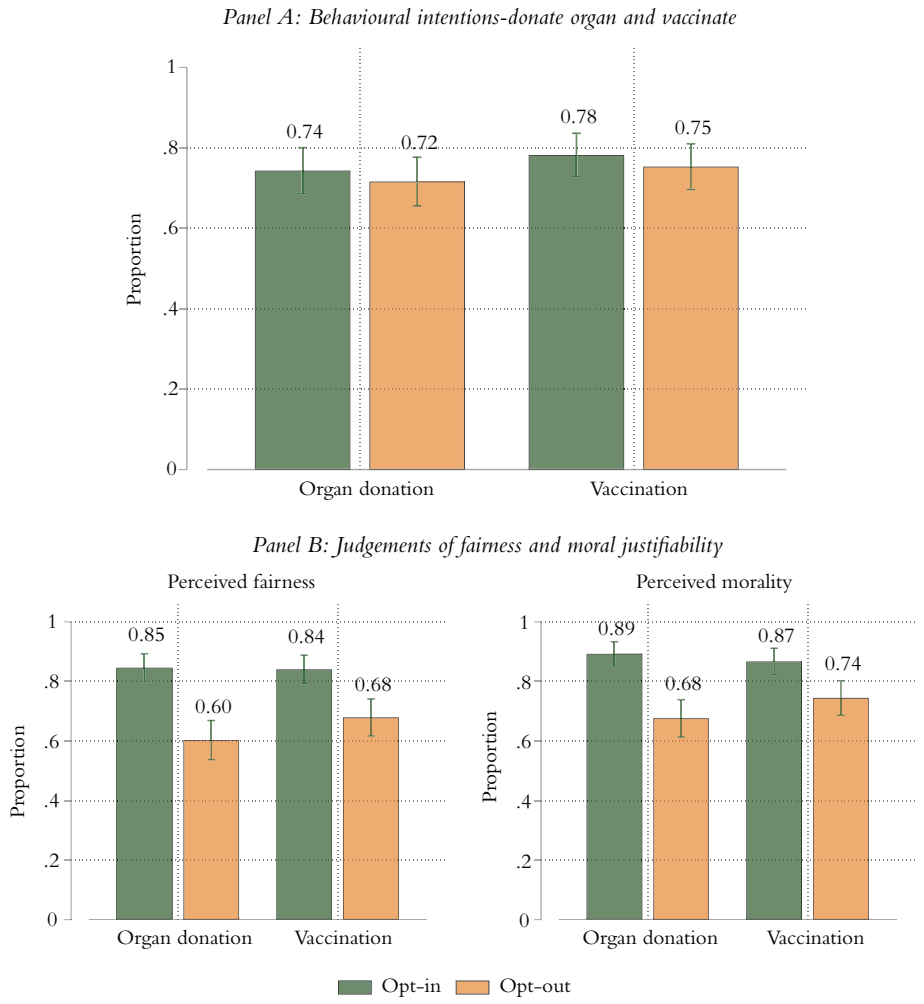
In terms of perceived morality (see Panel B [right] of Figure 1) (for further plots confirming the main findings, see Appendix 2), there was a significant effect for default (OR = 0.318, SE = 0.068, $p < 0.001$), no significant effect for policy focus (OR = 0.634, SE = 0.366, $p = 0.430$) but a weakly significant interaction between the two (OR = 1.771, SE = 0.595, $p = 0.089$). The significant default effect indicates that a

Table 1: Manipulation of defaults (opt in versus opt out) by focus of the policy (deceased organs versus vaccination), an alternative policy for deceased organ xenotransplantation and assessment of behavioural intentions, fairness and morality

		Policy focus		Alternative policy
Default	Opt in	Deceased organs	Vaccination	
		A person is considered automatically to be a *non-donor* after their death, but if they wish to be an organ donor, they can *register (opt in) as an organ donor*	A person is considered automatically *not to* have to get a vaccination, but if they wish to, they can choose to *opt in* and get vaccinated	
	Opt out	A person is considered automatically to be a *donor* after their death, but if they wish *not* to be an organ donor, they can *deregister (opt out) as an organ donor*	A person is considered automatically, *to get* a vaccination, but if they wish to, they can choose to *opt out* and not get vaccinated	
				Xenotransplantation Transplantation concerns the transplantation of organs between members of *different species*, primarily from pigs to humans
Assessments	**Behavioural intentions – cooperation**	Would you donate your organs after death under this system? (Yes = 1; No = 0)	Would you get a flu vaccination under this system? (Yes = 1; No = 0)	
	Behavioural intentions – treatment	Would you accept organs under this system? (Yes = 1; No = 0)		Would you accept organs under this system? (Yes = 1; No = 0)
	Fairness	Do you think this system is fair? (Yes = 1; No = 0)	Do you think this system is fair? (Yes = 1; No = 0)	Do you think this system is fair? (Yes = 1; No = 0)
	Morality	Is this system morally justifiable? (Yes = 1; No = 0)	Is this system morally justifiable? (Yes = 1; No = 0)	Is this system morally justifiable? (Yes = 1; No = 0)
	Normative judgement			Do you think that most people would accept an organ under this system?

Notes: For the exact implementation of these survey items, see Appendix 1. We should note that the order of questions was not randomised; therefore, order effects may be present. To account for individual characteristics, our statistical tests are clustered at the individual level (see appendices). The alternative policy data are considered later in the commentary.

Figure 1: Perceptions of defaults: default (opt in versus opt out) across focus (deceased organs versus vaccination)



Notes: Panel A captures intentions to donate an organ and get vaccinated across default policy. Panel B captures perceived fairness of organ donation and vaccination across default policy. The *y*-axis is the proportion of people willing to donate an organ and vaccinate (Panel A), or the proportion of people who consider the system fair or moral (Panel B). Confidence intervals (CIs) are 95 per cent CIs. While the analysis reports parametric tests, equivalent non-parametric tests were also conducted, yielding the same results.

significantly larger proportion of people perceived the opt-out system as less morally justifiable than the opt-in system, regardless of focus (donation or vaccination). The weak interaction effect indicates that for both donation and vaccination, opt out is perceived as less morally justifiable than opt in but that this difference is greater for organ donation than vaccination (see Models 5 and 6 of Table A4 in Appendix 3).

Thus, we clearly see that fewer people perceived an opt-out policy as fair or morally justifiable, with the difference for the morality measure between opt out and opt in being greater for deceased organ donation. A key takeaway from this is that opt-out defaults are not the panacea that they are often made out to be by policymakers (see also Kalkstein et al, 2022). While they undeniably have merits, they need to be implemented with careful thought and consideration of the context at hand.

Mechanisms beyond defaults

While defaults serve as a potential tool to enhance and scaffold the fragility of cooperation, opt-out policies face challenges with respect to public opinion and operational implementation (see, for example, Van Dalen and Henkens, 2014; Moseley and Stoker, 2015; MacKay and Robinson, 2016; Ferguson et al, 2019a). Therefore, other approaches need to be added to the arsenal of nudges. These should focus on levers that are known to enhance and sustain altruism and cooperation (for reviews with respect to blood and organ donation, see Ferguson and Masser, 2018; Masser et al, 2020). We discuss some key ones for cooperation in the public health domain.

The 'eyes have it': observability and reputation

Larson and Toledo (2023) highlight the importance of observability (Bradley et al, 2018) and reputation building (Milinski et al, 2001; 2002a; Milinski, 2016) in fostering cooperation. Indeed, evidence shows that being observed, or the feeling of being observed, can increase the probability of cooperation (Bateson et al, 2006; Bradley et al, 2018; see also Figure 2). While the effect size of this observer phenomenon is small, it amplifies when observers are passive or cooperation is consequential (Bradley et al, 2018). Reputation is one of the mechanisms proposed to support the observer effect (Bradley et al, 2018). That is to say, people want to be seen as nice, gain reputation points and not be judged harshly. Thus, as Larson and Toledo (2023) show, this underlies why the feeling of being observed, especially by a 'judgemental' deity, is an effective way to ensure compliance with social norms of cooperation (Shariff and Norenzayan, 2007; Norenzayan and Shariff, 2008).

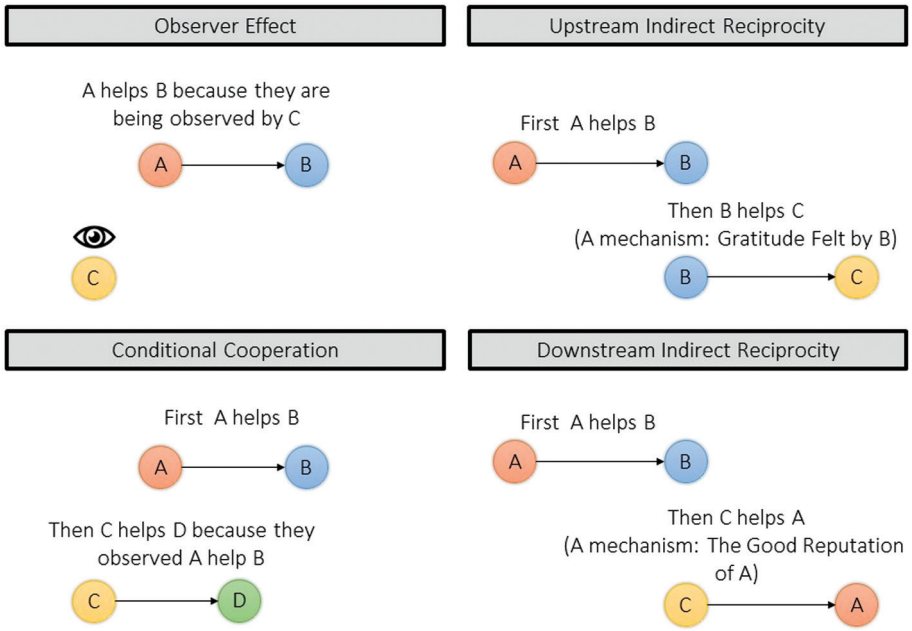
Observation also works in the opposite direction, based on the social norm of conditional cooperation (see Figure 2), whereby people cooperate conditionally and proportionally when observing that others cooperate or believing that they will cooperate in the future (Fischbacher et al, 2001; Fehr and Fischbacher, 2004). Norms of fairness and reciprocity potentially underlie this effect.

Indirect reciprocity is a mechanism to help explain why people help strangers (Nowak, 2006). There are two flavours of indirect reciprocity: *downstream* (or pay it back) and *upstream* (pay it forward).

Downstream indirect reciprocity (see Figure 2) occurs when a person (A) is observed or known to have helped another person (B), and A is helped by another person (C) because they helped person B. Reputation underlies downstream (or pay-it-back) indirect reciprocity (Nowak, 2006). That is to say, being observed to cooperate or known to have cooperated increases reputation, which, in turn, increases the probability of being helped (Gurven et al, 2000; Milinski et al, 2002b). This provides a clear evolutionary advantage to helping (Nowak, 2006) and explains why reputation is a valued commodity (Pfeiffer et al, 2012).

The other flavour of indirect reciprocity is upstream (or pay-it-forward) indirect reciprocity (Nowak and Roch, 2007) (see Figure 2). Here, a person (A) helps another person (B), who then goes on to help someone else (C). Gratitude (Nowak and Roch, 2007) has been proposed to underlie this flavour of indirect reciprocity. Gratitude, in fact, emerges as an important mechanism for all forms of reciprocity, including direct reciprocity, whereby one person helps another with the agreement that this will be repaid directly (Ma et al, 2017).

Figure 2: Observer effects, conditional cooperation and indirect (downstream and upstream) reciprocity



Notes: Observer effect: people are more likely to cooperate if they feel they are being observed. Conditional cooperation: people cooperate conditionally and proportionally when they observe, or believe, that others cooperate. Upstream indirect reciprocity: if A helps B, then B is more likely to help C. Downstream indirect reciprocity: if A helps B, then C, having observed this act, might help A in the future.

Source: The diagrams for indirect reciprocity have been adapted from Figure 1 of Nowak and Sigmund (2005).

If we consider just these four simple rules (observer effects, conditional cooperation and both downstream and upstream indirect reciprocity), we can see how they can lead to the emergence of sustainable cooperation among strangers, what Tang et al (2021) label 'generosity ripples'. This generosity-rippling effect should continue; however, if someone free rides and does not go on to pay that goodwill back or forward, then this branch of the cooperative chain will likely end.

Application to public health

The mechanisms just described can be applied to enhance public health cooperation through several distinct strategies:

- Observer effects: Sénémeaud et al (2017) demonstrated that using imagery of human eyes in messages asking people to donate blood significantly increases donor registrations. Specifically, when messages included the time and date of the blood drive along with an image of human eyes, the likelihood of donating was 2.5 times higher than those exposed to the same message with a neutral image.

- Conditional cooperation: the positive response to seeing others act cooperatively can be leveraged in public health. For example, indicating organ donor registration through a Facebook status update led to increased registration rates (Cameron et al, 2013). Known as the 'Facebook effect', there is no reason not to expect it to generalise to the vaccination context.

- Reciprocity:

  - Reciprocal primes: asking people to consider if they would accept an organ if needed has been shown to increase organ donation registrations under opt-in systems (Sallis et al, 2018; O'Carroll et al, 2019). This effect has also been shown to be effective in blood donation (Ferguson et al, 2022).
  - Pay it forward: this approach has been used to encourage vaccination uptake and screening. Tang et al (2021) describe a study where people in the 'pay-it-forward' condition are given a free flu vaccination and asked if they would be willing to support vaccination in other poorer areas (donate money to pay for vaccination or produce materials to support vaccination). Those in the standard vaccination condition paid a fee to get vaccinated. Vaccination rates were significantly higher (83 per cent versus 35 per cent) in the pay-it-forward versus standard condition. Importantly, of those in the pay-it-forward condition, 99 per cent paid cash (on average, equating to just over 50 per cent of the market price of the vaccine) to support vaccination elsewhere and 18 per cent created materials. In the context of screening, successful pay-it-forward interventions have been operationalised as follows. People receiving free screening are told that this is because others who have previously been screened had contributed money to ensure that others could receive screening. These people are then asked if they would contribute something so that others in the future could receive screening (Tang et al, 2021).

While there is substantial evidence to support the positive role of reputation and observability in encouraging prosocial behaviours, there are also instances where it might lead to counterproductive outcomes. For example, peer observation and the desire to maintain a reputation within a group can lead to vaccination hesitancy. For instance, in communities with anti-vaccination beliefs, individuals might refuse to get vaccinated in order to conform to the group social norm, even if they believe in the vaccine's benefits (Hornsey et al, 2018; Abdalla and Lee, 2021; Rabb et al, 2022; Moehring et al, 2023). The 'lone wolf' effect (discussed earlier) also shows the power of negative conditional cooperation (Ferguson et al, 2019a). This effect is stronger than the opposite 'good shepherd' effect, whereby people cooperate under an opt-in system once they observe others opting in (Ferguson et al, 2019a).

The warm glow of giving

The aforementioned mechanisms represent social phenomena, in that they concern relational dynamics between people and contexts over time, and how these influence evaluations of self and others, such as reputation. Certain emotional states, such as

gratitude, are also derived from social dynamics that drive (have a causal role in) future cooperation (Ma et al, 2017). Indeed, gratitude is part of a moral emotion triad that Haidt (2003; 2007) refers to as 'other-regarding emotions'. Similarly, the self-conscious moral emotions of Haidt's (2003) triad of shame, embarrassment and guilt (SEG) are also socially derived and have a casual role as reparative emotions that sustain cooperation through forgiveness (see Haidt, 2007; Skatova et al, 2017). Indeed, there is a growing literature on the strength and important role played by emotional drivers for cooperation in general (Ma et al, 2017) and blood donation specifically (Ferguson, 2015; Ferguson and Masser, 2018; Ferguson, 2022).

Outside these specific moral emotions is the theory of 'warm glow' from behavioural economics (Andreoni, 1990), that is, people gain emotional utility – a warm glow – from the act of helping others. Warm glow is linked to intrinsic motivation (Ferguson et al, 2019a) and the person's prosocial identity (Ferguson et al, 2023). Warm glow can both arise from helping and motivate future action by setting up an expectancy to gain more warm glow from helping again (Ferguson and Flynn, 2016). Warm glow has been shown to underly sustained high-cost giving in the context of blood donation (Ferguson et al, 2008; Ferguson, 2015; Ferguson and Lawrence, 2019; Ferguson et al, 2019a; 2019b; Ferguson et al, 2023). Similarly, personal utility could also be gained from vaccination in terms of the warm glow that comes from protecting others. This all suggests that like moral emotions, warm glow should have a causal role to play with respect to future cooperation. This has been confirmed with the exogenous manipulation of warm glow in a small but growing number of field experiments (Neumann, 2019; List et al, 2021; Ferguson et al, 2023).

With respect to SoHO, Ferguson et al (2023) showed that an exogenous manipulation of warm glow (framed message) was successful in 'warming up' cool cooperators to make a repeat blood donation three months later. Importantly, this work showed that this exogenous warm-glow nudge was maximally successful when catalysed by a prosocial identity prime designed to trigger the person's cooperative identity, in this case, as a blood donor (for example, 'Thank you, today is the day you became a blood donor, and we hope you are feeling the warm glow that comes from knowing you are helping save many people's lives in the future'). Thus, warm glow is effective when linked to identity as a good prosocial person, which is akin to reputation.

The 'vaccination altruism' hypothesis posits that emphasising the social benefits of vaccination can nudge people towards vaccinating. This concept has been supported in various studies (Betsch et al, 2013; 2017; but see Isler et al, 2020). Based on Ferguson et al (2023), this effectiveness could be further augmented by adding a prosocial-identity prime and warm-glow nudge: 'Thank you, today is the day you became a vaccinated person, and we hope you are feeling the warm glow that comes from knowing you are contributing greatly to help to protect yourself, a family member, friend and the wider community.' This work on warm-glow suggests that exploring the emotional experiences of cooperators in the context of public health and healthcare is critical to understanding cooperation and developing successful interventions (Ferguson and Masser, 2018).

Inequalities in public health

One of the most pressing challenges in public health today is addressing the lack of diversity and inclusion. Significant disparities persist within the sector. Recognising

and accounting for these nuances is crucial, as a 'one-size-fits-all' strategy risks diminished effectiveness.

Inequality in SoHO

One issue that sits at the heart of global inequalities in healthcare is access to the safe and adequate supply of blood by those in low- and middle-income countries (LMICs) due to: (1) shortfalls in the supply of blood; and (2) safety in terms of transfusion-transmitted infections (TTIs) (WHO, 2023a). In terms of shortfalls, there are, on average, 5.9 donations per 1,000 in lower LMIC countries compared to 33.1 per 1,000 in high-income countries (WHO, 2023a), with 35 countries in sub-Saharan Africa collecting fewer than ten donations per 1,000 individuals (Barro et al, 2018). A similar picture emerges for both vaccination (Nabaggala et al, 2022; Tatar et al, 2022; WHO, 2023b) and organ donation (Vanholder et al, 2021; Sterri et al, 2022). These disparities may, in part, reflect donor and recipient motivations, beliefs and models of altruism, resources, infrastructure, and finances (Barro et al, 2018; Hajizadeh, 2018; Bayati et al, 2022). However, this issue requires cooperation across nations and within communities, neighbourhoods and groups to tackle these structural issues and understand specific motivations and barriers (Bavel et al, 2020).

The importance of co-design

Larson and Toledo (2023) highlight the importance of cultural sensitivity and message tailoring to sustain cooperation, especially in hard-to-reach or minority populations (see also Telenta et al, 2020). Indeed, there is a need for a greater voice for minority ethnic groups in research to overcome such barriers to health, and this is advocated by both the UK and US governments (for the US, see US Department of Health and Human Services Office of Minority Health, 2001; for the UK, see the Health and Social Care Act 2012[2] and National Health Service Act 2006[3]). Therefore, co-design needs to be the cornerstone of any public health campaign (Trischler et al, 2019; Telenta et al, 2020). Co-design is a dynamic and interactive process whereby communities affected by an issue participate in developing, producing, and evaluating materials (Trischler et al, 2019; Telenta et al, 2020).

For example, we are currently working with Action-on-Blood to develop community-based co-designed arts-based interventions to encourage more Black people in the UK to donate blood. Through the co-design process, these arts-based approaches were designed to be inclusive and context-free but to engage people emotionally. Through a wider co-design and community-based approach, important questions have been raised with respect to encouraging more Black blood donors. From a clinical perspective, people with sickle cell disease (SCD), which is more prevalent in people from Black African/Caribbean backgrounds, have better outcomes if treated with blood from the same background (Shaz et al, 2008). This is due to the effective matching of donor and recipient on the Ro Kell antigen (Josephson et al, 2007; Shaz et al, 2008; Berzuini et al, 2021), which has a 52 per cent prevalence in Black people versus 2 per cent in White people (NHSBT, 2022a). However, only 5 per cent of current blood donors in the UK are from minority ethnic communities, despite these communities representing 14 per cent of the population (NHSBT, 2022b).

Several UK and European campaigns have sought to encourage blood donation among Black people, often differing in their focus on 'specificity' or 'inclusivity'. While inclusivity promotes unity and shared responsibility, specificity-oriented campaigns emphasise traits or health conditions within a target group. However, there is a risk: emphasising specificity might inadvertently foster 'othering' (Grove and Zwi, 2006; Akbulut and Razum, 2022; Avera, 2023), a feeling of marginalisation and social exclusion. Feedback from Black communities often reflects a sentiment that blood from this community is not valued by the broader community (Renzaho and Polonsky, 2013). Conversely, a concentrated spotlight on SCD might foster in-group altruism (Charbonneau and Tran, 2013; Parmasad, 2015). An experiment (see preregistration: https://osf.io/9zemj (DOI:https://doi.org/10.17605/OSF.IO/9ZEMJ)) is currently under way to explore these important questions. It is worth noting that understanding of the tension between specificity and inclusivity might not have emerged without the insights provided by the co-design process.

The individual and systematic frames

While many of the approaches described in this journal issue, including in Larson and Toledo's (2023) article, emphasise the behavioural science approach that focuses on individual behavioural change, this should be carefully considered when the factors that we are trying to change are often societal. Chater and Loewenstein (2022) distinguish between 'i-frames' that focus on individual behavioural change and 's-frames' that focus on the system in which individuals are operating. They argue that the needle has moved too far towards i-frame at the expense of s-frame policies. The authors claim that a focus on i-frames makes the problem one of individual responsibility, providing the example of a 'carbon footprint', a public relations (PR) initiative by the petroleum industry to reframe solutions to global warming as an individual responsibility to change rather than focusing on systematic changes (for example, changing the type of fuel used, how energy is used, energy taxes and so on). Indeed, as Chater and Loewenstein (2022: 5–6) state: 'Corporations with an interest in maintaining the status quo promote PR messages that the problem at hand is one of individual responsibility, and that people need help to exercise that responsibility more effectively. That is, the challenge is cast in the i-frame.' That said, they also argue that i-frames can be used to inform better s-frame policies. For example, they consider: how s-frames should be framed; when and for whom s-frame policies will be acceptable; whether s-frames have any unforeseen consequences; and debates surrounding a supportive environment for s-frame policies. We now explore two cases of s-framed policies, holding true to the notion of 'libertarian paternalism' (Thaler and Sunstein, 2003), where behaviour can be changed while adhering to personal autonomy and freedom of choice.

UK blood services: fostering greater diversity and inclusion

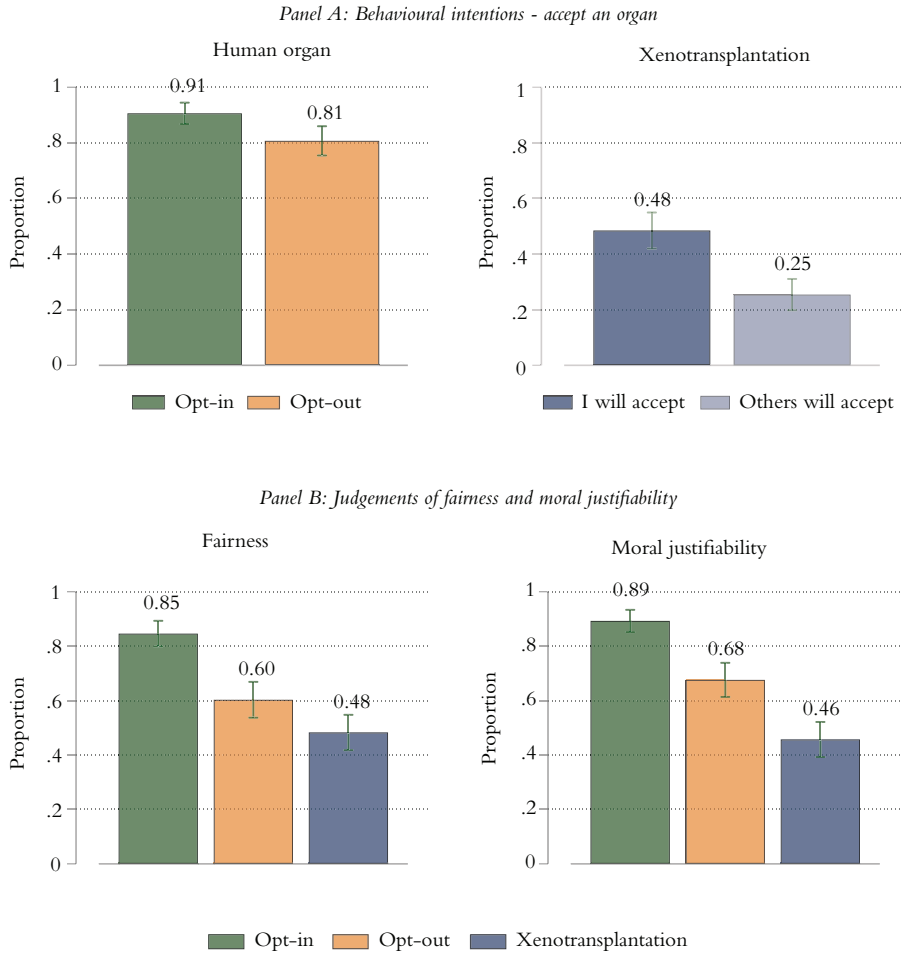
One example of systematic change (s-frame policy) is when the UK blood services changed policy from deferring men who have sex with men (MSM) from donating blood, based on their sexual behaviour, to an individualised approach, based on the sexual behaviour and history of all potential donors. Behavioural science was a key

part of the research process to inform and support the successful policy change, rollout and evaluation (see the FAIR project: https://www.blood.co.uk/news-and-campaigns/news-and-statements/fair-steering-group/). This work reflects a broader understanding of risk and a commitment to fairness and inclusivity within one segment of healthcare.

Xenotransplantation: getting public buy-in

An example of an s-frame policy to solve the organ donation shortage would be to move towards xenotransplantation: the use of animals other than humans as a source

Figure 3: Perceptions of xenotransplantation relative to human organ donation



Notes: Panel A captures willingness to accept a human organ across default policies (left). For xenotransplantation (right), subjects were asked their perception of whether they would accept an organ under this policy and whether they think others would accept it (this did not vary by default policy). Panel B captures the perceived fairness of organ donation by default policy and xenotransplantation. The *y*-axis is the proportion of people willing to accept organs (Panel A) or believing a system was fair or morally justifiable (Panel B). Confidence intervals (CIs) are 95 per cent CIs. While the analysis reports parametric tests, equivalent non-parametric tests were also conducted, yielding the same results.

of organs (Denner, 2014; Jou et al, 2023). This offers a very different potential solution to the organ shortage (Harris et al, 2014; Hryhorowicz et al, 2017). Pig organs are the most suitable for human use, and advances in the bioengineering of pig organs have overcome many basic immune-rejection problems (Denner, 2014). Combined with the promise of mixed-chimerism, a technique to reduce the burden of anti-rejection medication, xenotransplantation is becoming a real possibility (Sykes and Sachs, 2001; Yamada et al, 2017). There are, of course, issues to be overcome, not only with respect to bioengineering, immunology and transplantation but also moral and psychological concerns. There is the worry about zoonotic infections, animal welfare and the ethics of using engineered animal organs as sources of products to aid human health (Nuffield Council on Bioethics, 1996; Zhai, 2022).

In a comparative context, it is informative to see how xenotransplantation is perceived in terms of fairness and morality as key components of cooperation relative to the opt-in and opt-out systems. Using the same survey study discussed earlier (see Table 1), we explored this exact question. The results in Panel A of Figure 3 show clearly that compared to the case for human organ donation, fewer people were willing to accept xenotransplantation (OR = 0.074, SE = 0.019, $p < 0.001$) and fewer thought that others would accept it (OR = 0.026, SE = 0.008, $p < 0.001$) (for full results, see Model 1 of Table A5 in Appendix 4). In addition, fewer people perceived xenotransplantation to be fair (OR = 0.152, SE = 0.037, $p < 0.001$) (see Panel B of Figure 3) (for full results, see Model 2 of Table A5 in Appendix 4) and morally justifiable (OR = 0.092, SE = 0.025, $p < 0.001$ (see Panel B of Figure 3) (for full results, see Model 3 of Table A5 in Appendix 4). Thus, these results suggest that while xenotransplantation offers a potential solution to the organ shortage, there is considerable work to be done with respect to wider public buy-in (for these results, see Table A5 in Appendix 4).

Conclusions

Cooperation is fragile but the bedrock of society and human evolution (Nowak, 2006). We need to acknowledge the importance of cooperation in healthcare and the provision of health-based public goods that provide such valuable benefits to public health. We need to develop and trial ways to enhance cooperation but be mindful of the nuances that come along with it. We need to strive for greater diversity and inclusion within healthcare and acknowledge that it is not always individuals that need to change but, rather, the environment in which they operate.

ORCID iD

Eamonn Ferguson https://orcid.org/0000-0002-7678-1451
Richard Mills https://orcid.org/0000-0002-1161-5815

Notes

[1] Corresponding author.
[2] Available at: www.legislation.gov.uk/ukpga/2006/41/contents
[3] Available at: www.legislation.gov.uk/ukpga/2012/7/contents/enacted

Funding

This work was funded by National Institute for Health and Care Research Blood and Transplant Research Unit in Donor Health and Behaviour (NIHR203337).

Acknowledgements
We would like to acknowledge the contribution of everyone who participated in this research. We also want to thank and acknowledge Sarah Woodland, Farkhanda Jabeen and Rebecca Foster for their help with data collection.

Ethics statement
The online study was approved through the ethical procedure at the School of Psychology, University of Nottingham (Ref: 738, 3 August 2020).

Data availability
The supplementary file and data file are available at: https://osf.io/hsq9c/

Conflict of interest
The authors declare that there is no conflict of interest.

References
Abdallah, D.A. and Lee, C.M. (2021) Social norms and vaccine uptake: college students' COVID vaccination intentions, attitudes, and estimated peer norms and comparisons with influenza vaccine, *Vaccine*, 39(15): 2060–7. doi: 10.1016/j.vaccine.2021.03.018

Akbulut, N. and Razum, O. (2022) Why othering should be considered in research on health inequalities: theoretical perspectives and research needs, *SSM – Population Health*, 20: 101286.

Andreoni, J. (1990) Impure altruism and donations to public goods: a theory of warm-glow giving, *The Economic Journal*, 100(401): 464–77. doi: 10.2307/2234133

Arshad, A., Anderson, B. and Sharif, A. (2019) Comparison of organ donation and transplantation rates between opt-out and opt-in systems, *Kidney International*, 95(6): 1453–60. doi: 10.1016/j.kint.2019.01.036

Avera, E. (2023) 'Blood has no colour': racialized donor in/ex-clusion in the South African National Blood Service, *Medical Anthropology*, 42(3): 207–21. doi: 10.1080/01459740.2023.2187295

Barro, L. et al. (2018) Blood transfusion in sub-Saharan Africa: understanding the missing gap and responding to present and future challenges, *Vox Sanguinis*, 113(8): 726–36. doi: 10.1111/vox.12705

Bateson, M., Nettle, D. and Roberts, G. (2006) Cues of being watched enhance cooperation in a real-world setting, *Biology Letters*, 2(3): 412–14. doi: 10.1098/rsbl.2006.0509

Bavel, J.J. et al. (2020) Using social and behavioural science to support COVID-19 pandemic response, *Nature Human Behaviour*, 4(5): 460–71. doi: 10.1038/s41562-020-0884-z

Bayati, M. et al. (2022) Inequality in the distribution of Covid-19 vaccine: a systematic review, *International Journal for Equity in Health*, 21(1): 1–9. doi: 10.1186/s12939-021-01581-5

Berzuini, A. et al. (2021) Black blood matters, *Blood Transfusion*, 19(5): 363.

Betsch, C., Böhm, R. and Korn, L. (2013) Inviting free-riders or appealing to prosocial behavior? Game-theoretical reflections on communicating herd immunity in vaccine advocacy, *Health Psychology*, 32(9): 978–85.

Betsch, C., Böhm, R., Korn, L. and Holtmann, C. (2017) On the benefits of explaining herd immunity in vaccine advocacy, *Nature Human Behaviour*, 1(3): 56.

BMA (British Medical Association) (2021) Organ donation, www.bma.org.uk/advice-and-support/ethics/end-of-life/organ-donation

Bradley, A., Lawrence, C. and Ferguson, E. (2018) Does observability affect prosociality?, *Proceedings of the Royal Society B: Biological Sciences*, 285(1875): 20180116. doi: 10.1098/rspb.2018.0116

Cameron, A.M. et al. (2013) Social media and organ donor registration: the Facebook effect, *American Journal of Transplantation*, 13(8): 2059–65. doi: 10.1111/ajt.12312

Chapman, G.B. et al. (2010) Opting in vs opting out of influenza vaccination, *JAMA*, 304(1): 43–4. doi: 10.1001/jama.2010.892

Charbonneau, J. and Tran, N.Y. (2013) The symbolic roots of blood donation, *Transfusion*, 53: 172S–9S.

Chater, N. and Loewenstein, G. (2022) The i-frame and the s-frame: how focusing on individual-level solutions has led behavioral public policy astray, *Behavioral and Brain Sciences*, 46: e147.

Curry, O.S., Chesters, M.J. and Van Lissa, C.J. (2019a) Mapping morality with a compass: testing the theory of 'morality-as-cooperation' with a new questionnaire, *Journal of Research in Personality*, 78: 106–24.

Curry, O.S., Mullins, D.A. and Whitehouse, H. (2019b) Is it good to cooperate? Testing the theory of morality-as-cooperation in 60 societies, *Current Anthropology*, 60(1): 47–69.

Denner, J. (2014) Xenotransplantation – progress and problems: a review, *Journal of Transplantations Technologies and Research*, 4(2): 100013. doi: 10.4172/2161-0991.1000133

Ebeling, F. and Lotz, S. (2015) Domestic uptake of green energy promoted by opt-out tariffs, *Nature Climate Change*, 5(9): 868–71. doi: 10.1038/nclimate2681

Ent, M.R. et al. (2020) Helping behavior is non-zero-sum: helper and recipient autobiographical accounts of help, *Evolution and Human Behavior*, 41(3): 210–17. doi: 10.1016/j.evolhumbehav.2020.02.004

Etheredge, H.R. (2021) Assessing global organ donation policies: opt-in vs opt-out, *Risk Management and Healthcare Policy*, 14: 1985–98. doi: 10.2147/RMHP.S270234

Fehr, E. and Fischbacher, U. (2004) Social norms and human cooperation, *Trends in Cognitive Sciences*, 8(4): 185–90. doi: 10.1016/j.tics.2004.02.007

Ferguson, E. (2015) Mechanisms of altruism approach to blood donor recruitment and retention: a review and future directions, *Transfusion Medicine*, 25: 211–26. doi: 10.1111/tme.12233

Ferguson, E. (2022) What blood and organ donation can tell us about cooperation?, *Current Opinion in Psychology*, 44: 202–7. doi: 10.1016/j.copsyc.2021.09.005

Ferguson, E. and Flynn, N. (2016) Moral relativism as a disconnect between behavioural and experienced warm glow, *Journal of Economic Psychology*, 56: 163–75. doi: 10.1016/j.joep.2016.06.002

Ferguson, E. and Lawrence, C. (2019) Altruistic and warm-glow motivations: differentiating first time from repeat donors, *TPM: Testing, Psychometrics, Methodology in Applied Psychology*, 26(4): 639–51.

Ferguson, E. and Masser, B. (2018) Emotions and prosociality: lesson for blood donation. in D.M. Williams, R.E. Rhodes and M.T. Conner (eds) *Affective Determinants of Health Behavior*, New York: Oxford Academic Press, pp 377–99. doi: 10.1093/oso/9780190499037.003.0017

Ferguson, E., Farrell, K. and Lawrence, C. (2008) Blood donation is an act of benevolence rather than altruism, *Health Psychology*, 27(3): 327. doi: 10.1037/0278-6133.27.3.327

Ferguson, E., Edwards, A.R.A. and Masser, B.M. (2022) Simple reciprocal fairness message to enhance non-donor's willingness to donate blood, *Annals of Behavioral Medicine*, 56(1): 89–99. doi: 10.1093/abm/kaab026

Ferguson, E., Lawrence, C., Bowen, S., Gemelli, C.N., Rozsa, A., Niekrasz, K., van Dongen, A., Williams, L.A., Thijsen, A., Guerin, N., Masser, B. and Davison, T.E. (2023) Warming up cool cooperators, *Nature Human Behaviour*, doi: 10.1038/s41562-023-01687-6

Ferguson, E., Murray, C. and O'Carroll, R.E. (2019a) Blood and organ donation: health impact, prevalence, correlates, and interventions, *Psychology and Health*, 34(9): 1073–104.

Ferguson, E., Shichman, R. and Tan, J.H.W. (2020) When lone wolf defectors undermine the power of the opt-out default, *Scientific Reports*, 10(1): 8973. doi: 10.1038/s41598-020-65163-1

Ferguson, E., Zhao, K., O'Carroll, R.E. and Smillie, L.D. (2019b) Costless and costly pro-sociality: correspondence among personality traits, economic preferences, and real world pro-sociality, *Social Psychological and Personality Science*, 10: 461–71. doi: 10.1177/1948550618765071

Fischbacher, U., Gächter, S. and Fehr, E. (2001) Are people conditionally cooperative? Evidence from a public goods experiment, *Economics Letters*, 71(3): 397–404.

Grove, N.J. and Zwi, A.B. (2006) Our health and theirs: forced migration, othering, and public health, *Social Science and Medicine*, 62(8): 1931–42. doi: 10.1016/j.socscimed.2005.08.061

Gurven, M. et al. (2000) 'It's a wonderful life': signaling generosity among the Ache of Paraguay, *Evolution and Human Behavior*, 21(4): 263–82. doi: 10.1016/S1090-5138(00)00032-5

Haidt, J. (2003) The moral emotions, in R.J. Davidson, K.R. Scherer and H.H. Goldsmith (eds) *Handbook of Affective Sciences*, Oxford: Oxford University Press, pp 852–70.

Haidt, J. (2007) The new synthesis in moral psychology, *Science*, 316(5827): 998–1002. doi: 10.1126/science.1137651

Hajizadeh, M. (2018) Socioeconomic inequalities in child vaccination in low/middle-income countries: what accounts for the differences?, *Journal of Epidemiology and Community Health*, 72(8): 719–25. doi: 10.1136/jech-2017-210296

Harris, D.G. et al. (2014) Lung xenotransplantation: recent progress and current status, *Xenotransplantation*, 21(6): 496–506. doi: 10.1111/xen.12116

Hornsey, M.J., Harris, E.A. and Fielding, K.S. (2018) The psychological roots of anti-vaccination attitudes: a 24-nation investigation, *Health Psychology*, 37(4): 307. doi: 10.1037/hea0000586

Hryhorowicz, M. et al. (2017) Genetically modified pigs as organ donors for xenotransplantation, *Molecular Biotechnology*, 59: 435–44. doi: 10.1007/s12033-017-0024-9

Hyde, M.K., Masser, B.M. and Coundouris, S.P. (2022) A review of whole-blood donors' willingness, motives, barriers and interventions related to donating another substance of human origin, *Transfusion Medicine*, 32(2): 95–114.

Isler, O. et al. (2020) Limits of the social-benefit motive among high-risk patients: a field experiment on influenza vaccination behaviour, *BMC Public Health*, 20(1): 1–9. doi: 10.1186/s12889-019-7969-5

Johnson, E.J. and Goldstein, D. (2003) Do defaults save lives?, *Science*, 302(5649): 1338–9. doi: 10.1126/science.1091721

Josephson, C.D. et al. (2007) Transfusion in the patient with sickle cell disease: a critical review of the literature and transfusion guidelines, *Transfusion Medicine Reviews*, 21(2): 118–33. doi: 10.1016/j.tmrv.2006.11.003

Jou, S. et al. (2023) Heart transplantation: advances in expanding the donor pool and xenotransplantation, *Nature Reviews Cardiology*. doi: 10.1038/s41569-023-00902-1

Kalkstein, D.A., De Lima, F., Brady, S.T., Rozek, C.S., Johnson, E.J. and Walton, G.M. (2022) Defaults are not a panacea: distinguishing between default effects on choices and on outcomes, *Behavioural Public Policy*. doi: 10.1017/bpp.2022.24

Larson, H.J. and Toledo, A.H. (2023) Nurturing, nudging and navigating the increasingly precarious nature of cooperation in public health: the cases of vaccination and organ donation, *Global Discourse*, 13: 3–4. doi: 10.1332/204378921X16884790609187

Lehmann, B.A. et al. (2016) Changing the default to promote influenza vaccination among health care workers, *Vaccine*, 34(11): 1389–92. doi: 10.1016/j.vaccine.2016.01.046

List, J.A., Murphy, J.J., Price, M.K. and James, A.G. (2021) An experimental test of fundraising appeals targeting donor and recipient benefits, *Nature Human Behaviour*, 5(10): 1339–48. doi: 10.1038/s41562-021-01095-8

Ma, L.K., Tunney, R.J. and Ferguson, E. (2017) Does gratitude enhance prosociality? A meta-analytic review, *Psychological Bulletin*, 143(6): 601–35. doi: 10.1037/bul0000103

MacKay, D. and Robinson, A. (2016) The ethics of organ donor registration policies: nudges and respect for autonomy, *American Journal of Bioethics*, 16(11): 3–12. doi: 10.1080/15265161.2016.1222007

Martínez-López, M.V., Díaz-Cobacho, G., Liedo, B., Rueda, J. and Molina-Pérez, A. (2022) Beyond the altruistic donor: embedding solidarity in organ procurement policies, *Philosophies*, 7(5): 107. doi: 10.3390/philosophies7050107

Masser, B. et al. (2020) Beyond description: the predictive role of affect, memory, and context in the decision to donate or not donate blood, *Transfusion Medicine and Hemotherapy*, 47(2): 175–85. doi: 10.1159/000501917

Milinski, M. (2016) Reputation, a universal currency for human social interactions, *Philosophical Transactions of the Royal Society B: Biological Sciences*, 371(1687): 20150100. doi: 10.1098/rstb.2015.0100

Milinski, M. et al. (2001) Cooperation through indirect reciprocity: image scoring or standing strategy?, *Proceedings of the Royal Society of London. Series B: Biological Sciences*, 268(1484): 2495–501. doi: 10.1098/rspb.2001.1809

Milinski, M., Semmann, D. and Krambeck, H. (2002a) Donors to charity gain in both indirect reciprocity and political reputation, *Proceedings of the Royal Society of London. Series B: Biological Sciences*, 269(1494): 881–3. doi: 10.1098/rspb.2002.1964

Milinski, M., Semmann, D. and Krambeck, H.J. (2002b) Reputation helps solve the 'tragedy of the commons', *Nature*, 415(6870): 424–6.

Moehring, A., Collis, A., Garimella, K., Rahimian, M.A., Aral, S. and Eckles, D. (2023) Providing normative information increases intentions to accept a COVID-19 vaccine, *Nature Communications*, 14(1): 126. doi: 10.1038/s41467-022-35052-4

Molina-Pérez, A., Rodríguez-Arias, D. and Delgado, J. (2022) Differential impact of opt-in, opt-out policies on deceased organ donation rates: a mixed conceptual and empirical study, *BMJ Open*, 12(9): e057107.

Moseley, A. and Stoker, G. (2015) Putting public policy defaults to the test: the case of organ donor registration, *International Public Management Journal*, 18(2): 246–64. doi: 10.1080/10967494.2015.1012574

Nabaggala, M.S. et al. (2022) The global inequity in COVID-19 vaccination coverage among health and care workers, *International Journal for Equity in Health*, 21: 147. doi: 10.1186/s12939-022-01750-0

Neumann, R. (2019) The framing of charitable giving: a field experiment at bottle refund machines in Germany, *Rationality and Society*, 31(1): 98–126. doi: 10.1177/1043463118820894

NHSBT (2022b) Black, Asian and minority ethnic communities, www.blood.co.uk/why-give-blood/demand-for-different-blood-types/black-asian-and-minority-ethnic-communities/.

NHSBT (NHS Blood and Transplant) (2022a) Blood donation statistics, www.nhsbt.nhs.uk/how-you-can-help/get-involved/share-statistics/blood-donation-statistics/.

Norenzayan, A. and Shariff, A.F. (2008) The origin and evolution of religious prosociality, *Science*, 322(5898): 58–62. doi: 10.1126/science.1158757

Nowak, M.A. (2006) Five rules for the evolution of cooperation, *Science*, 314(5805): 1560–3. doi: 10.1126/science.1133755

Nowak, M.A. and Roch, S. (2007) Upstream reciprocity and the evolution of gratitude, *Proceedings of the Royal Society B: Biological Sciences*, 274(1610): 605–10. doi: 10.1098/rspb.2006.0125

Nowak, M.A. and Sigmund, K. (2005) Evolution of indirect reciprocity, *Nature*, 437(7063): 1291–8. doi: 10.1038/nature04131

Nuffield Council on Bioethics (1996) Animal-to-human transplants: the ethics of xenotransplantation, www.nuffieldbioethics.org/assets/pdfs/xenotransplantation.pdf.

O'Carroll, R.E., Quigley, J. and Miller, C.B. (2019) The effect of reciprocity priming on organ donor registration intentions and behavior, *Annals of Behavioral Medicine*, 53(6): 592–5.

Parmasad, V. (2015) 'She is my blood': donation and reciprocity in Trinidad 1, in J. Charbonneau and A. Smith (eds) *Giving Blood: The Institutional Making of Altruism*, London: Routledge, pp 199–218.

Pfeiffer, T. et al. (2012) The value of reputation, *Royal Society Interface*, 9(76): 2791–7. doi: 10.1098/rsif.2012.0332

Rabb, N., Bowers, J., Glick, D., Wilson, K.H. and Yokum, D. (2022) The influence of social norms varies with 'others' groups: evidence from COVID-19 vaccination intentions, *Proceedings of the National Academy of Sciences*, 119(29): e2118770119.

Rand, D.G. and Nowak, M.A. (2013) Human cooperation, *Trends in Cognitive Sciences*, 17(8): 413–25. doi: 10.1016/j.tics.2013.06.003

Renzaho, A.M.N. and Polonsky, M.J. (2013) The influence of acculturation, medical mistrust, and perceived discrimination on knowledge about blood donation and blood donation status, *Transfusion*, 53: 162S–71S.

Rithalia, A. et al. (2009) Impact of presumed consent for organ donation on donation rates: a systematic review, *British Medical Journal*, 338: a3162. doi: 10.1136/bmj.a3162

Sallis, A., Harper, H. and Sanders, M. (2018) Effect of persuasive messages on National Health Service organ donor registrations: a pragmatic quasi-randomised controlled trial with one million UK road taxpayers, *Trials*, 19: 1–10. doi: 10.1186/s13063-017-2423-4

Sénémeaud, C. et al. (2017) The watching-eyes phenomenon and blood donation: does exposure to pictures of eyes increase blood donation by young adults?, *Transfusion and Apheresis Science*, 56(2): 168–70.

Shariff, A.F. and Norenzayan, A. (2007) God is watching you: priming god concepts increases prosocial behavior in an anonymous economic game, *Psychological Science*, 18(9): 803–9. doi: 10.1111/j.1467-9280.2007.01983.x

Shaw, R.M. (2019) Altruism, solidarity and affect in live kidney donation and breastmilk sharing, *Sociology of Health & Illness*, 41(3): 553–66. doi: 10.1111/1467-9566.12805

Shaz, B.H. et al. (2008) Blood donation and blood transfusion: special considerations for African Americans, *Transfusion Medicine Reviews*, 22(3): 202–14. doi: 10.1016/j.tmrv.2008.02.006

Shepherd, L., O'Carroll, R.E. and Ferguson, E. (2014) An international comparison of deceased and living organ donation/transplant rates in opt-in and opt-out systems: a panel study, *BMC Medicine*, 12(1): 1–14.

Skatova, A., Spence, A., Leygue, C. and Ferguson, E. (2017) Guilty repair sustains cooperation, angry retaliation destroys it, *Scientific Reports*, 7: 46709. doi: 10.1038/srep467

Sterri, A.B., Regmi, S. and Harris, J. (2022) Ethical solutions to the problem of organ shortage, *Cambridge Quarterly of Healthcare Ethics*, 31(3): 297–309. doi: 10.1017/S0963180121000955

Sykes, M. and Sachs, D.H. (2001) Mixed chimerism, *Philosophical Transactions of the Royal Society of London. Series B: Biological Sciences*, 356(1409): 707–26. doi: 10.1098/rstb.2001.0853

Tang, W. et al. (2021) How kindness can be contagious in healthcare, *Nature Medicine*, 27(7): 1142–4. doi: 10.1038/s41591-021-01401-x

Tatar, M. et al. (2022) COVID-19 vaccine inequality: a global perspective, *Journal of Global Health*, 12: 03072. doi: 10.7189/jogh.12.03072

Telenta, J. et al. (2020) Australian lessons for developing and testing a culturally inclusive health promotion campaign, *Health Promotion International*, 35(2): 217–31. doi: 10.1093/heapro/day118

Thaler, R.H. and Sunstein, C.R. (2003) Libertarian paternalism, *American Economic Review*, 93(2): 175–9. doi: 10.1257/000282803321947001

Thaler, R.H. and Sunstein, C.R. (2008) Nudge: improving decisions about health, *Wealth, and Happiness*, 6: 14–38.

Trischler, J., Dietrich, T. and Rundle-Thiele, S. (2019) Co-design: from expert- to user-driven ideas in public service design, *Public Management Review*, 21(11): 1595–619. doi: 10.1080/14719037.2019.1619810

US Department of Health and Human Services Office of Minority Health (2001) *National Standards for Culturally and Linguistically Appropriate Services in Health Care (Final Report)*, Washington, DC: Office of Minority Health.

Van Dalen, H.P. and Henkens, K. (2014) Comparing the effects of defaults in organ donation systems, *Social Science and Medicine*, 106: 137–42. doi: 10.1016/j.socscimed.2014.01.052

Van Lange, P.A. and Rand, D.G. (2022) Human cooperation and the crises of climate change, COVID-19, and misinformation, *Annual Review of Psychology*, 73: 379–402. doi: 10.1146/annurev-psych-020821-110044

Vanholder, R. et al. (2021) Organ donation and transplantation: a multi-stakeholder call to action, *Nature Reviews Nephrology*, 17(8): 554–68. doi: 10.1038/s41581-021-00425-3

West, S.A., El Mouden, C. and Gardner, A. (2011) Sixteen common misconceptions about the evolution of cooperation in humans, *Evolution and Human Behavior*, 32(4): 231–62. doi: 10.1016/j.evolhumbehav.2010.08.001

West, S.A., Griffin, A.S. and Gardner, A. (2007) Social semantics: altruism, cooperation, mutualism, strong reciprocity and group selection, *Journal of Evolutionary Biology*, 20(2): 415–32. doi: 10.1111/j.1420-9101.2006.01258.x

WHO (2021) WHO Model Lists of Essential Medicines, https://www.who.int/groups/expert-committee-on-selection-and-use-of-essential-medicines/essential-medicines-lists.

WHO (2023b) Immunization coverage, www.who.int/news-room/fact-sheets/detail/immunization-coverage.

WHO (World Health Organization) (2023a) Blood safety and availability, www.who.int/news-room/fact-sheets/detail/blood-safety-and-availability.

Yamada, K., Sykes, M. and Sachs, D.H. (2017) Tolerance in xenotransplantation, *Current Opinion in Organ Transplantation*, 22(6): 522. doi: 10.1097/MOT.0000000000000466

Zhai, X. (2022) Xenotransplantation – reflections on the bioethics, *Health Care Science*, 1(2): 86–92. doi: 10.1002/hcs2.18