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REVIEW ARTICLE

Cultural evolutionary behavioural science in public policy

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Abstract
Interventions are to the social sciences what inventions are to the physical sciences – an application of science as technology. Behavioural science has emerged as a powerful toolkit for developing public policy interventions for changing behaviour. However, the translation from principles to practice is often moderated by contextual factors – such as culture – that thwart attempts to generalize past successes. Here, we discuss cultural evolution as a framework for addressing this contextual gap. We describe the history of behavioural science and the role that cultural evolution plays as a natural next step. We review research that may be considered cultural evolutionary behavioural science in public policy, and the promise and challenges to designing cultural evolution informed interventions. Finally, we discuss the value of applied research as a crucial test of basic science: if theories, laboratory and field experiments do not work in the real world, they do not work at all.

Keywords: cultural evolution; applied cultural evolution; behavioural public policy; WEIRD; behavioural science

Introduction

Our psychology and behaviour are shaped by millions of years of genetic evolution, thousands of years of cultural evolution and a short lifetime of experience (Muthukrishna *et al.*, 2021). Dual inheritance theory describes how genes, culture and individual learning interact to shape our behaviour, explaining how we evolved as a cultural species, how culture itself evolves and how gene-culture coevolution has shaped our genomes and physiology (Cavalli-Sforza & Feldman, 1981; Boyd & Richerson, 1985; Henrich *et al.*, 2008; Boyd *et al.*, 2011; Chudek *et al.*, 2015; Henrich, 2016; Uchiyama *et al.*, 2021). Much of our behaviour is shaped by culture – the values, beliefs, behaviours, norms, skills, know-how and technologies each of us possesses. Dual inheritance theory and cultural evolution, therefore, offer a

framework for understanding and changing behaviour (Muthukrishna & Henrich, 2019; Muthukrishna, 2020a; Efferson, 2021; Muthukrishna *et al.*, 2021).[1]

Behavioural science is a powerful toolkit for addressing global challenges in areas such as public health, economic development and environmental policy (World Bank Group, 2015; Ruggeri, 2021). The behavioural science toolkit draws primarily on cognitive psychology, social psychology and economics, and has typically exploited empirically discovered biases and heuristics without worrying too much about why these exist. However, as a result, it has inherited the challenges of these parent fields, such as the replication crisis – many findings failing to replicate (Open Science Collaboration, 2015; Camerer *et al.*, 2018) – and the WEIRD people problem – over-reliance on findings from Western contexts and lack of attendance to cross-cultural and contextual differences (Henrich *et al.*, 2010b; Apicella *et al.*, 2020). Within behavioural science, cultural and other contextual heterogeneities are acknowledged as important (IJzerman *et al.*, 2020; Bryan *et al.*, 2021; Sunstein, 2021), but it remains unclear how to systematically incorporate these factors in a principled manner. And so it is difficult to know when we should expect findings and past successes to generalize (Deaton & Cartwright, 2018).

In this article, we discuss cultural evolution as a framework for addressing this contextual gap. We begin by describing the history of behavioural science and how cultural evolution offers the natural next step.

Social science and public policy

Science and technology go hand in hand. Science opens new technological possibilities and technologies help us refine the science and understand how it works or even whether it works in the real world (Gibson *et al.*, 2020; Hammond & Stewart, 2001; Muthukrishna & Henrich, 2016). The same is true of the social sciences. Some social sciences, such as economics, have a longer history of policy application (Buyalskaya *et al.*, 2021). Behavioural science is the latest wave of economic public policy application, in this case, applied to human behaviour. We can trace this history from neoclassical theory to the present day.

Neoclassical theory

Neoclassical economic theory emerged in the early 20th century with origins in philosophers like John Stuart Mill (Persky, 1995) describing people with rational preferences maximizing the satisfaction of these preferences as 'utility'. The lack of realism of these assumptions was debated, but as a prominent essay by economist Milton Friedman argued, models should not be judged by the realism of their assumptions, but only by the accuracy of their predictions (Friedman, 1953). These assumptions included axioms (Von Neumann & Morgenstern, 1953), such as completeness (people have clear preferences: $x \succ y$, $y \succ x$ or $x \sim y$), transitivity ($x \succ y$ and $y \succ z$ implies that $x \succ z$), continuity (if $x \succ y$, $y \succ z$ and $x \succ z$, then there exists a probability p such that: $px + (1-p)z \sim y$), and independence (if $x \succ y$, $px + (1-p)z \succ py + (1-p)z$). The behavioural economics revolution began with

[1]An abbreviated version of this paper will also be published in the *Oxford Handbook of Cultural Evolution*.

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empirical challenges to both predictions derived from these assumptions and the assumptions themselves (Machina, 1987; Camerer, 1989; Tversky & Kahneman, 1989, 1992; Tversky *et al.*, 1990). Three key figures in this revolution were Daniel Kahneman, Amos Tversky and Herbert Simon.

The formal predictions of expected utility theory made them falsifiable (see Muthukrishna and Henrich (2019) for a discussion on the importance of formal theory). Psychologists Daniel Kahneman and Amos Tversky realized that there was a mismatch between the predictions of expected utility theory and empirical findings in cognitive psychology (Lewis, 2017). They began a lifelong, productive research program modifying and challenging neoclassical theories by including *psychological realism*. For example, in contrast to the expectation principle which states the utility of a risky prospect is linear in outcome probabilities, Tversky and Kahneman's Prospect Theory states that the utility function is concave for gains and convex for losses – 'losses loom larger than gains' (Tversky & Kahneman, 1992). For example, given a coin flip to lose or win $100, people require a much larger gain to accept the bet (Tversky & Kahneman, 1991).

Herbert Simon similarly attempted to modify standard utility approaches by introducing psychological realism: cognitive limitations on time and computation, introducing the idea of *bounded rationality* – rationality within constraints, people *satisficing* rather than *optimising* for their preferences due to constraints such as limited information, limited computation and limited time (Simon, 1957, 1982). These kinds of challenges to neoclassical theory gave birth to the field of behavioural economics. However, this research was primarily conducted in WEIRD contexts and the heterogeneity created by social and cultural factors was still not on the research agenda.

Behavioural economics

Cognitive psychology was used to correct assumptions in neoclassical economics to create behavioural economics. These were later formalized by including human psychology in economic models to create more realistic and predictive theories (Fehr & Schmidt, 1999; Camerer *et al.*, 2004; Rabin, 1998). For example, empirical results using the public goods game suggested that people initially contribute more than the expected Nash equilibrium of no contribution. The payoff (π), equal to utility (u) is maximized when no contribution ($g_{it} = 0$) is made from the endowment (e) and instead the payoff is this endowment and a share of contributions made by the other $s - 1$ players multiplied by m and divided equally.)

$$\pi = e - g_{it} + \left(\frac{m}{s_t}\right) \sum_{j=1}^{s_t} g_{jt} \tag{1}$$

$$u(\pi) = \pi \tag{2}$$

To resolve this behavioural deviation from the formal model whereby players typically contribute $g > 0$ in a way that reflects the contributions made by others also contributing $g > 0$, Fehr and Schmidt (1999) included inequity aversion in the utility

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model – the utility is not only positive with an increased payoff but reduced when you get more than me (weighted by α) or I get more than you (weighted by β). i.e. Equation 2 becomes:

$$u(\pi) = \pi - \alpha_i\left(\frac{1}{n-1}\right)\sum_{j\neq 1}\left[\max\left(x_j - x_i, 0\right)\right] - \beta_i\left(\frac{1}{n-1}\right) \times \sum_{j\neq 1}\left[\max\left(x_i - x_j, 0\right)\right] \quad (3)$$

In this same spirit, Kőszegi and Rabin (2006) developed a model on reference-dependent preferences. They show that under uncertainty, behaviour is influenced by a gain-loss utility, leading to unstable preferences – for example, changes in how much decision-makers are willing to pay for the same product, or in how much a worker is willing to work given a daily wage.

Many prominent researchers contributed to the field with ideas and findings that were radical for the economic literature at the time. Many of these findings had direct relevance for public policy. For example, modelling and experiments showed that in sequential decision-making, people's behaviour can converge on the wrong choice (i.e. 'herding': people bulk buying toilet paper during the pandemic because others do the same), despite unbiased behaviour (Banerjee, 1992; Bikhchandani *et al.*, 1992; Goeree *et al.*, 2007; Weizsäcker, 2010).

Another stream of work directly deals with the preferences of decision-makers, and how they can be skewed by psychological variation in aversion to risky choices (Gneezy & Potters, 1997; Loewenstein *et al.*, 2001; Charness *et al.*, 2013). Other works engaged with the social context of economic behaviour and specifically how we humans make altruistic decisions in sharing resources (Andreoni, 1990; Fehr & Fischbacher, 2003; List, 2007), how altruistic punishment evolves (Boyd *et al.*, 2003) and how social norms can regulate behaviour (Fehr & Fischbacher, 2004; Bicchieri, 2005), how the zero-sum nature of status-seeking via, for example, the consumption of luxury goods, has provided insight on optimal taxation of such goods (Frank, 1985) and how groups solve the collective action problem (Ostrom, 1990). Behavioural economics thus also drew on works from Sociology, for example, with regards to sanctions stabilizing cooperation (Coleman, 1994). In addition to the social and cultural context (Gelfand *et al.*, 2011), the personal context such as existing endowments (Kahneman *et al.*, 1991; Apicella *et al.*, 2013) and associated reference points (Abeler *et al.*, 2011; Fehr *et al.*, 2011) significantly influences behaviour. Economists also began synthesizing how contextual factors could affect behaviour across domains. A prominent example is resource scarcity, with poorer people doing less well than they could (e.g. in agriculture or parenting), when under the psychological and economic stress of scarcity (Mani *et al.*, 2013; Mullainathan & Shafir, 2013). Among others, Ashraf *et al.* (2006) went on to apply such insights and developed a savings tool, applying behavioural economics research to help people save money.

As behavioural economics began incorporating insights from other fields, it was often labelled under the more general term 'behavioural science', although this

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term is also used for a broad range of fields studying human behaviour. This next wave applied the theoretical, laboratory and field experimental insights gained in behavioural economics to interventions and public policy.

Behavioural science

In 2008, Thaler and Sunstein summarized work in behavioural economics and behavioural science in their popular book 'Nudge' (Thaler & Sunstein, 2008). The book gained a following among many politicians and policymakers. In 2010, the United Kingdom Cabinet Office commissioned a report on behavioural science and public policy interventions; the MINDSPACE report (Dolan *et al.*, 2010, 2012). This report led to the creation of the Behavioural Insights Team (BIT), often referred to as the 'Nudge Unit'. BIT had several successes, notably garnering Her Majesty's Revenue & Customs (HMRC) an additional £200 million in tax repayments through a small change in a tax letter that exploited social influence and norms (Cabinet Office Behavioural Insights Team, 2012; Hallsworth, 2014). The same strategy had similar success in other countries, including Costa Rica and Poland (Doshi, 2017) and so began to be applied to other contexts, such as Barack Obama's second bid for the White House (Carey, 2012). This later led to the creation of over 200 Behavioural Insights Teams around the world (Benartzi *et al.*, 2017; Sunstein, 2020). In 2015, President Barack Obama signed an executive order for the incorporation of behavioural science insight into public policy (White House, 2015). In 2017, Thaler was awarded a Nobel Prize and in 2021, António Guterres, the Secretary General of the United Nations, defined behavioural science as one of the key skills of UN-organisations (Jochim & Schimmelpfennig, 2022).

Nudging and behavioural insights interventions (Thaler, 2016, 2018) have now been applied to a wide array of domains, but the problems outlined in the opening on replication failures and the WEIRD people problem remain. For example, behavioural priming is often unreliable (Simons, 2014), and behaviour in economic games such as the dictator game varies from 47% offer in the USA to 26% offers among the Hadza (Henrich *et al.*, 2010b). Similarly, a recent study found that extended dishonesty among bankers may not generalize to other societies (Cohn *et al.*, 2014, 2019; Rahwan *et al.*, 2019). Returning to our opening example on fairness in the public goods game, cross-cultural research reveals that fairness preferences vary considerably – disadvantageous inequity whereby you receive less than others seems reliably developing, but advantageous inequity is not universal (Blake *et al.*, 2015; House *et al.*, 2020).

Cultural evolutionary researchers will recognize these three waves as an example of path dependence (Page, 2006; Nunn, 2009; Muthukrishna *et al.*, 2021). Nineteenth-century philosophical positions on the nature of humans and human decision-making led to formalizations of an arguably misspecified theory of human behaviour, which were then challenged and adjusted at the margins. The initial path-dependent solution involved retaining expected utility theory but adding 'patches' based on empirical psychological research. This approach, however, failed to address the replication and cross-cultural generalizability of these patched solutions.

The most effective critique of a theory is a better theory. Such a theory has not yet emerged, but here we lay out a path in the context of public policy. We argue that the

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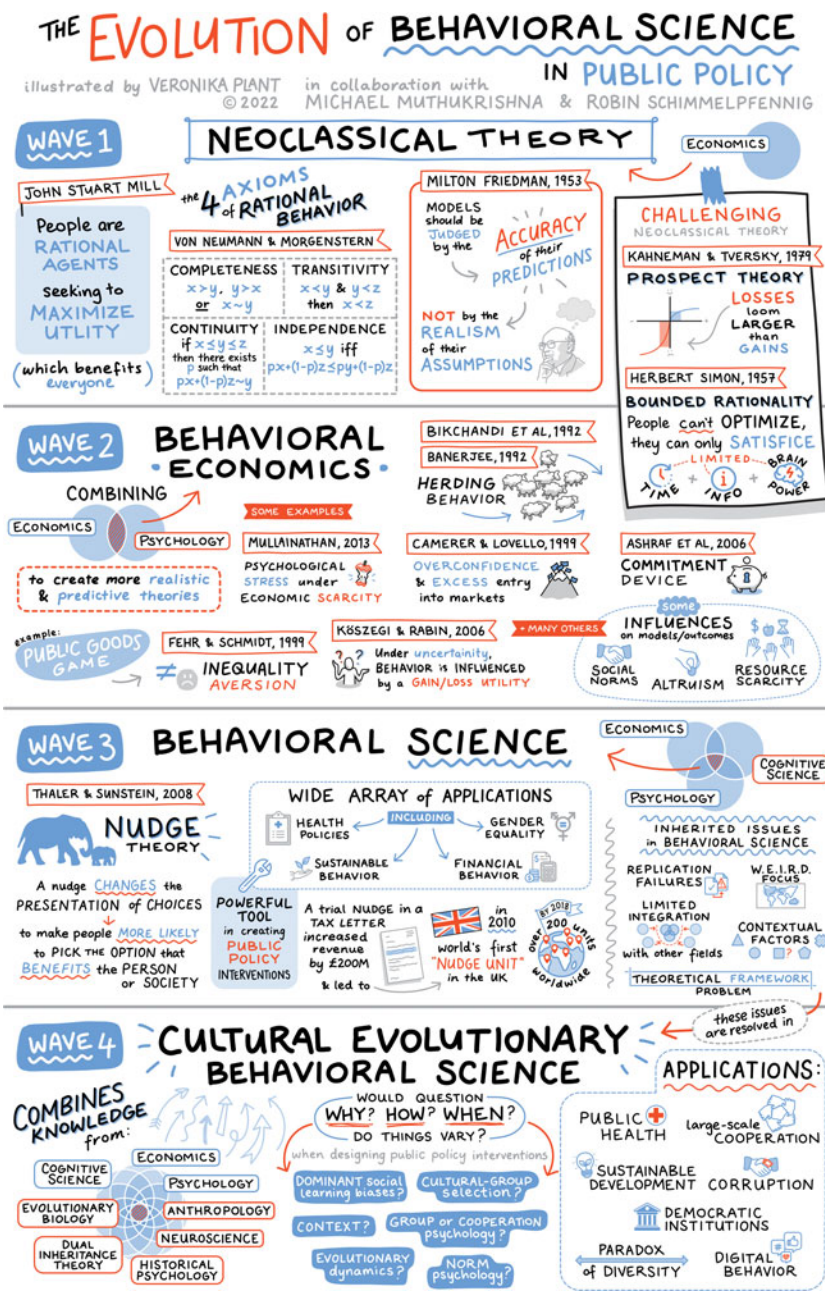

Figure 1. The evolution of behavioural science in public policy.

natural next step in this path is a formal theory that includes not just empirically discovered cognitive biases, social norms and preferences, but the origins, variation and dynamics of these captured by models in cultural evolution (Figure 1).

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The fourth wave: cultural evolutionary behavioural science

Just as biological evolution is mainly driven by the transmission of genes between generations, cultural evolution is driven by the transmission of social and cultural information through social learning. This social learning is not random but driven by several interacting learning biases (Kendal *et al.*, 2018). For policymakers, this has important implications. Behaviour change at scale often depends on how information is transmitted within the population. A policy designed for a population in which prestige-biased learning dominates should be designed differently than in a population in which conformist-biased learning dominates (Mesoudi *et al.*, 2016; Glowacki & Molleman, 2017; Molleman & Gächter, 2018; Muthukrishna & Schaller, 2020; Schaller & Muthukrishna, 2021). Indeed, the interaction of these learning biases remains a neglected, but powerful method for large-scale, endogenous behavioural change (Young, 2015; Nyborg *et al.*, 2016; Efferson *et al.*, 2020; Andreoni *et al.*, 2021; Berger, 2021; Berger *et al.*, 2021; Efferson, 2021).

In addition to social learning biases (Mesoudi, 2016; Muthukrishna *et al.*, 2016; Kendal *et al.*, 2018), cultural evolutionary behavioural science can exploit research on (a) norm psychology (Chudek & Henrich, 2011), for example, what people perceive to be fair/unfair, (b) ethnic, group or cooperation psychology (Henrich & Muthukrishna, 2021), for example, the scale of cooperation that dominates in a culture, such as kin, friends or impartial institutions, (c) evolutionary dynamics, for example, how beliefs and behaviours endogenously spread in a population (Young, 2015) and (d) factors such as cultural-group selection (Richerson *et al.*, 2016; Francois *et al.*, 2018; Schimmelpfennig *et al.*, 2022).

Incorporating cultural evolution forces us to consider not just differences in psychology, norms and preferences, but their origins and dynamics. For example, experiments with Swiss children reveal that pre-existing inequality concerns affect bargaining behaviour in subsequent games (Berger *et al.*, 2022). Furthermore, Fehr and Schmidt's (1999) assumption of symmetric inequity aversion driving what is fair, children in Uganda, Canada and the USA care about both disadvantageous and advantageous inequity, but children in India, Senegal and Peru (at least in the communities studied) care mostly about whether they are on the losing end (Blake *et al.*, 2015). Despite the cross-cultural variation in the content of social norms (e.g. variation in antisocial punishment across societies (Herrmann *et al.*, 2008)), there may be a universal psychology for responding to social norms across society (House *et al.*, 2020). House *et al.* find that by middle childhood, children have similar social norms as the adults in their society and develop a uniform tendency to respond to novel social norms across societies (House *et al.*, 2020). So yes, context matters. But the question is when and why?

Cultural evolutionary research has shown that factors such as market integration (Henrich *et al.*, 2010a), the presence of moralizing gods (Shariff & Norenzayan, 2007; White *et al.*, 2019), historic exposure to the Catholic Church and their restrictive marriage and family program (Schulz *et al.*, 2019) or kinship intensity and opportunities to cooperate with kin (Enke, 2019) can explain differences in fairness norms offering an exogenous explanation for why these differ around the world and how they may be

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changed (for review, see Henrich and Muthukrishna (2021) and Muthukrishna *et al.* (2021)).

The gaps in behavioural science that are resolved through integration with cultural evolution can be summarized as follows:

1. *Replication Crisis*. As argued by Muthukrishna and Henrich (2019), methodological malpractice and statistical shenanigans have contributed to the replication crisis and may be resolved by open science methods such as replications and transparency in research, but a larger issue is the lack of a theoretical framework.
2. *Theoretical Framework Problem.* The list of heuristics and biases is enormous (Wikipedia, 2021) and, no doubt, several related biases masquerade under separate research programs. For example, the self-enhancement bias (Kwan *et al.*, 2004), positivity bias (Mezulis *et al.*, 2004), optimism bias (Sharot, 2011) and overconfidence (Johnson & Fowler, 2011) are at best strongly correlated and at worst linguistic noise describing the same concept. Identified biases such as these are a combination of genetic influences shared with other species, cultural influences through norms (Gelfand *et al.*, 2011) and our lifetime of experience.
3. *WEIRD People Problem.* The empirical basis for many behavioural insights, biases, heuristics and assumptions about human behaviour are skewed towards WEIRD people who do not represent most people in most places (Apicella *et al.*, 2020; Henrich, 2020; Henrich *et al.*, 2010b). Cultural evolutionary insights can offer guidance as to which insights are likely to be universal (e.g. defaults, social influence) and which are likely to vary or not replicate (e.g. endowment effect (Apicella *et al.*, 2013). Much more cross-cultural research is required.
4. *Contextual Factors.* Behavioural economics argues humans are contextually embedded decision-makers (for example, on risk preferences (Imas, 2016) or incentives (Gneezy *et al.*, 2011)), but often fail to answer *how context matters*. There are rarely strong predictions for how different internal, environmental or social cues matter, even if these could be reliably measured. Some paths forward from a cultural evolutionary perspective include understanding how we integrate different social learning cues (e.g. what do we do if a prestigious person does one thing and the majority do another) and recognizing that culture is not just cross-national, but overlapping and embedded distributions of cultural traits within societies (Muthukrishna & Henrich, 2019; Uchiyama *et al.*, 2021). Obvious examples include regional (Talhelm *et al.*, 2014) and religious differences (White *et al.*, 2021), but intersections are deeper. Holding the hand of a stranger will reduce neural activation in a case of a threat. The effect will be increased if those holding have a strong marriage (Coan *et al.*, 2006). Or so it seemed, but a later study showed that the effect was only robust for a well-educated, white women (Coan *et al.*, 2017).
5. *Integration with Other Fields.* While not being a gap *per se*, cultural evolution has increasingly integrated with other biological sciences (Laland, 2018; Laland *et al.*, 2011; Uchiyama *et al.*, 2021), social sciences (Besley & Persson, 2019; Besley, 2020; Nunn, 2021) and the humanities (for review, see Muthukrishna

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et al. (2021)). It thus offers a pathway for behavioural science to derive insights beyond those in economics, psychology and cognitive science. Cultural evolution can provide a framework to understand policy problems. Its ability to integrate with other fields then helps to find solutions for problems in different settings.

There is much work to be done for a truly cultural evolutionary behavioural science for public policy, but emerging work reveals the promise and challenges.

The promise of cultural evolutionary behavioural science

Applied cultural evolutionary behavioural science is in its infancy. Empirical work is rare and applied theoretical work is rarer still. Here, we review some examples of work in different domains that reveal the promise of cultural evolutionary behavioural science.

Public health

Public health initiatives are sometimes at odds with local culture and traditions (Cloward, 2016). Policy to improve public health may thus be subject to a backlash and non-compliance by at least some parts of the population. Female genital cutting (FGC) is one such example (World Health Organisation, 2008). The conflict is that from the perspective of universal human rights, FGC is harmful to the health and well-being of women but legislation to ban it would interfere with local cultural traditions.

FGC is still pervasive in many countries. For example, in Egypt, UNICEF estimates suggest that 87% of females between 15 and 49 years of age are cut (based on data from 2004 to 2015; UNICEF, 2016). Current approaches to eradicate FGC practices often fail. In some cases, exogenous attempts to change behaviour are perceived as intrusions that impose out-group values, leading to a backlash in the local population (Shell-Duncan & Hernlund, 2000; Gruenbaum, 2015; Camilotti, 2016; Vogt *et al.*, 2016). That is, when attempts to reduce FGC are perceived as external, FGC rates can increase because not cutting girls is seen as Westernization and cutting girls becomes an ingroup ethnic marker (Cloward, 2016). Resolving the conflict between cultural sensitivity and female public health remains a challenge.

Policy interventions in this realm are often informed by the hypothesis that FGC, similar to foot binding, involves coordination incentives for families (Mackie, 1996; Efferson *et al.*, 2015). That is, families with sons want cut wives because FGC is perceived as a sign of fidelity, tradition and becoming a good mother. And so, families with daughters choose to cut their daughters to increase the chances of finding a good spouse, sometimes regardless of personal preferences. In a population where families with sons favour uncut wives, families with daughters may choose to coordinate their decision and not cut their daughters (Cloward, 2016). How can a policymaker switch a population from the maladaptive (cutting) to the adaptive (not cutting) equilibrium?

One tantalizing possibility is behavioural change through endogenous spillovers by affecting a social tipping point (Nyborg *et al.*, 2016; Andreoni *et al.*, 2021). That is,

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could a policymaker run a minimal intervention with selective targets that then starts a chain reaction within the population tipping them from a cut equilibrium to an uncut equilibrium? Here, the policymaker can focus attention and resources on persuading just enough of the right people until the social tipping point is reached, and then the endogenous social influence mechanisms, such as conformity take over with people coordinating around the new social norm.

Formalizing this policy possibility, Efferson *et al.* (2020) developed a cultural evolutionary model informed by their previous empirical research (Efferson *et al.*, 2015; Vogt *et al.*, 2016, 2017), that captures the cultural evolutionary dynamics of harmful traditions. They model how behaviour spreads in a population via social influence after the population has been shocked by an external policy intervention. They show that the effectiveness of the policy, both in its size and target, depends on the distribution of attitudes in the population. An intervention will have a direct effect and an indirect effect (see Figure 2).

Perhaps counterintuitively, the results show that in a scenario where many in the population are resistant to the policy, policy makers can maximize the total effect of their policy by targeting not those most likely to change, but those most resistant to the policy (Efferson *et al.*, 2020; Schimmelpfennig *et al.*, 2021). Convincing those resistant to change through an intervention – perhaps one that exploits social learning biases (Kendal *et al.*, 2018) – leaves the comparably 'easy' cases for the endogenous spillovers via social learning.

Efferson *et al.* argue that in scenarios where attitudes cannot be estimated, for example, because of concerns around social desirability of the response data (Krumpal, 2013), policymakers may instead opt to target a random sample, such as through 'edutainment' (Vogt *et al.*, 2016), rather than the most compliant, which may otherwise lead to polarization. This work may complement other behavioural and evolutionary approaches to public health (Gibson & Mace, 2006; Lawson *et al.*, 2015; Wells *et al.*, 2017; Arnot *et al.*, 2020; Gelfand *et al.*, 2022), representing the cutting-edge of integration of cultural evolutionary theory and policy interventions, whose success and value will be known over the coming decade.

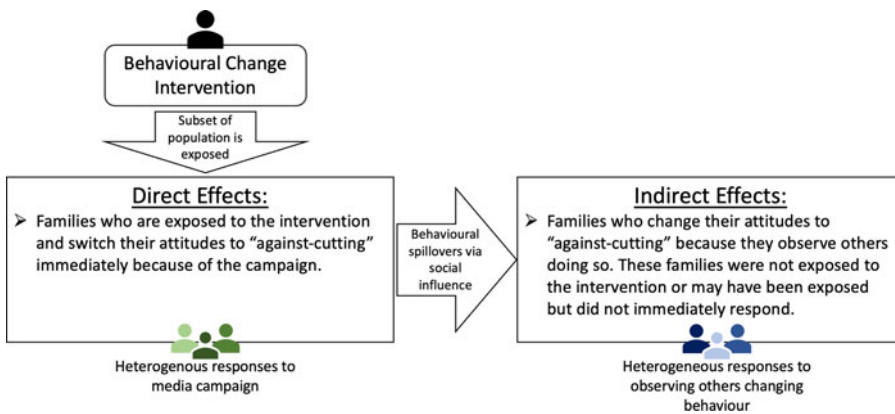

Figure 2. The direct and indirect effect of an intervention (adapted from Schimmelpfennig *et al.* (2021)).

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Corruption

A common assumption is that corruption is a vice and cooperation is a virtue. Corruption harms economic development and creates barriers and inefficiencies to competition in a free market. Interventions and media campaigns, often unsuccessfully, focus on portraying corruption as malicious, harmful and unnatural. Cooperation, on the other hand, supports economic development and forms the backbone of democratic societies. But cooperation is no virtue in itself. Advances in technology and world wars, flourishing societies and genocides, our greatest achievements and our worst atrocities all require large-scale cooperation (Axelrod & Hamilton, 1981; Henrich & Muthukrishna, 2021). From a cultural evolutionary perspective, corruption is also a cooperative act (Murray *et al.*, 2017; Muthukrishna *et al.*, 2017).

It's natural to want to help relatives – well explained by theories of inclusive fitness – but doing so at the expense of impartial institutions is nepotism. It's natural to want to help friends, friends of friends or those in an exchange of some sort – well explained by theories of reciprocal altruism, direct and indirect reciprocity (see Yoeli *et al.* (2013) for applications) – but doing so at the expense of impartial institutions is cronyism. Reducing corruption requires undermining lower scales of cooperation or aligning them with higher scales such that what's good for family and friends is also good for everyone else. Transparency alone can backfire when norms support lower scales of cooperation (such as expectations for favouring friends or family (Abbink, 2006; Murray & Frijters, 2016; Muthukrishna *et al.*, 2017)). Similarly, theoretical work shows that the effectiveness of centralized punishment to combat corruption can break down when some actors can bribe the central authorities (Abdallah *et al.*, 2014). Indeed, many empirically derived anti-corruption strategies (e.g. Klitgaard *et al.*, 2000), implicitly change incentives and or move people around to disrupt these cooperative ties.

An example of how smaller scales of cooperation were undermined and norms around kin-based small-scale cooperation have changed to support states is the Catholic Church's change to traditional large kin-network family structures through policies such as banning cousin marriage. This centuries-long program decreased the power of larger family clans, laying the foundations for large-scale societies supported by impartial institutions and what we now call WEIRD-psychology (e.g. individualism) (Schulz *et al.*, 2019; Henrich, 2020). Places, where these kin ties remain, are dominated by tribalism, increased corruption and more fragile democratic institutions (Akbari *et al.*, 2019).

Developing policies that disrupt lower scales of cooperation and waiting half a millennium is not likely to sway policymakers, but the same principle can be applied with more immediate results. One prominent problem in WEIRD countries is the 'revolving door', whereby individuals seamlessly move between government and private sector positions. Blanes i Vidal *et al.* (2012) reveal that 56% of the revenue by private lobbying firms in the USA between 1998 and 2008 can be attributed to lobbyists with previous federal government experience. Furthermore, 34 of the 50 top lobbyists in Washington have previous federal government experience (Eisler, 2007). The prospect of future employment in the private sector may influence the behaviour of public servants (deHaan *et al.*, 2015), to increase their employability.

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Banning the revolving door, or at least setting a long minimum time between switching from the public to private sector, may help to undermine such lower scales of cooperation (e.g. the 'cooling-down' period for members of the European Commission has been increased from 12 months in 1999, to 18 months in 2011 and to 24 months in 2016, after former President of the Commission Barosso joined Goldman Sachs, shortly after he had left office (Luechinger & Moser, 2020)).

Corruption is by no means restricted to the developing world, but plagues societies with less robust democratic institutions and norms. Indeed, corruption may have a greater absolute cost in the developed world, but a greater relative cost in the developing world (Muthukrishna, 2017; Muthukrishna *et al.*, 2017; Henrich & Muthukrishna, 2021). Undermining informal tribal institutions is a difficult challenge for the same reasons that it's difficult to stop FGC. Aligning the societal institutions with local structures may be a less ambitious, more practical and effective approach. For example, a recent study in the Democratic Republic of Congo found that giving local chiefs the authority to collect state taxes increased property tax compliance by 3.3% (Balan *et al.*, 2022). Although the chief still collected bribes, they were able to use local knowledge of whom to target with tax enforcement and thus increased the overall tax revenue by 43%. Their local knowledge allowed them to target high-income individuals reversing the inefficient and unfair, but common practice of targeting the more easily auditable lower-income bracket. For example, in the USA, people earning less than $25,000 are at least three times more likely to be audited than partnership firms (Sorkin *et al.*, 2021). Teaming up with bribe-collecting chiefs may not be the first choice for current approaches in public policy, but is a step in the right direction and sensible from a cultural evolutionary approach, combining and aligning different scales of cooperation. Moreover, it allows us to move a society to an *adjacent possible* in the cultural space, where planned policies can continue to put a society on a path to a more efficient equilibrium (Muthukrishna & Henrich, 2016; Muthukrishna *et al.*, 2021; Nunn, 2021).

Successful democratic institutions

Formal institutions can be thought of as hardened culture – written down to allow for easier coordination and application. But no institution can anticipate all possible behaviours. Thus successful institutions rest on necessary cultural norms. But unlike the explicit institutions, these norms are largely invisible to those who have implicitly internalized them since they were children. Therefore, foreign policymakers exporting successful WEIRD institutions, such as liberal democracies, have systematic blindspots that lead them to unknowingly ignore the invisible cultural pillars that support institutions.

Giuliano and Nunn's (2013) analyses reveal that where democratic institutions have been successfully transplanted are places where proto-democratic institutions (and presumably the requisite norms) already existed. They also offer an example of how cultural evolutionary behavioural science can be informed by historical data, building the Ancestral Characteristics Database (Giuliano & Nunn, 2018) using data from the Ethnographic Atlas (Murdock, 1967), Ethnologue (Lewis, 2009) and Landscan 2000 (Dobson *et al.*, 2000). There is a historical path dependence of traditional local democracies on the beliefs and attitudes towards today's political institutions, robust to European influence and quality of land for agriculture among other controls.

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As a contrasting example, the recent high-profile failure to implement liberal democratic institutions in Afghanistan can be at least partially blamed on differences in norms around rule of law and impartial rules applied impartially to all people. Afghanistan is high on strong kin-based cooperation; people rely on their kin for survival through support and favours, even marrying among their extended family (the rate of cousin marriage in Afghanistan is 46%; Saify & Saadat, 2012). Kin-based obligations undermine the kind of impartial institutions that liberal democracies are familiar with. Moreover, the exogenous laws borrowed from other cultures may be rejected by parts of the population with strong prior beliefs, such as those grounded in Islamic sharia law. A Pew survey (2013) suggests that 99% of Afghans favour making Sharia the official law of the land, 81% of Afghans favour corporal punishment (like lashings) for theft, 85% favour stoning as the punishment for adultery and 79% favour a death penalty for leaving Islam. It is important to consider how these numbers are affected by the timing of the survey, representativeness of the respondents and response biases, but it is critical to have at least some measure of such norms rather than relying on assumptions about human behaviour drawn from a WEIRD life experience. Such norms are critical to predicting whether an institution or policy will succeed and assumptions about what people want (e.g. freedom of speech, freedom in behaviour, impartial rules, rule of law, secular society, etc.) based on WEIRD life experience cannot be assumed to be human universals. Without appropriate cultural pillars, institutions such as democracy collapse.

Finally, institutions interact with norms, mutually shaping one another. In 2011, the Supreme Court of the Canadian province of British Columbia ruled that the prohibition against polygamy was constitutionally valid. The case was in part decided by cultural evolutionary scientists, Joseph Henrich's primary expert witness on the role that monogamy has had in stabilizing society by solving the problem of young males who can not find a wife (Henrich *et al.*, 2012). Henrich argued that 'monogamy seems to direct male motivations in ways that create lower crime rates, greater wealth (GDP) per capita and better outcomes for children'. In contrast, polygamy leads to a surplus of unmarried men, that may engage in high-risk strategies or criminal activities to secure sufficient resources to find a mate (BC Supreme Court, 2010; Bucci, 2010). Indeed, China's one-child policy combined with a cultural son preference temporarily led to a doubling of 'surplus men'. An analysis by Edlund *et al.* (2013) suggested that for every 1% increase in male bias in the sex ratio, property and violent crimes rise by 3%. Similar data can be found in India (Drèze & Khera, 2000), where male-biased sex ratios are associated with murder rates across districts. The British Columbian Supreme Court decision is an example of how institutions can be used to constrain and reinforce cultural practices that would otherwise undermine these institutions, and a policy decision informed by cultural evolutionary research.

Sustainable development

Taking a cultural evolutionary approach to sustainable development, Waring *et al.* (2015, 2017) identify four factors that academics and policymakers need to better understand to accomplish sustainability policy goals. First, policy needs to be informed by knowledge about the emergence and persistence of social-ecological

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states – how social and ecological factors relate and interact. Second, they need to account for endogenous cultural change (Berger *et al.*, 2021; Constantino *et al.*, 2022). Third, they need to incorporate cooperation dynamics. And fourth, they need to address the complexities of social-ecological interactions over multiple levels (Waring *et al.*, 2015).

Using this approach, they derive several principles that can guide policy implementation. These principles include targeting the appropriate level of selection (e.g. targeting group vs targeting individual), changing the level of selection pressure (e.g. change incentive structure to group-level payoffs), shifting trait variation across levels (between-group vs within-group variation in cultural traits), leveraging the evolution of cooperation (e.g. creating infrastructure that allows for repeated interactions, reputational mechanisms and peer punishments to increase prosociality) and avoiding ethnocentric solutions (e.g. counter the tendency for policies driven by social identity of groups). Waring's work is an example of the broader contribution of evolutionary anthropology to public policy (Alvard, 1998; Gibson & Lawson, 2014).

Summary

As the diverse domains above illustrate, cultural evolutionary public policy sometimes suggests ways of solving a problem. But a cultural evolutionary approach also fundamentally shifts the approach itself for how to go about designing a solution – a solution is not always designed. An invisible cultural pillar of economic-derived public policy is the assumption of a great planner or policymaker. This approach is akin to an intelligent designer's view of culture and institutions. We can contrast this with genetic evolution's blind watchmaker and cultural evolution's visually impaired watchmaker. Not designing but instead *evolving* good solutions through efficient selection between different approaches designed with partial causal models of the world (Muthukrishna & Henrich, 2016; Schimmelpfennig *et al.*, 2022). A cultural evolutionary public policy is not simply about designing efficient institutions but designing efficiently evolving institutions.

The challenges of cultural evolutionary behavioural science for public policy

The challenge of understanding ultimate causes for application

Discovering ultimate causes of a behaviour is an important goal for the social sciences, though the focus is often on proximate explanations (Tinbergen, 1963; Mesoudi, 2009, 2016). Ultimate causes offer a more 'upstream' policy lever since proximate causes may be replaced by a different proximate cause if the ultimate cause remains. As Pirsig (2006) put it, if a factory is torn down, but the reasons for the factory persist, a new factory will take its place.

For example, consider gender roles and gender inequality in societies. A proximate explanation may focus on attitudes, preferences, beliefs or ideologies. At a proximate level, one could explain gender inequality as a product of men perceiving themselves as superior. This may lead to policies, such as implicit bias training (Forscher *et al.*, 2019; Pritlove *et al.*, 2019), but ignores the underlying causes for the attitudes, preferences, beliefs, ideologies and subsequent behaviours.

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Discovering these underlying causes requires considering the cultural evolution of gendered perceptions and norms. Two influential hypotheses in this field stem from historical economics. Research by Alesina *et al.* (2013) reveals that current-day gender norms covary with historical cultures, for example, traditional agricultural practices (Lonati, 2020). Specifically, areas with higher intensity in the use of the plough (causally exogenously identified by land suitability to the plough) have less gender-equal norms – a product of the plough requiring greater physical strength than the hoe giving males a comparative advantage and leading to a larger sex-based division of labour. These attitudes persist even after plough-based agriculture is replaced by machines and can be measured in attitudes towards gender roles and behaviour in the participation of women in the workplace, politics and entrepreneurship. Moreover, these effects are measurable in second-generation immigrants that are not born in these regions but have family ties. In this case, these norms lead to other norms and infrastructure that reinforce gender inequality. In turn, these differences may be mitigated by policies that target not just gender norms, but the broader set of cultural norms and institutional infrastructure that reduce the unequal cost of childbearing and rearing borne by women (Kleven *et al.*, 2019, 2021).

Considering this ultimate level of explanation is critical to designing culturally aware public policies. In 2005, India passed a law requiring equal female inheritance. This in turn, led to increases in parallel cousin marriage and decreases in female labour force participation (Bahrami-Rad, 2021). This well-intentioned policy is a powerful illustration that people may not respond to incentives in a way that policy makers expect. Cultural evolution can offer an ultimate-level explanation for problems that get to root causes. In doing that, it can provide new solutions to problems that are often dealt with at a proximate level.

As another example, the paradox of diversity refers to the inherent trade-off between cultural trait diversity's potential for recombinatorial innovation and division created by communication and coordination challenges (Muthukrishna, 2020b). Considering evolvability in cultural evolution offers a framework for resolving the paradox of diversity (Schimmelpfennig *et al.*, 2022), moving the focus from norms and biases to factors such as zero-sum perceptions and reality in intergroup competition (Schimmelpfennig & Muthukrishna, 2021). Understanding ultimate causes offer new policy levers for tackling long-standing problems.

The challenge of knowing how context matters?

Context matters in behavioural science (Michie *et al.*, 2011; Dolan *et al.*, 2012; World Bank Group, 2015). But how does it matter? Consider research on dishonesty. Experiments reveal that a simple change in framing can lead honest citizens to behave like dishonest bankers (Cohn *et al.*, 2014). Professionals from a Swiss bank participated in a game to measure honest behaviour. They privately rolled a die a few times and afterwards reported to the experimenter how many times they rolled an even number (for each even number the participant received a payoff). Since the die roll was private, at an individual level, it was impossible to know if participants were being dishonest or were just lucky, but at a group level, researchers could measure the degree of dishonesty based on deviations from the expected distribution of

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even numbers. The main treatment manipulated the context, by either priming a professional (e.g. talking about their job before the task) or a personal context (e.g. talking about hobbies). The researchers found that bankers primed for the professional context were significantly more dishonest, reporting 58.6% even dice rolls (50% would be expected on a six-sided dice). One conclusion would be that the financial sector attracts dishonest people, but the bankers in the control group primed with a personal context did not significantly deviate from the expected frequency of even dice rolls (they reported 51.8%). These results suggest the importance of context and culture rather than types of people for creating dishonest behaviour (Cohn *et al.*, 2014). But the conclusions are more complicated – the same prime may create different behaviours in different cultural contexts (Cohn *et al.*, 2019; Rahwan *et al.*, 2019) or in-person vs online (Cohn *et al.*, 2022). Participants are more dishonest (i.e. report more successful dice rolls than expected) when embedded in a digital context (i.e. when reporting results to a chatbot), compared to communicating their dice rolls to a human.

A question policymakers need answers to is how context matters for the effectiveness of their policies. Cultural differences are low-hanging fruit – the evidence for the impact of cultural differences on the replicability and generalizability of research in social science has grown in the past decade (Henrich *et al.*, 2010b; Apicella *et al.*, 2020; Henrich, 2020). Advancements in the measurement of cultural differences offer new tools for policymakers. Muthukrishna *et al.* (2020) developed a cultural distance CFst scale revealing how cultural distance from the United States – which may serve as a proxy for a 'WEIRD scale' – predicts other cultural differences, from individualism to personality, prosociality and honesty. Beyond documenting such differences, other research reveals the origins of differences in personality (Gurven *et al.*, 2013; Smaldino, 2019), normative behaviours and prosociality (Henrich *et al.*, 2001; Santos *et al.*, 2017; Muthukrishna & Schaller, 2020), and more broadly, in how our brain processes visual information (Dehaene *et al.*, 2010; Han *et al.*, 2013). These differences are increasingly important in interpreting research findings and possible heterogeneous treatment effects (IJzerman *et al.*, 2020; Bryan *et al.*, 2021; Sunstein, 2021).

The challenge of traditions and historical path dependencies

Societies do not emerge spontaneously, but evolve over decades and centuries – they are shaped by history (Henrich, 2020; Muthukrishna *et al.*, 2021; Uchiyama *et al.*, 2021). Genetic drift may play an important role in how societies develop, but the effect of cultural evolution is much larger (Bell *et al.*, 2009; Uchiyama *et al.*, 2021). Thus, cultural evolutionary public policy can use history to identify the ultimate causes of present-day psychology (Muthukrishna *et al.*, 2021). This historical psychology matters for present-day policy interventions.

One dark example of historical path dependency is the effects of 'Tuskegee Study' on trust in public health services. The Tuskegee Study was a longitudinal study in the USA between the 1930s and 1970s. Researchers wanted to better understand the health consequences of untreated syphilis. The participants, African Americans who had contracted Syphilis, were assigned to not receive available treatments against the disease. Worse still, participants were not informed about the nature of the

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experiment. Over 100 died as a result and many family members also contracted the disease. These historical events contribute to the mistrust of medical communities and public health in present-day African American communities (Thomas & Quinn, 1991; Corbie-Smith, 1999; Corbie-Smith *et al.*, 1999). In an influential study, Alsan and Wanamaker (2018) offer support for this claim with an identification strategy using publicly available data. Using and interacted difference-in-difference-in-differences model, that compared older black men to other demographic groups before and after the disclosure of the study in 1972 (Alsan & Wanamaker, 2018). Their results reveal that exposure to the disclosure of the event is correlated with increases in medical mistrust and decreases in both outpatient and inpatient physician interactions for older black men. As a consequence, life expectancy fell by up to 1.5 years in response to the exposure. Although improving, health outcomes are still comparably worse for African American families, a tragedy reinforced by data from the COVID-19 pandemic (Price-Haywood *et al.*, 2020). Similar decreases in medical mistrust have been attributed to medical campaigns in colonial Africa (Lowes & Montero, 2021) and a CIA-staged vaccination campaign in Pakistan (Martinez-Bravo & Stegmann, 2022). A better understanding of historical psychology is thus an important part of cultural evolutionary behavioural science.

The challenge of modern technologies and online interactions

Getting into a stranger's car or spending the night in their empty home was once dangerous and ill-advised. Today it's commonplace thanks to companies like Uber and Airbnb. These platforms facilitate cooperation by brokering reputational information (Muthukrishna, 2021). Online reviews and ratings are an institutionally mediated form of indirect reciprocity and an example of cultural evolution interacting with modern technologies and online interactions. These institutions securitize and centralize trust, allowing us to scale up reputational cooperation through trust in the institution rather than several independent sources of reputational information. But that reputational information is not always present, and we can not trust everything we find online.

Misinformation is less about information and more about trust. The cultural cues we would normally use to distinguish truth from falsehoods are often missing online perhaps making us more susceptible to believing misinformation. Cultural evolution reveals that we learn what is right and true not through a deep causal understanding of information, but through trust in whom we receive the information. We believe that the world is round and rotating around the sun in violation of our everyday experience because we trust those who told us and live in a world where everyone we trust also holds this belief. We believe that a virus caused the COVID-19 pandemic, and an mRNA vaccine can help mitigate it, not because we really understand germ theory or exactly what messenger RNA is or does, but because of whom we trust. Trust that the sources of information are knowledgeable, prestigious, sincere, and in the same cooperative group, such that actions are for our mutual benefit. But information on the Internet often lacks the signals we have evolved to pay attention to, such as cues of prestige, sincerity displays or credibility enhancing displays (CREDS) (Chudek *et al.*, 2015; Henrich, 2016). Misinformation can undermine the foundations of our societies and so incorporating our understanding of our cultural

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learning psychology into the design of digital infrastructure is an important direction for applied behavioural science.

Beyond the science

The application of cultural evolution to behavioural science in public policy has challenges beyond whether the science is correct and possible to apply. These include standard challenges such as the mismatched incentives between those in power and those doing the science, as well as ethical considerations, and heterogeneity in populations. Here, we discuss these issues and also emphasize the importance and challenges of effective impact evaluation to improve the basic science.

Incentive structures for leaders and stakeholders

In principle, a scientist's key concern is getting the science right and in practice, an additional concern is being able to publish the science. It is critical to get the science right and have the support of peers via peer review. Overselling or getting the science wrong undermines trust in science and scientists. But for politicians and policy stakeholders the right science supported by peer-reviewed publications is barely the first step.

Politicians and policy stakeholders often have competing motivations and additional challenges. For example, a new approach may seem risky to career civil servants with little incentive to innovate and many incentives to not fail to ensure the next promotion in their career. A politician must be able to sell a new approach within their own party and to their broader constituency who may not fully understand the science. And mediating the relationship between science, politics, the public and the media.

Thus, although science communication, managing media and nurturing relationships with politicians and policymakers may not seem like a scientist's job, these are critical to successful behavioural science in public policy, even more so when dealing with a cutting-edge approach such as cultural evolutionary behavioural science. As cultural evolution would suggest, reputation and trust are critical. Scientific methods, such as experimentation and randomization, are poorly understood and sometimes aversive to some parts of society, perhaps in politics too. Meyer *et al.* (2019), for example, find that people are often averse to randomization, especially where health is involved. This aversion is true even when people have similar ratings for the options (Heck *et al.*, 2020). A parallel aversion seems to exist for decisions made by algorithms (Dietvorst *et al.*, 2018). These methods are banal for scientists, but of concern to stakeholders for whom public reactions are paramount to their success. Thus, the success of cultural evolutionary behavioural science in public policy is contingent on overcoming these non-scientific barriers. In any case, informed consent is critical to the ethical application of behavioural science.

Ethics

The ethics of nudging and behavioural science interventions are actively debated and discussed in the discipline. Even if cultural evolutionary approaches to behavioural

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science are effective, they may not be socially desirable or perceived to be ethical. In general, questions remain about whether it is ethical for researchers and policymakers to experiment with the public and manipulate behavioural change. These questions are perhaps even more pertinent for cultural evolutionary scientists dealing with what amounts to scaled cultural change.

These debates are not new and interventions continue by those who argue that if a policy goal is socially desirable and the freedom of choice is not restricted, the intervention is ethical (Thaler & Sunstein, 2003). Lades and Delaney (2020) offer a more specific framework that goes beyond the question of choice restriction – FORGOOD (Table 1).

This framework equally applies to cultural evolutionary public policy, but there are additional concerns for cultural interventions. Here are a few:

1. It may be preferable and more ethical to aim for endogenous norm and behaviour change driven by existing variation and selective social learning and social influence (Efferson *et al.*, 2020).
2. Additional caution is required where cultural evolutionary processes can initiate long-enduring path dependencies. This is especially important as well-intended interventions can change adaptive cultural practices that seem maladaptive from the outside. For example, the Asian Development Bank changed the irrigation of rice fields in Bali which was, until then, dominated by cultural practices in which all rice farmers would irrigate their fields at the same time during a ceremony (Lansing, 2009). This traditional practice left little room for pests to develop, as all fields were flooded at the same time. After the implementation of the new uncoordinated irrigation practice, pests flourished, leading to large losses in harvests. Similarly, transhumant pastoralism, which is often viewed as an archaic form of livestock farming (Mattee, 2006), may be adapted to the local circumstances, allowing livestock to flexibly move according to the environmental circumstances (FAO, 2018).
3. All policies are likely to affect the process of cultural evolution by changing the information landscape or the models from whom information flows. Cultural

Table 1. FORGOOD ethics framework for nudging and behavioural sciences based on Lades and Delaney (2020).

Fairness	**Does the behavioural policy have undesired redistributive effects?**
Open	**Is the behavioural policy open or hidden and manipulative?**
Respect	**Does the policy respect people's autonomy, dignity, freedom of choice and privacy?**
Goals	**Does the behavioural policy serve good and legitimate goals?**
Opinions	**Do people accept the means and the ends of the behavioural policy?**
Options	**Do better policies exist and are they warranted?**
Delegation	**Do the policy makers have the right and the ability to nudge using the power delegated to them?**

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evolutionary scientists can and should be more aware and cautious of these effects. Managing cultural evolution can itself be an effective method for enhancing the ability of groups to evolve new solutions.

Overall, cultural evolutionary researchers should also be more acutely aware that societies are made up of embedded and overlapping distributions of beliefs, behaviours and other cultural traits and thus should be more acutely aware of the effects of possibilities created by this diversity.

Diverse populations

Behavioural experiments often assume homogenous populations, but recognizing, measuring and developing interventions that incorporate the reality of heterogeneity can be an effective strategy (Bryan *et al.*, 2021; Sunstein, 2021).

Heterogeneity in beliefs and behaviours complicates the large-scale adoption of new policies (Muthukrishna *et al.*, 2017; Efferson *et al.*, 2020). Different people can react in different ways to the same intervention and these differences may even have unintended effects with negative behavioural spillovers (Efferson *et al.*, 2020; Schimmelpfennig *et al.*, 2021; Ehret *et al.*, 2022). As more and more culturally distant humans live side by side, an individual-level approach to nudging becomes less tenable and even harmful. For example, targeting the wrong part of a society without prior measurement can lead to reactance. This may explain why an intervention to reduce FGC in Kenya actually increased the cultural practice (Thomas, 2000).

Impact evaluation

Measuring the impact of a public program is a cornerstone of an evidence-based approach to policy. Impact evaluation of cultural evolutionary public policy is likely to encounter two key challenges:

1. *Data collection is difficult and unattractive to many stakeholders*: Cultural evolutionary behavioural science requires large datasets that can detect contextual factors and cultural differences within populations. Sampling data in a population is often difficult, expensive and creates no immediate payoff for policymakers. Furthermore, measurements will often feature selection biases, as relatively amenable subjects self-select into the sample (Berk, 1983; Heckman, 1990), or provide socially desirable responses (Krumpal, 2013). More efficient methods of data collection, such as random sampling, may be more likely to be implemented.
2. *Evaluating out of sample and across time:* Cultural evolution can play out over long periods, but the time horizon of policies and politicians is often driven by shorter cycles of elections and media attention. Moreover, public programmes directed at a subset of a population are likely to have effects beyond the group targeted by the policy. Thus, the impact assessment of the policy must continue over a period of time and go beyond the targeted population to detect possible spillovers.

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Despite these challenges, impact evaluation is critical to not just applied cultural evolutionary behavioural science, but the basic science of cultural evolution.

If it does not work in the real world, it does not work at all

As scientists, our goal is to develop theories and models to explain the world (Muthukrishna & Henrich, 2019). Often the methods we use to test these models and theories are not in the world but in a more constrained lab or online setting. But of course, the ultimate test of our theories is the real world. If our theories do not work in the real world, they do not work at all. Thus, cultural evolutionary behavioural science in public policy is not just a useful extension of the cultural evolutionary framework and research program, it is essential to the development of the science. It offers a true test of cultural evolution as a theory of human behaviour. Basic and applied science go hand in hand. Electrons and molecules behave the same way in a lab as they do in the real world. People do not.

The marriage between cultural evolution and behavioural science can produce more effective methods for developing public policies. We have shown how this combined approach can guide researchers and practitioners in designing legitimate, ethical and sustainably effective policies and programmes. But the intersection of cultural evolution and public policy is not just a useful approach for policymakers. Cultural evolutionary public policy is critical to the future of the discipline.

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