Behavioral and Brain Sciences

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The i-frame and the s-frame: How focusing on individual-level solutions has led behavioral public policy astray

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Target Article

Cite this article: Chater N, Loewenstein G. (2023) 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: 1–84. doi:10.1017/S0140525X22002023

Target Article Accepted: 23 August 2022
Target Article Manuscript Online: 5 September 2022
Commentaries Accepted: 21 February 2023

Keywords:
addiction; behavior change; behavioral economics; behavioral public policy; climate change; framing; nudge; obesity

Abstract

An influential line of thinking in behavioral science, to which the two authors have long subscribed, is that many of society's most pressing problems can be addressed cheaply and effectively at the level of the individual, without modifying the system in which the individual operates. We now believe this was a mistake, along with, we suspect, many colleagues in both the academic and policy communities. Results from such interventions have been disappointingly modest. But more importantly, they have guided many (though by no means all) behavioral scientists to frame policy problems in individual, not systemic, terms: To adopt what we call the "i-frame," rather than the "s-frame." The difference may be more consequential than i-frame advocates have realized, by deflecting attention and support away from s-frame policies. Indeed, highlighting the i-frame is a long-established objective of corporate opponents of concerted systemic action such as regulation and taxation. We illustrate our argument briefly for six policy problems, and in depth with the examples of climate change, obesity, retirement savings, and pollution from plastic waste. We argue that the most important way in which behavioral scientists can contribute to public policy is by employing their skills to develop and implement value-creating system-level change.

1. The i-frame and the s-frame

The behavioral and brain sciences primarily focus on what we call the i-frame: On *individuals*, and their thoughts and behaviors. Public policy, by contrast, typically focuses on the s-frame: The *system* of rules, norms, and institutions usually studied by economists, sociologists, legal scholars, and political scientists.

Historically, i-frame insights engage with public policy through evidence about which s-frame policies will work. Thus, research on neural and cognitive mechanisms of imitation has been linked to the impacts of media violence (Bandura, Ross, & Ross, 1963; Hurley, 2004). The neuroscience and psychology of addiction has informed the regulation of recreational drugs, cigarettes, alcohol, and gambling (Robinson & Berridge, 2000; Verdejo-Garcia et al., 2019; Volkow & Boyle, 2018). Health psychologists, epidemiologists, and public health doctors have studied the physiological and psychological mechanisms that convert s-frame factors (e.g., status, inequality, isolation, food environments) into health outcomes (see, e.g., Harris, Bargh, & Brownell, 2009; Leigh-Hunt et al., 2017; Marmot, 2004; Marteau, Hollands, & Fletcher, 2012; Pickett & Wilkinson, 2015). Insights about individual psychology thus inform regulation, taxation, social support, and institutional reform. We advocate deepening and extending this work.

Recently, there has been increasing enthusiasm for a more direct approach: Using i-frame insights to create *i-frame policies* (Camerer, Issacharoff, Loewenstein, O'Donoghue, & Rabin, 2003; Sunstein & Thaler, 2003; Thaler & Sunstein, 2003). Two founding papers identified individual limitations (e.g., excessive self-interest, present bias, confirmation bias), not systemic issues, as the source of social problems. Sunstein and Thaler (2003, p. 1162) wrote "Drawing on some well-established findings in behavioral economics and cognitive psychology, we emphasize the possibility that in some cases individuals make inferior decisions in terms of their own welfare – decisions that they would change if they had complete information, unlimited cognitive abilities and no lack of self-control." Camerer et al. (2003) likewise note "To the extent that the errors identified by behavioral research lead people not to behave in their own best interests, paternalism may prove useful." The first three chapters of *Nudge* (Thaler & Sunstein, 2008), including the updated "final edition" (Thaler & Sunstein, 2021), contrast the biases and self-destructive behaviors of "humans," with the rational actors of economic theory. Unlike traditional policies, i-frame interventions don't fundamentally change

the *rules* of the game, but make subtle adjustments to help fallible individuals play the game better.[1]

These approaches are not mutually exclusive. For example, the battle against cigarette smoking includes individual and systemic measures (e.g., gruesome labels on cigarette packages *and* tobacco taxes and smoking bans). Similarly, in pensions, the i-frame change of auto-enrollment is often part of wider changes (e.g., requiring or incentivizing executives to offer pensions to workers). Moreover, the boundary between i- and s-frame policies is not always clear-cut. For example, if individuals aren't sufficiently aware of a default setting, then changing that default could be a mandate by subterfuge: The veneer of free choice is maintained without the substance. But i-frame interventions that slide into s-frame mandates are against the spirit of the new approach, which is to encourage "good" choices while respecting individual liberty.

Freedom aside, shifting the focus to i-frame interventions is also pragmatically appealing. Traditional public policy measures often get snared in legislative thickets (especially when politics is polarized) and can be dauntingly costly. The hope is that "small changes can make a big difference."[2] As the labels "libertarian paternalism" and "regulation for conservatives" hint, clever interventions to help people help themselves are intended to be politically uncontroversial.

The goal is not merely to create a smoother "interface" between government and citizens (by analogy, say, with mobile phone design), which we see as entirely appropriate. It is much more ambitious: To provide an alternative to traditional s-frame policies. For example, in a technology, entertainment and design (TED) talk the year before he became the British Prime Minister David Cameron, who established the first "nudge unit," said "The best way to get someone to cut their electricity bill is to show them their own spending, to show them what their neighbors are spending, and then show what an energy conscious neighbor is spending…Behavioral economics can transform people's behavior in a way that all the bullying and all the information and all the badgering from a government cannot possibly achieve." Presumably, the "bullying" and "badgering" is traditional regulation: Taxes and energy efficiency standards. Cameron hopes that i-frame solutions make old-fashioned s-frame approaches redundant.

We shared such hopes, and most of our own policy-oriented research has focused on i-frame interventions. But we now worry that in advancing i-frame solutions to problems, we have inadvertently assisted corporations that oppose s-frame reforms. These corporations consistently cast societal problems as issues of individual weakness and responsibility, the solutions to which involve "fixing" individual behavior.

In the remainder of this section, we outline our overall argument. Next, we illustrate our concerns in a series of case studies. Finally, we outline the crucial positive role that we believe the behavioral and brain sciences can and should play in informing s-frame policy.

Let us begin with an analogy: That seeing individual cognitive limitations as the source of society's problems is like seeing human physiological limitations as the key to the problems of malnutrition or lack of shelter. Humans are vulnerable to cold, malnutrition, disease, predation, and violence. An i-frame perspective would focus on tips to help individuals survive in a hostile world.[3] But human progress has arisen through s-frame changes – the invention and propagation of technologies, economic institutions, and legal and political systems has led to spectacular improvements in the material dimensions of life. Human physiology varies little over time. But the systems of rules and institutions we live by have changed immeasurably. Successful s-frame changes have been transformative in overcoming our physiological frailties.

Our suspicion is that the same is true of our cognitive frailties. Just as mechanisms for governing common resources help counteract self-interest (Cramton, MacKay, Ockenfels, & Stoft, 2017; Ostrom, 1990), many institutions help overcome psychological frailties (Heath, Larrick, & Klayman, 1998; Laibson, 2018). For example, competition in science or the adversarial nature of legal disputes is a partial antidote to confirmation bias (Kunda, 1990) and motivated reasoning (Nickerson, 1998). Likewise, the impersonal framing of the law counteracts favoritism (Greenwald & Pettigrew, 2014); limited liability may help overcome risk and loss aversion (de Meza & Webb, 2007), which might otherwise stifle entrepreneurial activity; workplace and state pensions help deal with the bias for present gratification (Laibson, 1997); social taboos and legal restrictions counteract visceral impulses (Loewenstein, 1996); and arbitrary markers for distinct cultural groups may help people coordinate their behavior (Efferson, Lalive, & Fehr, 2008). In short, history shows that the solution to individual frailty is to change the system, not to enhance the individual.

I-frame interventions alone are likely to be insufficient to deal with the myriad problems facing humanity. Indeed, disappointingly often they yield small or null results. DellaVigna and Linos (2022) analyze all the trials run by two large US nudge units: 126 randomized controlled trials (RCTs) covering 23 million people. Although the average impact of nudges reported in academic journals is large – at 8.7% – their analysis yielded a mean impact of just 1.4%. Why the difference? They conclude that selective publication in academic journals explains about 70% of the discrepancy.[4] DellaVigna and Linos also surveyed nudge practitioners and academics, to predict the effect sizes their evaluation would uncover. Practitioners were far more pessimistic, and realistic, than academics, presumably because of their direct experience with nudge interventions.

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https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

Even when i-frame interventions *are* highly effective, their impact may be modest. For example, consider a recent large-scale field trial which showed that over 85% of Swiss individuals and 75% of businesses who were defaulted into a more expensive green energy tariff stuck with this tariff over many years (Liebe, Gewinner, & Diekmann, 2021). The authors estimate this mechanism could yield very large carbon savings. In an optimistically titled commentary on this work ("Green defaults can combat climate change"), Sunstein (2021, p. 548) begins by contrasting i- and s-frame approaches:

> It has long been thought that to reduce environmental harm, the best approach is an economic incentive, perhaps a corrective tax. In recent years, however, increasing attention has been given to non-monetary interventions including "nudges," such as information disclosure, warnings, uses of social norms, and default rules. A potentially promising intervention would automatically enroll people in green energy, subject to opt-out.

But the ultimate impact is likely to be slight. The energy system does not respond by instantaneously producing more green energy for newly defaulted consumers. Rather, existing green energy is reallocated, with *no* direct impact on the energy mix. Moreover, the policy could not be applied universally because there would be insufficient green energy to "go round." Admittedly, if it could be rolled out almost universally, the policy might generate a sufficient price "premium" for green energy to boost investment – but that very premium would push people away from the green tariff, and likely generate a media and political backlash. Worse, investment costs would be inequitable and divisive, allowing free-riders to avoid investing in the public good of green energy. This type of i-frame intervention is not an alternative to the s-frame measures that have successfully decarbonized the power system in many countries.

There is a deeper concern: i-frame interventions may draw attention and support from crucial s-frame changes. Five increasingly specific lines of evidence suggest that this is a serious problem:

(1) The brain represents stimuli of all kinds in only one way at a time. Thus, once a representational "frame" is adopted, other frames are difficult to access. This is evidenced throughout the cognitive and neurosciences, from perceptual rivalry (e.g., Kornmeier & Bach, 2012), functional fixedness in problem-solving (Duncker, 1945), or the mind's apparent limitation to a single "mental model" in reasoning (e.g., Johnson-Laird, 1983). Irrespective of cognitive domain, different frames compete; where several are available, a focus on one tends to crowd out others.

(2) Work on causal attribution indicates that people see responsibility as divisible – the causal responsibility associated with one factor or agent varies inversely with that of any other (Chockler & Halpern, 2004; Lagnado, Gerstenberg, & Zultan, 2013). This implies that voters and policy makers alike will judge s-frame causes as less important, when focusing on i-frame factors.

(3) A possible mechanism for such displacement effects is "single-action bias" (Weber, 1997). Weber found that US farmers who had adapted their agricultural practices to climate change were less supportive of government climate policies, and Hansen (2004) found parallel results in Argentina. Weber (2006) hypothesized that action to cope with a problem reduces fear, and hence the perceived importance of other risk reduction strategies. This effect occurs even if the action taken is not the most effective option, or where multiple actions are needed.

(4) The "competition" between i-frame and s-frame explanations of behavior may be tilted toward the i-frame. Indeed, the tendency to underestimate situational factors and overestimate individual factors is viewed by many as *the* key finding of social psychology, known as the "fundamental attribution error" (Ross, 1977) or "correspondence bias" (Gilbert & Malone, 1995). Thus, business interests advancing i-frame solutions may have benefit from a tailwind of human psychology.[5]

(5) Finally, direct experimental evidence shows that the i-frame can "crowd out" s-frame considerations in policy-relevant contexts (Thøgersen & Crompton, 2009). Hagmann, Ho, and Loewenstein (2019) show that merely alerting people (including policy makers in one study) to the possibility of an i-frame intervention (a green energy nudge) reduces support for more substantive policies (a carbon tax). Moreover, they find that a green energy nudge appears to crowd out support for a carbon tax by providing the false hope that climate change can be addressed without costlier (but immeasurably more effective) policies. When individuals are informed about the limited impact of the green energy nudge, however, their support for a carbon tax increases.

Werfel (2017) finds these effects in the field. Households in Japan who were randomly assigned to report actions they took to save energy were less supportive of a carbon tax, and those who reported more actions were especially unsupportive. Werfel concludes that the effect is "driven by an increase in the perceived importance of individual actions relative to government regulation" (Werfel, 2017, p. 512). Truelove, Carrico, Weber, Raimi, and Vandenbergh (2014) find mixed results when it comes to support for recycling policies, but greater overall support for negative than positive spillovers.

Finally, Maki et al. (2019) conclude in their meta-analysis of proenvironmental behavior (PEB) that spillovers from PEBs to *intentions* are positive; but spillovers from PEBs to actual behavior and, crucially, policy support, are negative (though small).[6] Collectively, these studies highlight a general propensity for i-frame solutions to undermine support for available s-frame policies.

Beyond crowd-out effects in public support, there are three further ways in which i-frame interventions can undermine s-frame policies. First, policies require human and financial resources: Pursuing one policy can interfere with pursuing others. Coronavirus disease (COVID) provides a recent illustration: China[7] and New Zealand[8] relied on isolation, and did not initially push hard on vaccination. Furman (2016, p. 3) notes that "policymakers have a finite amount of time and attention, so every policy action taken has a cost in terms of other actions that they are unable to undertake as a result… Thus, even a high benefit-to-cost ratio may not be sufficient justification for pursuing a policy if it crowds out the time and attention that might have gone into other policies with higher absolute net benefits."

Second, there will also be unavoidable crowd out of research resources. Social and behavioral scientists face constraints on time, effort, and funding, so that a focus on nudges almost inevitably reduces effort elsewhere. We are by no means calling for the

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

suppression of specific types of research; but, as we argue below, a reprioritization could help both science and society.

Third, a focus on i-frame interventions can shift the standards of what counts as quality *evidence* for public policy. For many i-frame policies, RCTs are seen as the gold standard for evaluating and incrementally improving policy, and as *the* crucial contribution of behavioral insights research (Luca & Bazerman, 2021).[9] But this gold standard itself pushes toward i-frame interventions (where different individuals may be randomly assigned to distinct interventions) and away from s-frame interventions where it is rarely possible to change the "system" for some subset of the population.[10,11] As Hansen (2018, p. 193) relates about his interactions with policy makers, "It is my repeated experience that we can quite easily run a letter-tweaking experiment involving thousands of taxpayers, but only provoke strenuous smiles when we say, 'We could also try to rethink the policy assumptions.'"

S-frame policies are not inherently superior to i-frame policies. Many do not have their intended effect,[12] or even backfire.[13] But to evaluate the likely efficacy of s-frame policies, the natural approach is rarely experimental. Instead, the s-frame encourages us to ask where, when, and why a problem arose, and to explore differences between and within countries. Such analyses can provide clues about problems' origins, as well as ideas about how they could be addressed, perhaps by reversing the historical changes or adopting s-frame approaches that have proven successful elsewhere.

The idea that support for i-frame interventions crowds out support for more substantive and effective s-frame ones receives indirect support from another observation, which is the central focus of this review: The powerful and consistent support that i-frame interventions have received from interests that are opposed to s-frame reform. Picking up our previous analogy, slum landlords (by analogy with corporations opposing s-frame reform) will see illness as arising from poor hand-washing or unhygienic food and drink preparation. And well-intentioned behavioral scientists may suggest i-frame interventions to increase the use of soap and boiled water, probably to a little effect. But the i-frame perspective may itself weaken the impetus for tried-and-tested s-frame reform: Regulations to enforce quality housing, with heating, sanitation, and safe drinking water.

Over many decades we show that public relations specialists representing corporate interests have effectively deflected pressure for systemic change by reframing social problems in i-frame terms. They have learned to back i-frame interventions that pose little threat to the status quo while simultaneously lobbying heavily against proven s-frame changes that threaten their interests. The billions of dollars spent promoting i-frame interventions should make behavioral scientists uneasy. With the best of intentions, proponents of i-frame policy, including ourselves, may have inadvertently weakened support for crucial systemic changes.[14] As we review below, there is every reason to believe that this has happened.

These considerations do not imply that i-frame research should be abandoned. Indeed, many influential advocates of i-frame policies have long seen them as complementing, rather than replacing, s-frame policy (e.g., Sunstein, 2022a; Thaler & Sunstein, 2021). But it does imply that behavioral scientists need to be aware of, and actively counter, any tendency to view i-frame interventions as alternatives to system change. Moreover, the relative impacts of i- and s-frame interventions strongly suggest that behavioral scientists should prioritize applying behavioral insights to s-frame reform.

1.1. Climate change and the i-frame

In the early 2000s, the world's second largest non-state-owned oil company, BP, began an enormous media campaign with the tagline *Beyond Petroleum* to improve its environmental image. Mann (2021) documents how BP and its fossil-fuel allies had long challenged the reality of climate change by supporting climate-skeptical academics and discrediting legitimate climate scientists. As this approach became increasingly indefensible, they shifted gears. Rather than opposing climate science directly, they worked to reframe the problem of carbon reduction in i-frame, not s-frame, terms, beginning what Mann calls the "new climate wars": promoting the idea that opposing climate change demands individual responsibility, not systemic reform.

A key strategy was to promote the personal "carbon footprint" (Safire, 2008), in part through BP's carbon footprint calculator, which was completed by nearly 300,000 people in 2004 (Solman, 2008). The campaign succeeded spectacularly: Individuals, campaigners, media organizations, and government agencies all created their own carbon calculators to help people reduce their impact on the planet.[15]

BP's campaign promotes the i-frame by helping individuals reduce their own personal carbon footprint, and behavioral scientists have jumped aboard by testing, and advancing the implementation of, a variety of "green energy nudges." The most prominent, based on ideas pioneered by Cialdini (1984) and highlighted by Cameron in his TED talk, involves showing people graphs comparing their own home-energy use with that of their neighbors (Schultz, Nolan, Cialdini, Goldstein, & Griskevicius, 2007).

BP's campaign may seem constructive, or at worst innocuous. But Mann (2021) suggests that it is in fact a clever exercise in *framing*: Describing a problem in a particular way to shape the solutions that come to mind (Chong & Druckman, 2007; Lakoff, 2014). BP's campaign, which included personal appeals such as "It's time to go on a low carbon diet" (Learmonth, 2020), frames the challenge of combating climate change as a matter of individual responsibility.[16]

Carbon footprints have certainly attracted, and perhaps distracted, behavioral scientists including ourselves. In consulting and advisory work, we have thought a lot about what interventions can help individuals reduce their use of heating, insulate their homes, and shift to low-carbon transport and more plant-based diets (e.g., Chater, 2020a; see also Allcott & Rogers, 2014). But we now doubt that carbon emissions can be substantially reduced by i-level interventions such as providing small incentives, better (or more transparent) information, more feedback, more awareness of social norms, or greener "defaults."[17] Having a real impact will require systemic transformation on a huge scale: Changing how we heat our homes, travel, ship goods, and produce and consume food; rethinking manufacturing; and vastly expanding the production, storage, and transmission of green electricity. Such transformations would likely include a substantial carbon tax alongside extensive regulation (e.g., Cramton et al., 2017; Energy Transition Commission, 2021; Markard, 2018), as well as redistributive transfers to deal with issues of unequal impacts.

The case of carbon footprints is part of a wider pattern (which we illustrate in the next section):

(1) Corporations with an interest in maintaining the status quo promote public relations (PR) messages that the problem at

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

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.

(2) Behavioral scientists enthusiastically engage with the i-frame, and focus on frailties of thought and behavior as the source of problems. It thus seems natural that behavioral scientists are well-positioned to solve them, by helping individuals overcome their limitations.

(3) There are hopes that i-frame interventions (nudges, providing individual-level incentives, information, and education) provide cheap and effective alternatives to conventional s-frame policies, such as regulation and taxation. This hope distracts from the s-frame. It also promises that "heavy-handed" s-frame interventions can be avoided in favor of cheap, incremental, and often politically palatable light-touch measures.

(4) The i-frame interventions yield disappointing results, and divert attention and effort from much needed s-frame reforms, bolstering the status quo.

(5) Corporations relentlessly target the s-frame, where they know the real leverage lies. They spend substantial resources on media campaigns, lobbying, think-tanks, and academic research sponsorship to ensure that the "rules of the game" reinforce the status quo.

Our focus in this paper is the unwitting (by academics) alignment of interests between corporations and behavioral scientists focusing on the i-frame. We leave aside the many direct attempts by business to coopt academia, dating back at least to the cigarette industry's mobilization of academics skeptical of a link between smoking and cancer (Brandt, 2012). Across the topics outlined below, there are direct initiatives by businesses to back academics who support specific industry-friendly positions. The same motivation likely underlies (more indirect) corporate campaigns to advance i-frame interpretations of societal problems.

Although some corporate tactics (e.g., regarding tobacco and climate disinformation) have been challenged as both legally and ethically deeply questionable, the broader tendency of companies to invest in PR and lobbying to promote their interests is almost inevitable, as predicted by economic theory (e.g., Grossman & Helpman, 1994), and described in the empirical literature (e.g., Bombardini & Trebbi, 2019). Here, too, an s-frame perspective is appropriate, rather than attributing the problem to the "greed" or other moral failings of individual executives. They too are working within the incentives and rules of a system which virtually requires that they promote their companies' interests, irrespective of their personal views. We take it to be uncontroversial that companies lobby to oppose s-frame reform. What is less obvious is that such PR and lobbying often operate by an indirect, but very powerful, mechanism: The promotion of i-frame solutions.

We now illustrate our argument in detail for four more policy domains (obesity, retirement savings, plastic waste, and rising healthcare costs), then more briefly for six others. Lastly, we outline a positive vision for an s-frame-oriented behavioral public policy.

2. Case studies: How i-frame behavioral public policy went wrong

Table 1 reviews prototypical i-frame and s-frame interventions for the four examples we discuss in detail, as well for climate change. Each case conforms (with variations) to the five steps outlined above.

Although we primarily focus on behaviorally inspired i-frame interventions, i-frame thinking also includes legal disclaimers,

Table 1. Potential i-frame and s-frame interventions to address public policy problems

Policy issue	Potential i-frame interventions	Potential s-frame interventions
Climate change	Social feedback on energy use (Schultz et al., 2007)	Carbon pricing (Best, Burke, & Jotzo, 2020)
	Smart meters (Department for Business, Energy & Industrial Strategy, 2013)	Decarbonization of the power sector (Jägemann, Fürsch, Hagspiel, & Nagl, 2013)
	Carbon footprint calculators (West, Owen, Axelsson, & West, 2016)	Green building codes (e.g., Leadership in Energy and Environmental Design (LEED) certification) (U.S. Environmental Protection Agency, 2022)
Obesity	Calorie labels (Jue et al., 2012; Swartz, 2011)	Sugar tax (Allcott, Lockwood, & Taubinsky, 2019b)
	Portion size changes (Downs & Loewenstein, 2011; Schwartz, Riis, Elbel, & Ariely, 2012)	Subsidies for healthy food (Afshin et al., 2017)
	Weight loss incentives (Volpp et al., 2008)	
	Individual incentives to exercise (Charness & Gneezy, 2009)	
Retirement savings	Advisors declare conflicts (Cain et al., 2005)	Employer-provided pensions (e.g., Australian Age Pension) (Agnew, 2013)
	Defaulting into pensions (Madrian & Shea, 2001)	
	Save more tomorrow (Benartzi, 2012)	Social security expansion (Social Security Administration, 2022)
Health care	Medication reminders (Volpp et al., 2017)	Government negotiation of prescription drug prices (Ginsburg & Lieberman, 2021)
	Choice architecture for insurance exchanges (Johnson et al., 2013)	Single-payer health insurance (Woolhandler & Himmelstein, 2019)
Waste	Keep America Beautiful campaign (Mann, 2021)	"Polluter pay" policies (Corkery, 2020)
	Painted footsteps leading pedestrians to trash bins (Keep Britain Tidy, 2015)	Plastic bag bans (National Conference of State Legislatures, 2021)

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

conflict of interest disclosures, information provision (e.g., calorie or carbon labeling), which are aimed at helping people make better decisions. Behavioral scientists tend doubt of the effectiveness of such strategies – and with good reason (Golman, Hagmann, & Loewenstein, 2017; Loewenstein, Sunstein, & Golman, 2014).

2.1. Obesity

The problem of obesity is one of the major public health challenges facing the developed world: We are, collectively, eating too much and exercising too little (Hill, Wyatt, & Peters, 2012). But why? Drawing on a vast literature on intertemporal choice from neuroscience (McClure, Laibson, Loewenstein, & Cohen, 2004), experimental psychology (Rachlin & Green, 1972), behavioral economics (O'Donoghue & Rabin, 1999), and philosophy (Parfit, 1984), researchers have often seen obesity as exemplifying the i-frame weakness of *present-bias*, by which lure of cake now overwhelms the long-term benefits of better health (see Chs. 13, 17, and 18 of Loewenstein, Read, & Baumeister, 2003; but see also Ch. 16).

Yet variations in obesity over time and across counties reveal the limitations of such a perspective. There is no evidence that present bias has changed over time or place in ways that explain variations in obesity. Indeed, we know of *no* empirical evidence causally connecting obesity to present-bias. There is, however, strong evidence that people who migrate often take on the obesity characteristics of their new locality (Schulz et al., 2006). Obesity is not the product of individual fallibility, but systemic factors.

The food industry encourages academics to focus on i-frame solutions to obesity, including attempts to deflect concern away from food as the source of the problem[18] and discredit academics with opposing views.[19] Brownell and Warner (2009) identify the central plank of the industry's strategy: "Focus on personal responsibility as the cause of the nation's unhealthy diet," *taking the food system as a given*.

Behavioral scientists have unwittingly jumped on this i-frame bandwagon, proposing and testing a wide variety of i-frame interventions.[20] Large bodies of research, including many papers by one of us, have explored (a) proximate interventions in people's interactions with food, including innovative calorie labeling and advanced ordering of meals (see Downs & Loewenstein, 2011); (b) specially crafted incentives to motivate weight loss (e.g., Volpp et al., 2008); and (c) promoting exercise, typically by paying people to go to the gym (Charness & Gneezy, 2009).

These i-frame interventions are often viewed as alternatives to legislation and taxation. In advocating for his HealthierUS initiative, for example, which promoted exercise and healthier food choices, former President George W. Bush expounded that:

> We have a problem when people don't exercise and eat bad food. Obesity can cause serious health problems, like heart disease and diabetes…We must reverse the trend, and we know how to do it. It's exercise and good dieting. Good foods and regular exercise will reverse the trend and save our country a lot of money but, more importantly, save lives. (Bush, 2003)

But i-frame interventions have proven disappointing: (a) Proximate interventions on food ordering produce small, though statistically detectable effects (e.g., VanEpps, Downs, & Loewenstein, 2016), (b) people regain weight once incentives are removed (John, Loewenstein, & Volpp, 2012); and (c) although incentives increase gym visits, a measurable impact on actual weight has not been demonstrated (Charness & Gneezy, 2009).

While publicly promoting an "i-frame" perspective on obesity, the food industry and agribusiness relentlessly lobbies at the s-frame: To maintain and modify laws and regulations to their advantage.[21] Individual consumers are no match for concentrated firms united by industry associations and armed with lobbyists, in line with Olson's (1965) classic analysis in *The Logic of Collective Action*. Individuals often care desperately about their waistlines and health, devoting huge amounts of time and money in (usually unsuccessful) attempts to get, and stay, thin (e.g., Polivy & Herman, 2002). It is not in any individual's interest to expend time or money to exert an infinitesimal influence on the overall food system.[22] But it *is* in the interests of a concentrated and highly organized food industry to spend vast sums to do so.

This argument in no way denies the fallibility of human behavior, or that such fallibility matters for s-frame public policy. Indeed, as we discuss in section 3, an i-frame *understanding* of human weakness is crucial to explaining how it can be exploited so effectively – for example, by producing and marketing products that cater to our evolved weakness for sugar and fat. As public health researchers Nestle and Jacobson (2000) note, "Changes in the food environment help explain why it requires more and more willpower for Americans to maintain an appropriate intake of energy." Moss (2013) documents a meeting of top food industry executives at which some acknowledged their leading role in the obesity epidemic, but could not agree on initiatives to curb it. Moss explains how the food industry uses the physiology and psychology of food consumption to reach consumers' "bliss points," maximizing craving and in some cases suppressing cues for satiation.[23]

Focusing on individual-level causes and remedies for obesity risks displacing researcher time, financial resources, and journal pages from deeper thinking and in-depth research about what caused the obesity epidemic, about s-frame interventions to reverse it, and about how to marshal behavioral science to help make such interventions successful. Misattributing problems to individual weakness rather than systemic factors also implicitly blames individuals – and encourages them to blame themselves – for their inability to swim against powerful currents they have little hope of resisting.

2.2. Inadequate provision for retirement

The citizens of the United States and many high-income countries are financially unprepared for retirement. Half of US families have no retirement savings whatsoever (Morrissey, 2019), and over half of workers between 60 and 65 believe their savings are not "on track" for retirement (Board of Governors of the Federal Reserve System, 2021). Indeed, the median retirement account savings balance for people approaching retirement is just $21,000 (Morrissey, 2019). Although the average Social Security payment is only $1,543/month (Social Security Administration, 2021), over two-thirds of US retirees identify Social Security as their *primary* income (Transamerica Center for Retirement Studies, 2020).

Inadequate saving vies with obesity as behavioral scientists' favorite illustration of "present-bias" (e.g., Laibson, 1997): The long-term benefits of saving are presumed to be overwhelmed by the immediate pleasures of spending. But, as with obesity, this story is implausible in a historical and cross-national context.

Preparing for retirement was, until quite recently, achievable for Americans. Until the 1980s, most companies offered pensions paying predictable amounts on retirement (typically pegged to

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

their final salary).[24] Problems began with the emergence of "defined-contribution" retirement plans (a euphemism for "save for your own retirement"). Originally envisioned to supplement pensions,[25] in the 1980s, companies found they could drastically reduce the cost, administrative burden, and risks of pension schemes by offloading funding, and investment decisions, to their employees. And, once some employers ceased to fund pensions, competitive pressures forced their competitors to follow suit. Defined-benefit plans are now largely confined to public sector workers, and, even there, there is a trend toward defined-contribution schemes. Some employers do match employee contributions; but many offer no retirement plans at all.

Cross-national comparisons reveal that inadequate savings is not a universal problem. Australia is a particularly telling example.[26] Not long ago, it was one of the few countries with lower retirement savings levels than the United States, but it is now a frontrunner in retirement preparedness following far-reaching systemic reforms: Universalizing retirement saving, mandating substantial employer and employee contributions, and prohibiting withdrawals for almost any reason. The United States has taken the opposite route: Not mandating contributions by employers or employees, permitting withdrawals for a range of reasons, and even permitting borrowing against retirement funds.[27]

A rapid shift back to conventional pensions would be financially onerous for most US companies, but especially for the financial services industry, built on the management of defined-contribution retirement plans. Not surprisingly, therefore, the industry adopts the i-frame: Taking the defined-benefit system as given, and focusing on helping people cope with it more adequately. Ads contrast the happy futures of those who put sufficient resources aside, with the struggles of those who do not. Likewise, the TIAA Institute, the research arm of the huge financial services company that manages many academics' retirement accounts, funds and posts on its website numerous research studies testing interventions to improve retirement preparedness, almost all of which aim to increase the level of saving within traditional defined-contribution plans.[28] From this perspective, the fate of struggling savers lies in their own hands. Such an i-frame perspective is understandable: Financial services firms could not be expected to propose policies that might put them out of business.

If defined-contribution retirement plans have such disastrous consequences, asks *Atlantic* author Frank Pasquale, then "why are policy makers so enamored of it?" Pasquale suggests that one reason is the hope that, with the right behavioral interventions ("nudges"), citizens can solve the problem on their own. But he suggests this hope is illusory:

> Because the nudge is really a fudge – a way of avoiding the thornier issues at stake in retirement security. The most worrisome unexpected costs of old age, including medicine and personal care, should be addressed by politicians via programs such as Medicare and Medicaid. But by focusing on individuals' decisions to save up for retirement, they can shift responsibility.
>
> This focus on the individual, rather than the wider social context, is not surprising, given that nudging comes out of microeconomics and psychology, two disciplines that tend to break the world into dyadic transactions between isolated individuals and firms. A sociological or political perspective, on the other hand, points to the real roots of retirement insecurity: a great shifting of risk from corporations to individuals. Workers can be urged to take all manner of "personal responsibility" for saving – but if their wages are stagnant while other costs are rising, it is hard to imagine that strategy really working.

Behavioral scientists have embraced the i-frame enthusiastically, proposing and testing different mechanisms to help people make the right pensions choices. As with green energy, one lever has been the power of defaults: Across the United States, the United Kingdom, and many other nations (OECD, 2020), people have been auto-enrolled into pension schemes, albeit with the possibility of opting out.[29] Present-bias has been tackled via "auto-escalation" – that is, allowing people to make low initial pension contributions, and ramp up contributions as their income grows (Thaler & Benartzi, 2004). In parallel, conventional i-frame interventions, such as improving customer understanding of pensions, and increasing "financial literacy" (Lusardi & Mitchell, 2014) are proposed and tested (e.g., Mandell & Klein, 2009).[30]

An interesting counterpoint to the i-frame interventions explored by behavioral scientists is provided by Willis's (2008) provocatively titled "Against Financial-Literacy Education." Specifically critiquing i-frame interventions involving disclosure, Willis writes:

> The dominant model of regulation in the United States for consumer credit, insurance, and investment products is disclosure and unfettered choice. As these products have become more complex, consumers' inability to understand them has become increasingly apparent, and the consequences of this inability more dire. In response, policymakers have embraced financial-literacy education as a necessary corollary to the disclosure model of regulation. (p. 197)

Willis questions whether such education really helps, and concludes:

> Harboring this belief [that financial literary is the solution] may be innocent, but it is not harmless; the pursuit of financial literacy poses costs that almost certainly swamp any benefits… When consumers find themselves in dire financial straits, the regulation through education model blames them for their plight, shaming them and deflecting calls for effective market regulation… The search for effective financial literacy education should be replaced by a search for policies more conducive to good consumer financial outcomes. (p. 198)

i-Frame interventions provide a tempting alternative to urgent-needed s-frame reform: Radical reform of current defined-contribution plans.

Advocates of behavioral interventions acknowledge the difficulties with defined-contribution plans, but argue that i-frame interventions should be part of the solution. For example, Thaler (2009) writes "Everyone's lost a lot of money on their 401(k) plans. I've heard some people calling them 201(k) plans. So it's even more important to get people to be saving more for retirement. Behavioral economics has helped us learn a lot about how to do that. One simple way is… automatic enrolment." Former President Barack Obama called automatic enrollment a "common-sense, practical solution" to retirement savings (Jacobson, 2012).

Auto-enrollment and auto-escalation are among the most ingenious and elegant i-frame interventions in any domain. Yet their impact has been disappointing, despite often being seen as the major success story for behavioral public policy.[31] David Laibson, once a leading advocate of i-frame solutions, concluded in a 2020 keynote[32] that neither auto-enrollment nor auto-escalation have moved the needle on retirement saving.

First, even without auto-enrollment, many employees end up enrolling in the firms' retirement plans; auto-enrollment only

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

slightly accelerates the process (Choi, Laibson, Madrian, & Metrick, 2004). Second, and more significant, is the problem of "leakage" (Argento, Bryant, & Sabelhaus, 2015): Employees often remove funds from retirement savings accounts, for example, when changing jobs, or borrow at low interest rates using their retirement balances as loan collateral. Third, auto-enrollment cannot help the many workers at companies which don't offer matches or provide no plan at all.[33] Incentives for companies to implement auto-enrollment were built into the Pension Protection Act of 2006, and pension enrollment did rise substantially at those firms that offered their workers defined-contribution pension plans (Engelhardt, 2011). But even when defaults apply, workers are often defaulted to low rates of contribution (Butrica & Karamcheva, 2013). A decade after these reforms, US retirement saving remains stagnant (Morrissey, 2019).

In the United Kingdom, auto-enrollment has been particularly undermined by default contributions often being set very low. Thus, many people wrongly believe they have "ticked the pensions box" while remaining woefully under-prepared for retirement (Decision Technology, 2017). Indeed, the tendency of low defaults to actually reduce contribution rates for workers who otherwise would have saved more was documented in the very first paper on the impact of defaults (Madrian & Shea, 2001).

Responding to an earlier paper (Loewenstein & Chater, 2017), in the concluding pages of *Nudge: The Final Edition*, Thaler and Sunstein (2021) rightly stress that pension reforms in the United States and United Kingdom involve both i- and s-frame changes. For example, the NEST pension scheme in the United Kingdom (which helps employers of all sizes provide workplace pensions), is almost entirely an s-frame reform. Crucially, employers are *required* to provide such pensions. The i-frame "nudge" element – that they are defaulted in *with an opt-out* – is a relatively minor detail. It is typically the s-frame issues that really matter: Whether, as in the United States, employees can withdraw money from, or take loans against, their pension; or in the United Kingdom, the default pension contribution level.

For pensions, unlike most of the topics we discuss, there has been relatively little active lobbying against reinvigorating defined-benefit schemes or their equivalent. We suspect this is because there are few firms that would benefit from a shift back to such schemes, and many that would be harmed. If strong public support were to emerge for such reform, we would anticipate a reaction from the financial services industry paralleling that in health care (see below).

2.3. Plastic waste

The production and disposal of plastics, cans, bottles, bags, and containers provides a further illustrative example. Plastic bags clog sewage systems, kill about 100,000 marine mammals every year, and degenerate into toxic microplastics that pollute oceans and landfills. Worldwide, shoppers use around 500 billion single-use plastic bags annually.[34]

Readers who see reducing waste as a matter of individual responsibility may be surprised, as we were, to discover that this i-frame perspective can be traced to the influence of industry. Consider, for example, the famous 'Crying Indian' ad (Mann, 2021, pp. 52–60). In the ad, an actor in Native American dress paddles a birch bark canoe on water that becomes increasingly polluted, pulls his boat ashore, and walks toward a bustling freeway where a passenger hurls a paper bag out a car window. The ad concludes with an encapsulation of the i-frame perspective "People start pollution. People can stop it." The wider "Keep America Beautiful" campaign (ubiquitous from the 1950s until today), of which the ad was a part, was conceived and funded by beverage and packaging corporations including the American Can Co., Owens-Illinois Glass Co., and later Coca-Cola and Dixie Cup.[35]

Behavioral scientists have generated many potential interventions, particularly focusing on reducing littering (e.g., Keep Britain Tidy, 2015). For example, pictures of "watching eyes" are widely deployed in the United Kingdom, in the light of studies indicating that these prime prosocial behavior (Bateson, Nettle, & Roberts, 2006; Haley & Fessler, 2005), and especially litter reduction (Bateson et al., 2015). A highly cited intervention tested in Copenhagen in 2011 involves painted footprints leading to brightly colored trash bins, was found to reduce littering by a 46%.[36] Unfortunately, despite its apparent success, this approach does not seem to have been tested further, and appears to have been implemented in one other locality: Stirling, Scotland.[37] This highlights a broader problem: Even where interventions do work, they are difficult to sustain or scale-up. To our knowledge, there are currently no proven anti-littering initiatives operating at scale with a strong evidence base.[38] Putting "watching eyes" on packaging (which reduced littering of a leaflet in one field study) may be scalable (Bateson et al., 2015). However, considerations of cost, displacement of other packaging information, and potential diminution in impact if "watching eyes" become almost ubiquitous, all argue for caution.

For over 50 years the oil and plastics industries have further resisted efforts to curb plastic packaging by promoting the myth that large-scale plastic recycling is technically and economically feasible, in order to allay concerns about new plastic.[39] Yet, according to the Environmental Protection Agency (EPA), less than 10% of plastic has been recycled in the last 40 years. An National Public Radio (NPR) investigation titled "Plastic Wars: Industry Spent Millions Selling Recycling – to Sell More Plastic" found internal documents from the 1970s confirming that the industry always knew that recycling at scale would never be economically viable. Moreover, the plastics and oil industries have created and funded nonprofit organizations with names that belie their true purpose. The promisingly proenvironment sounding "Earth911" (https://earth911.com/about-earth911-mission-and-history/), for example, with industry partners including ExxonMobil, which promotes the recycling myth and focuses on the i-frame, states that "Thousands of individual small changes create a large, positive impact."

While promoting the i-frame publicly, the food, beverage, and packaging industries have correctly identified that s-frame change is far more important. Indeed, s-frame interventions banning or taxing plastic use have proven highly effective. For example, in San Jose, CA, a plastic bag ban led to 89% fewer plastic bags in storm drains (60% in rivers and residential areas), and the average number of bags used per person decreased from 3 to 0.3.[40] As standard political economy considerations would predict, industry has therefore lobbied heavily against such s-frame interventions, with great success. Although in the United States only two states (CA and HI) have banned plastic bags, 10 (AZ, FL, IA, ID, IN, MI, MN, MO, MS, and WI) have legislated statewide *preemptive bans* on banning plastic bags, preventing municipalities from imposing bans or fees. These bans aren't spontaneous expressions of public hostility to an obscure policy; they arise from concerted lobbying.[41]

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

Corporate interests have also actively opposed "Extended Producer Responsibility" measures for packaging, cigarettes, bottles, and other waste, an s-frame approach that aims to make producers bear the full social and environmental cost of their waste, thereby incentivizing product redesign to reduce that waste (Walls, 2006). Where implemented, such schemes can be highly effective (Hanisch, 2000; Walls, 2006), and the approach is gaining momentum in the European Union (EU) and United Kingdom.[42]

2.4. The high cost of US health care

Health care is increasingly expensive, especially in the United States, both for individuals and the economy at large; and results are often disappointing. As usual, time trends and international comparisons reveal this. The United States has not always been an outlier. In the 1980s, the US population was primarily insured in managed care plans with incentives to insurers and providers to keep down costs (Draper, Hurley, Lesser, & Strunk, 2002). Providers were mainly paid salaries, which were high but not lavish. In the 1980s, however, the United States began a crucial systemic shift: To a fee-for-service system and highly fragmented private insurance market, with high administrative costs and incentives to over-provide expensive, low benefit tests and services, as well as overpriced medications (Lesser, Ginsburg, & Devers, 2003). US healthcare costs soon departed dramatically from those in comparable countries, and at this point US health costs are roughly twice the Organization for Economic Co-operation and Development (OECD) median, with no better than median results on almost all measures of health and health care. Higher US health costs do not arise because Americans are, individually, less healthy than people in other countries. For example, smoking rates in the United States are far lower (14% in 2019) than many countries with much lower health costs (e.g., France, Germany, and Spain; all with smoking rates substantially higher than 25% in 2021).[43]

The US healthcare industry (e.g., insurers and providers) promotes an i-frame perspective: That high healthcare costs stem from poor health, which itself depends on individual fallibility. The message is conveyed through actions such as the provision of rewards for exercise (or subsidization of fitness clubs), despite little evidence that such incentives impact health (Redmond, Solomon, & Lin, 2007).

Behavioral economists have often taken a similar line. In a typical passage from a large literature, Loewenstein, Brennan, and Volpp (2007) wrote:

> Individual behavior plays a central role in the disease burden faced by society. Many major health problems in the United States and other developed nations, such as lung cancer, hypertension, and diabetes, are exacerbated by unhealthy behaviors. Modifiable behaviors such as tobacco use, overeating, and alcohol abuse account for nearly one-third of all deaths in the United States. (p. 2415)

A huge range of i-frame interventions have been proposed to improve health.[44] But incentives, reminders, and apps have shown little success, either in changing behavior or improving outcomes (e.g., Volpp et al., 2017). In parallel, more traditional i-frame solutions, such as providing information (e.g., alcohol labeling), injunctions on products (e.g., "please drink responsibly"), and industry-funded self-help programs (e.g., https://www.drinkaware.co.uk/) have typically yielded disappointing results, as with obesity.

Behavioral researchers have also proposed i-frame inventions to help people reduce their own healthcare costs by optimizing their choice of insurance plan, for example, using calculation aids and defaults (Johnson, Hassin, Baker, Bajger, & Treuer, 2013). The researchers extrapolated from their promising results that the approach could save Americans $9 billion/year (although scaling up i-frame interventions is often difficult and disappointing; see Kalkstein et al., 2022). s-Frame differences between the US system and that of comparable countries account cost over $1 trillion/year (Centers for Medicare and Medicaid Services, 2021). Even the best i-frame intervention is no substitute for s-frame reform.

If s-frame changes caused the problem, then reversing those changes is surely the most natural solution. We know from history, however, that such s-frame reform meets concerted opposition. Following Olson's logic of collective action, the concentrated interests of the healthcare sector trump the diffuse benefits that system reform could give individuals. As President Obama (2020) wrote on the challenges of even modest reform:

> Unlike the insurance companies or Big Pharma, whose shareholders expected them to be on guard against any change that might cost them a dime, most of the potential beneficiaries of reform – the waitress, the family farmer, the independent contractor, the cancer survivor – didn't have gaggles of well-paid and experienced lobbyists roaming the halls of Congress.

Health care is poor value-for-money in the United States because there has not been the political consensus to drive through s-frame reforms. Without that consensus, the power of special interests to dilute and derail change is considerable: The United States' major recent attempt at reform, the Affordable Care Act, left most problems facing US healthcare intact, as President Obama implicitly acknowledges above.[45]

The world provides a number of successful healthcare systems with better services and far lower costs than in the United States. The key to lowering healthcare costs is to move decisively to a system proven to work elsewhere.[46] Insights from the behavioral sciences may thus be best focused primarily on understanding how damaging s-frame policies become embedded, and how to build consensus for s-frame reform, rather than "patching" the problem with new i-frame interventions.

2.5. The broader picture

The pattern we have identified applies more widely. Here, we briefly consider six further areas: educational inequalities, discrimination, privacy, misinformation, addiction to prescription drugs, and gun violence.

2.5.1. Educational inequalities

Across most of the world, although elites obtain high-quality education for their children, educational opportunities for the disadvantaged are often poor (UNESCO, 2020). It is uncontroversial that educational inequality is a systemic phenomenon (Merrow, 2017). As affluent parents send their children to private schools, their interest in maintaining the quality of publicly funded schools declines, hurting the quality of public schools (Scott & Holme, 2016). In consequence, people at decreasing levels of affluence find it worthwhile to make the financial sacrifice to send their children to private schools, creating a pernicious "tipping" effect (Darling-Hammond, 2017). Even within the publicly funded school system, similar feedback loops occur between

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

school catchment areas and property prices, which can rapidly divide localities into affluent communities with "good" schools and less affluent communities whose children are consigned to "bad" schools. In the United States, the divide is exacerbated because education is funded by local property taxes (EdBuild, 2019). Inequalities in education can substantially be reduced with the right systems in place: Most Scandinavian countries, for example, have well-funded universal education with no significant private educational sector (Abrams, 2016).[47]

How have behavioral scientists contributed to the debate? Much of our work has focused, not on changing the system, but on helping individual students: Shifting students' attributions for outcomes from a "fixed mindset" to a "growth mindset" (Dweck, 2008; Hochanadel & Finamore, 2015), instilling "grit" (Duckworth, 2016), and reducing "stereotype threat" (Steele, 1998). Much of the research along these lines has hinted, or even explicitly proposed, that these interventions can counteract the impact of low-quality education.[48] Here, as in the many other cases we discuss, there is the real danger that well-intentioned research providing a false hope of radical change from i-level interventions will undermine public pressure for fundamental systemic change.

2.5.2. Discrimination

Poor and unequal education is, of course, closely linked with race- and class-based discrimination, not just in education, but in housing, nutrition, criminal justice, economic opportunities, and beyond. These are highly entrenched systemic problems that warrant far-reaching s-frame reforms. With its embrace of diversity, equity, and inclusion as top goals for institutions, academia, perhaps more than any other profession, have taken the problem to heart. Yet the interventions that are proposed and embraced – mainly dealing with individual-level solutions such as measuring, acknowledging, and combatting "implicit bias" (Banaji & Greenwald, 2016), are, we suspect, likely to make only a small dent in the problem (Dobbin & Kalev, 2018). We believe it is crucial that these policies reinforce, rather than distracting from, the case for deep systemic changes, including a massive reallocation of resources and opportunities.

2.5.3. Privacy

The rapid transition to the digital age has seen rules for maintaining privacy lag far behind technological and commercial innovations that undermine privacy. Currently, even with the protections put in place by the EU's GDPR,[49] privacy is unachievable for anyone who owns a smart phone, shops at supermarkets, drives a car, or browses the web. We each leave a digital trail that is all too easy for companies, governments, or malign individuals to track and exploit.

Technology companies promote i-frame solutions while opposing tighter s-frame regulation. The movement toward "notice and consent," whereby people click a consent button allowing their data to be used, is a paradigm example. Here, a behavioral perspective provides a useful corrective, pointing out that few people read, let alone understand, the lengthy and legalistic policies attached to products, apps, and services (Loewenstein et al., 2014); and in any case, they have little choice but to consent, or be denied access.

As elsewhere, behaviorally inspired i-frame interventions have been proposed (e.g., Acquisti et al., 2017). A particular puzzle is the "privacy paradox" (Acquisti, Brandimarte, & Loewenstein, 2015; Barnes, 2006): People claim to care about privacy, yet readily reveal private information when on-line. Merely identifying the puzzle seems implicitly to blame individuals for their carelessness. But achieving digital privacy is not within the power of individuals, however motivated they might be. As elsewhere, s-frame regulation, rather than individual-level prompts, is crucial (Acquisti et al., 2015).

2.5.4. Misinformation

In today's politically polarized atmosphere, the problem of *misinformation* is especially pressing. Rational public debate requires agreement on the facts. But in many countries, and especially the United States, there are powerful interests actively promoting conspiracy theories and "alternative facts," sowing confusion and uncertainty among the general public. Again, regulation lags far behind technological and social change.

Behavioral science provides a powerful i-frame analysis of *why* people are so vulnerable to misinformation – and should be taken to imply that protecting against these vulnerabilities requires s-level interventions. People are excessively credulous (Gilbert, Tafarodi, & Malone, 1993), strongly underestimate the power of conflicts of interests (Dana & Loewenstein, 2003), and are influenced by the many nonepistemic benefits of new information: Reducing cognitive dissonance, shoring up personal beliefs systems, creating or cementing identification with "like-minded" others, providing ammunition in hypothetical or real debates, and many more (Chater & Loewenstein, 2016; Wojtowicz, Chater, & Loewenstein, 2022).

There have been wide-ranging academic discussions on how to tackle misinformation (Zucker, 2020), but a major focus of behavioral science has been on i-frame interventions, such as training individuals to detect fake news (van der Linden, Roozenbeek, & Compton, 2020). One representative study on misinformation about climate change (van der Linden, Leiserowitz, Rosenthal, & Maibach, 2017), for example, forewarned participants that some political actors try to mislead people on the issue, and gave facts and arguments to refute the misinformation before they encountered it. This "inoculation" had some of its intended effect, although one might wonder about the scalability of such an approach given the huge quantity and diversity of misinformation. Likewise, Pennycook, McPhetres, Zhang, Lu, and Rand (2020) showed a powerful impact on truth-discernment and information forwarding of either asking research participants to judge the accuracy of a piece of information or reminding them that information might be inaccurate. Disappointingly, this finding barely replicated (Roozenbeek, Freeman, & van der Linden, 2021) and quickly disappeared, and again seems difficult to scale. Yet another approach involved having individuals play a game – *Bad News*[50] – in which they seek to distinguish between real and fake news (Basol, Roozenbeek, & van der Linden, 2020). With a very large sample, rates of correct detection increased slightly, although even this small effect is difficult to evaluate, as the study lacked a control group.

The problem of misinformation is urgent. If behavioral scientists could find an effective i-level remedy in advance of systemic reforms, this would be hugely ideal. We worry, however, that the "promise" of i-level solutions (which, we suspect, will continue to disappoint) will reduce the perceived need for s-level change, which would surely entail the dramatic tightening of regulation of social media. The negative consequences of "information pollution" are, after all, potentially even more damaging to society than chemical pollution, by destabilizing the common base of facts that must underpin any well-functioning democracy.

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

2.5.5. Addiction to prescription drugs

There has been a wide coverage of the corporate malpractice and government complicity that created a wave of addiction and overdoses that currently kills more than 100,000 Americans each year. Purdue, the company most notorious in fueling the disaster, heavily funded academic studies promoting the idea that pain was under-treated and that opioids provide the best treatment. Purdue-funded academics baselessly claimed that only 1% of patients put on opioids become addicted, and even promoted the bizarre concept of "pseudo-addiction," according to which people who appeared to be suffering from withdrawal were actually suffering from *under*-treatment (Greene & Chambers, 2015).

Crucially for the present argument, Purdue consistently promoted an i-frame perspective on the problem it had helped create, portray its addict victims as weak-willed, irresponsible, individuals. Purdue's Richard Sackler, for example, wrote in an email detailing his company's proposed legal and PR defense, "We have to hammer on the abusers in every way possible. *They* are the culprits and the problem. *They* are reckless criminals" (emphasis added).[51] Highlighting the i-frame puts the focus of federal and state policy makers on law enforcement, targeting the illegal use of opiates, but not restricting medical prescriptions – the s-frame intervention that could have had a decisive impact. Moreover, framing addiction as a crime not a disease led addicts to hide their addiction from doctors and others who could potentially help, and compounded the misery of the addicts by adding self-blame to the other devastating consequences of addiction.[52]

While advancing the i-frame perspective to the media and government, Purdue relentlessly lobbied against s-frame regulation to limit opioid prescribing. Just how powerful s-frame actions could have been is indicated by international comparisons. For example, Germany, the country second to the United States in opioid prescriptions (and hence a conservative point of comparison), resisted efforts by Purdue to foist opioids on patients, and managed to largely avoid the addiction epidemic and rash of overdoses experienced in the United States.[53]

2.5.6. Gun violence in the United States

Why are there so many more mass shootings, and gun-related murders and suicides in the United States than in other developed nations? The consensus in criminology is that systemic factors are decisive: The availability of cheap and powerful firearms is a distinctive feature of the United States. Many nations have imposed strict s-level regulations on weapons, rules on gun ownership, and on locking guns safely. Such s-level interventions have generally proven remarkably successful. For example, increasing restrictions on firearms in the United Kingdom has led to steady declines in gun-deaths by homicide, to around 30 per year in England and Wales in 2020.[54] By contrast, in the United States, figure is over 50 *per day*. There have been only two mass shootings in Great Britain in more than 20 years, whereas mass shootings in the United States (in which at least four people are killed) occur *almost daily*.[55] The National Rifle Association (NRA) has fought every attempt at regulation, adopting the ubiquitous catch-phrase "guns don't kill people; people kill people," succinctly encapsulating the i-frame perspective.

Behavioral scientists have at times pursued i-frame policies to combat gun violence. In New York City, the behavioral insights firm ideas42 (founded by Harvard behavioral economists) was asked by the city to conduct a campaign to "discourage would-be shooters from carrying guns" (Gardiner, 2017). Researchers at the University of Chicago Crime Lab point to field experiments showing that interventions to promote cognitive behavioral therapy techniques among male youths reduce violent crime arrests (Heller et al., 2017). Although these types of interventions might prove useful in the unlikely event that they could be rolled out to a broader population, there is a risk that the promise of such approach could nudge policy makers away from the s-frame actions so urgently required to address the structural roots of gun violence.[56]

2.6. A success story: Tobacco

Perhaps the best evidence that corporate interests *can* be overcome and problems (largely) solved via s-level reforms comes from the long but ultimately successful battle against cigarettes in many countries. In the United States, government interventions played a key role in decreasing the smoking rate, from around 50% in the mid-1900s to below 15% today.[57] A range of different factors turned the tide of public opinion, including Surgeon General Luther Terry's 1964 report definitively linking cigarettes and cancer, and, later, the movement opposing second-hand cigarette smoke, ultimately resulting in legislation and regulation, against tobacco.

Despite concerted and well-funded opposition from the tobacco industry, s-frame reforms, starting shortly after the 1964 report, collectively contributed to the decline in cigarette sales and smoking (Cole & Fiore, 2014). These include large cigarette excise tax increases, clean indoor air laws, efforts to prevent adolescents from purchasing tobacco, more dramatic labeling of cigarette packing, and the pressure and consequences of litigation against the tobacco industry by private individuals, the states, and the US Department of Justice (DOJ). The success of these efforts shows both that individual initiatives can, under the right conditions, overcome corporate resistance, and that s-frame policies can address entrenched problems. Although some policies (e.g., labeling) have more of an i-frame flavor, others (taxes and clean indoor air laws) are squarely s-frame; and the far-reaching nature of the policies taken as a whole is unambiguously s-frame in character.[58]

3. Toward an s-frame behavioral public policy

We have argued that i-frame interventions won't provide cheap and effective solutions to pressing social problems. In retrospect, perhaps this should have been obvious, as the message has been conveyed, repeatedly, by colleagues in political science, law, and sociology.

Our faith in i-frame interventions came from attributing diverse societal problems to frailties in individual behavior. But the history of culture, technology, law, science, technology, and politics is not merely one of human potential continually undermined by human folly (though there is plenty of folly). It is also a story of how humans can flourish *despite* our physical and cognitive weaknesses, by reshaping the rules and systems by which we live. The invention of language, writing, diagrams, maps, and notations of all kinds allows us to share and store our ideas, overcoming the limitations of our memories. Religious, moral, and judicial systems keep selfishness in check. The division of labor helps overcome individual limitations in knowledge and skill acquisition, and radically increases efficiency. Legal and political institutions help us coordinate our actions, determine the allocation of power and property, and save us from Hobbes's "war of all against all." The adversarial processes of the courts, political

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

debates, and scientific exchange mitigate confirmation bias and related effects. And these institutions are entwined with the invention of money, joint stock companies, taxes, governments, the market economy, international organizations and agreements, and the logistical, informational, and financial architecture underpinning modern economies – allowing us, collectively, to achieve, understand, and produce far more than we could operating as lone individuals. In short, the history of humanity is one of astonishing s-frame innovation (Hayek, 1945; Ostrom, 1990; Polanyi, 1941; Sugden, 1989). This innovation has occurred despite our cognitive failings, and, in fact, in remediation of them.

Given that human society and its decision makers have historically demonstrated an extraordinary ability to create rules, systems, and institutions to solve social problems, why do the urgent challenges discussed here remain unaddressed? The answer is not, we believe, that these problems are particularly intractable. For most of the problems discussed here, tried-and-tested s-frame solutions are available, many of which are currently successfully implemented in some parts of the world. Nor is the problem any lack of will, attention, long-term focus, or deficiency in moral fiber. Rather, these problems remain unresolved primarily because of the active and coordinated efforts to block s-frame reform by concentrated commercial interests who benefit from the status quo (see Mayer, 2017), and who seek to maintain it in part by promoting the perspective that these problems are solvable by, and the responsibility of, individuals.

This pattern of opposition to change is another constant of human history. s-Frame, and indeed technological, innovations have been continually and actively opposed by powerful interests that benefit from the status quo, and whether such opposition succeeds has dramatic consequences for mass prosperity and well-being (Acemoglu & Robinson, 2012). It has been argued that the same pattern arises regarding corruption, dictatorships, and even civil wars (Collier & Hoeffler, 2004). Deep and persistent problems arise not because individual humans are not sufficiently ingenious, far-sighted, or unselfish enough to solve them; but because powerful groups benefit from, and defend, the status quo, whatever the consequences for the population at large.

Looking back, we realize that we, and many of our colleagues, had excessive faith that a specific and quite narrow subfield of research on individual judgment and decision making could substantially help address some of society's most pressing problems. By understanding present-bias, loss-aversion, and judgment biases such as over-confidence, we thought it might be possible to redesign the decision-making environment – the "choice architecture" – perhaps in quite subtle ways, that would help nudge the individual "players" in society to make better choices for themselves and society at large. But the real problem lies not in human fallibility, but in institutions, laws, and regulations that render such fallibility largely irrelevant. In short, we had mistaken deep systemic problems of political economy and conflicts of interest, for problems of individual human folly and responsibility.

But individual-level research remains crucial to informing s-frame policy. Systems operate through their impact on individuals, and their design, operation, and impact depend crucially on human psychology. There are long traditions of applied work in health and educational psychology, clinical psychology, political psychology, and criminology, as well as basic findings in the behavioral and brain sciences, that are directly relevant to the design, implementation, and testing of s-frame public policy. Here we illustrate this relevance by considering three key issues: Seeing the problem, increasing public support for effective s-frame policies, and policy design.

3.1. Seeing the problem

The role of human psychology is important, first, for understanding when and why people perceive the existence of a problem that warrants attention. If people are unaware of (or doubt the reality of) climate change, the rising epidemic of obesity, or the crisis in retirement savings, they are unlikely to seek out or support policy solutions (Weber, 2006).

Unfortunately, our minds and brains are not well-adapted for identifying and reacting to long-term systemic problems, however severe. Natural selection operates primarily at the level of individual, and most human evolution occurred in radically simpler times, when most of what mattered for survival and reproduction was in our local environment and occurring in the immediate present. This is especially true of our evolutionarily older emotion system, which evolved to help us deal with immediate threats, such as falling from heights, attacks from predators (Gray, 1987), and problematic social interactions involving norm violations or uncooperativeness (Frank, 1988). Our emotion system is ill-adapted to responding to slowly evolving, complex, large-scale social problems.

Our emotion system is adaptive. If an adverse situation persists over time, or worsens gradually, our emotional reactions diminish (Frederick & Loewenstein, 1999). Emotions evolved to motivate action. But when we fail to act, or action brings no immediate result, it is taken as a sign that maintaining emotions serves no function. Our emotion system is, therefore, not well designed to motivate action against most of the problems discussed in this paper, such as climate change, obesity, and gun violence, that have gradually climbed to levels which, if we experienced them abruptly, would horrify us. As Dubos (1965) wrote prophetically in *Man Adapting*, "This very adaptability enables [us] to become adjusted to conditions and habits which will eventually destroy the values most characteristic of human life."

Our emotion system is also largely oriented to the present, which is a major cause of present-bias (McClure et al., 2004). In part because our emotion system is so much more responsive to immediate than delayed outcomes, we fail to clamor for solutions to problems that threaten us in the future. Governments may be in an even worse position than individuals, trapped in a short-term election cycle or concerned about imminent unrest.

Finally, the most effective way to diminish negative emotional reactions to perceived threats is often not to tackle the threats themselves, but to ignore them or persuade ourselves that they don't exist – a major theme in the literature on "fear appeals" (e.g., Leventhal, 1970; Witte & Allen, 2000). As Marshall (2015, p. 228) writes in *Don't Even Think About It: Why Our Brains Are Wired to Ignore Climate Change*, "The bottom line is that we do not accept climate change because we wish to avoid the anxiety it generates and the deep changes it requires."

Emotions are also oriented to the vivid and the tangible, and to narratives, rather than to facts and statistics. Constantino and Weber (2021) insightfully argue that narratives

> play a vital role in shaping environmental publics, policy and politics. They can be strategically crafted and disseminated, or they can emerge, be reinforced or revised through social relations. To the extent that those with vested interests in the existing system also have power over

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

> information flows, uncertainty may create the conditions for the intentional manufacturing of narratives that reproduce existing power relations and serve those interests, including discourses of denial, uncertainty and delay. (p. 152)

Constantino and Weber review evidence that narratives have played a key role in forestalling action on climate change (Bushell, Buisson, Workman, & Colley, 2017; Lamb et al., 2020), and also have the potential to motivate successful reform (Hinkel, Mangalagiu, Bisaro, & Tàbara, 2020).

Our emotional reactions are often remarkably disconnected from factors that are most important for survival and well-being. We cry in movies about fictional characters, but not when we read about calamities in the newspaper. We are outraged by someone jumping line at a restaurant, but unperturbed by extreme wealth inequality. We are swayed more by stories than statistics (Johnson, Bilovich, & Tuckett, 2023). Again, this lack of proportionality makes us vulnerable to manipulation. Powerful interests are often perfectly aware of these features of human emotions, and actively exploit them. We can be manipulated into risking our life in war, or into committing atrocities, by primal appeals to identity, including nationalism; and we can be distracted from crucial policy challenges by the emotional appeal of "hot-button" issues (Lobel & Loewenstein, 2005).

3.2. Increasing public support for effective s-frame policies

Human psychology critically determines which policies people support – and in a democratic system (or an authoritarian one in which rulers need to maintain popularity) public support can have a powerful influence on policy. Applying behavioral science to this issue is therefore an important development (e.g., Goldberg, Gustafson, Ballew, Rosenthal, & Leiserowitz, 2021; Rinscheid, Pianta, & Weber, 2021; Sherman, Shteyn, Han, & Van Boven, 2021).

Consider emotional adaptation, discussed above, which crucially shapes reactions to beneficial s-frame policies, both before and after implementation. People systematically *underestimate* how much they will adapt (Mazar, Tomaino, Carmon, & Wood, 2021; Riis et al., 2005; Ubel, Loewenstein, & Jepson, 2005). This provides a powerful brake on the public appetite for systemic change, and a tendency to want to maintain the status quo (Samuelson & Zeckhauser, 1988; loss aversion exacerbates this problem, Tversky & Kahneman, 1991). Those opposing the s-frame reforms needed to shift world economy to net zero carbon emissions, or to reform pensions, health care, or the redistribution of wealth, have found that threats to the status quo (e.g., to the "American way of life") are highly effective tools in resisting reform.

Yet once an effective s-frame policy is implemented, people often adapt surprisingly quickly. Janusch, Kroll, Goemans, Cherry, and Kallbekken (2021), for example, examined individuals' acceptance of a "congestion charge" before and after its implementation in a six-player-two-route congestion game. Although the charge curbed congestion effectively, people often vote against it initially. But when the positive effects of the charge were experienced, many embrace an s-level reform they had previously resisted.

Policy makers, too, may significantly underestimate how rapidly people can adapt to new circumstances and how quickly social norms can change (e.g., initial resistance to masks rapidly reversed in many countries during the COVID-19 pandemic; Denworth, 2020). Indeed, people consistently underestimate how much of their behavior is driven by habits (Mazar & Wood, 2022) and social norms (Cialdini, 2005) rather than preferences – and hence overestimate how much they will dislike a shift to new patterns of behavior.

Moreover, adaptation can lead us into futile "arms races," in which competition expends resources to no-one's overall benefit (Frank, 1985, 2005; Hirsch, 1976). Frank argues that goods can be divided into those that increase human welfare directly (e.g., freedom from pain) and "positional" goods that are valued partly because we have them, and others do not (obtaining a place in a prestigious college, winning a race, or holding high political office).

Frank argues that a larger than optimal fraction of consumer spending is devoted to what are primarily positional goods (e.g., large houses, fast cars, and "luxuries" of all kinds), creating an arms race that funnels human activity and economic resources to activities that leave people, in aggregate, no better off. Frank's argument is bolstered by neural and behavioral evidence that the physiology and psychophysics of the senses are inherently comparative (Laming, 1997), with only crude judgments of absolute level magnitudes such as loudness or brightness (e.g., Stewart, Brown, & Chater, 2005). Similarly, reward value is coded relatively in at least some neural systems (e.g., Tremblay & Schultz, 1999), and behavioral experiments (e.g., Ariely, Loewenstein, & Prelec, 2003; Vlaev, Seymour, Dolan, & Chater, 2009) as well as research on happiness (Boyce, Brown, & Moore, 2010; Clark, Frijters, & Shields, 2008) tells a similar story. The accumulation of money (rather than leisure, time with family, and so on) may itself generate an arms race leading to a large loss of human welfare. The challenge of diffusing such arms races (e.g., by s-frame measures such as taxation and redistribution; Frank, 2005), is therefore crucial, though not straightforward.

Psychological insights can also provide direct guidance for designing policies that will garner popular support. For example, banning single-use plastic bags might be perceived as intruding on individual rights. But charging consumers a token amount for using single-use plastic bags is remarkably effective in reducing their use (Homonoff, 2018).

These same "implementational" questions arise when considering how to implement a carbon tax. Psychological insights, and research using psychologically informed research methods, can contribute tremendously to design decisions regarding whether a carbon tax should be imposed upstream (e.g., on miners, drillers, manufacturers, or retailers) or downstream (on consumers), if such a tax should be integrated with the price of the product or segregated (Chetty, Looney, & Kroft, 2009), and, crucially, how tax revenues should be returned to the public. Moreover, some of the same psychological forces that undermine calls for immediate climate action can also help make interventions more palatable (see Loewenstein & Schwartz, 2010; Schwartz & Loewenstein, 2017). If people discount the future and ignore small changes, then it may be appropriate to use capital markets to generate the dividend from future carbon tax revenues in an up-front lump sum. Indeed, a "people's payout" model, in which carbon tax revenues are largely or entirely redistributed, rather than supporting government spending, has gathered enough support to be implemented in many provinces in Canada (Nuccitelli, 2018). Behavioral research on these questions will be crucial in making carbon taxes publicly acceptable (Carattini, Kallbekken, & Orlov, 2019; Kallbekken, Kroll, & Cherry, 2011).

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

3.3. Improving policy design

The behavioral and brain sciences can also provide i-frame insights that inform better s-frame policies. "Behavioral insights" have been at the heart of the i-frame interventions defining the nudge movement. But individual-level psychology is equally important in designing effective s-frame interventions. Table 2 illustrates the many ways in which the behavioral and brain sciences can inform public policy. We briefly discuss a selection of these issues here.

Uncontroversially, s-frame policies should be as "ergonomic" as possible, and they frequently fail badly in this regard. For example, claiming tax credits or benefits often involves navigating a baffling bureaucratic process, excluding many of the people they are intended to benefit (Goldin, 2018); financial, medical, environmental, or nutritional information is often uninterpretable to consumers and does not improve their choices (Loewenstein et al., 2014); processes by which the public express their preferences (e.g., regarding preferred school options for their children) can be mystifying (Johnson, 2022); and information disclosure (e.g., about restaurant hygiene standards) is often optional, while consumers often fail to appreciate the significance of omitted information (Gurney & Loewenstein, 2020; Sah & Read, 2020).

A valuable lesson from the behavioral insights movement has been that ergonomics matters just as much for government policies as for the personal computer (PC) or smart phone (see, e.g., Norman, 1988; Thaler & Sunstein, 2008, 2021). Designing policy around the consumer can frequently make the difference between success and failure, and policy design should be guided primarily by behavioral insights. Policy, like any complex good or service, is best designed by multidisciplinary teams, with subject experts, designers, user-experience specialists, ethnographers, anthropologists, and psychologists, alongside behavioral insights specialists.

3.3.1. Improving the policy-making process

Another crucial target for the behavioral sciences is improving how policy is made. To optimize the process of policy development (including influences of lobbying and even corruption), scrutiny and consultation (with external bodies and other parts of government), and legal and political "sign-off" (see, e.g., Sunstein, 2022b), systemic factors will, again, be crucial. But individual psychology remains important: Do policy makers effectively prioritize the most impactful policies (Toma & Bell, 2022)? Are they overconfident, both individually and in potentially self-reinforcing group discussions? Is there suspicion of ideas borrowed from other countries or contexts that are "not invented here" (e.g., Katz & Allen, 1982), which may impede policy development?

Here the interplay between s- and i-frame analyses is particularly intricate (e.g., Mercier & Landemore, 2012). The process by which diverse opinions and interests are combined provides checks and balances against psychological quirks. Open public scrutiny, or the consultation with a range of interests, may reduce the tendency to "lock in" to particular viewpoints (Chater, 2020b), by uncovering counterarguments and evidence (e.g., Callon, Lascoumes, & Barthe, 2009). Conversely, policy-making environments with "like-minded" people, or where there is pressure to be on the "winning side" of any debate (if debate occurs at all), may amplify individual biases, by squashing counterarguments and evidence (Sunstein, 1999), leading to group polarization (Bray & Noble, 1978), pluralistic ignorance (Miller & McFarland, 1991), and group think (Janis, 1972). How to make group interaction improve, rather than impede, policy design is a key topic for further investigation.

3.3.2. Understanding and reversing industry exploitation of human psychology

Industry often exploits consumer psychology for its own ends.[59] We have already discussed the food industry's search for "bliss points" for ultraprocessed foods (Moss, 2013). Just as understanding the psychology and physiology of appetite and eating helps industry identify such products (typically nutritionally poor and energy-dense), so that same understanding can shape s-frame regulation to protect consumers. Slot machines (and other gambling products and services) are deliberately designed to maximize the tendency to keep gambling and the desire to return (Schüll, 2012) – capitalizing on human desires for immediate "hits," loss-chasing, present-bias, and so on. Arguably entire industries, including alcohol, cigarettes, gambling, and pay-day lending, are partially dependent on "hooking" consumers. Similarly, "clickbait," "fake news," and the propagating of extreme opinions by social media algorithms are all designed to keep our collective eyeballs on our screens; day-trading platforms encourage unsophisticated investors to "burn" their money by overtrading, and so on. Here, too, effective regulation requires psychological insight into when and how people can be exploited to their detriment.

3.3.3. s-Frame changes that improve i-frame decision making: Helping individuals make better choices

Improving individual decision making has been the focus of i-frame behavioral insights. But often the most powerful way to help people make better decision is not merely to modify their "choice architecture," but to fundamentally change the "rules of the game." Thus, eliminating conflicts of interest between professionals and their clients (e.g., in medicine or finance) is likely to be more effective than requiring disclosure (Cain, Loewenstein, & Moore, 2005, 2011; Kanter & Loewenstein, 2019; Larkin et al., 2017), or educating consumers to detect potential conflicts. Similarly, removing conflicts between operational and safety considerations (e.g., by separate chains of command, and being bound by agreed protocols) is typically the priority in safety critical contexts (e.g., airlines, medicine), rather than helping individuals manage these conflicts in the moment.

s- And i-frame approaches can still often be mutually reinforcing. For example, i-frame measures, such as health warnings on cigarette packets or antismoking public information campaigns, may increase public support for s-frame measures including advertising bans, and outlawing smoking in public places (Sunstein, 2022a). Similarly, standardized procedures, such as checklists in aviation and medicine (e.g., Gawande, 2009), may enhance s-frame processes for scrutinizing performance (e.g., adherence to procedures is more easily monitored).

Finally, in a democracy, key individual decisions citizens make is through voting – and a crucial systemic challenge is to maximize turnout. Recent work (Mazar, Tomaino, Carmon, & Wood, 2022) has revealed that people dramatically underestimate the impact of "frictional" factors (e.g., long-distances to travel) on voter turnout. Citizens who are particularly prone to this bias are especially supportive of measures that would increase frictional effects. An electoral system based on good understanding of the determinants of individual behavior may be crucial for maintaining a healthy democracy.

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

Table 2. Many roles of the behavioral and brain sciences in policy design and implementation

Question for i-frame analysis	Example issues	Key policy choices	Supporting input from the behavioral sciences	Examples input from system level
When are individuals vulnerable to exploitation?	Is there a perceived and/or real distinction between addictive behavior and "free choice" (Vohs & Baumeister, 2009) Where does product/service complexity exceed consumers ability to choose (e.g., financial and health decisions)? (Scheibehenne, Greifeneder, & Todd, 2010) The problem of conflicts of interests (e.g., in health care, Chimonas & Korenstein, 2021; finance services, Bolton, Freixas, & Shapiro, 2007)	Extent of regulation of prescription drugs, gambling (Kolodny, 2020; Schüll, 2012), taxation of ultraprocessed foods, etc. (Brownell et al., 2009) When is regulation justified to simplify options or eliminate poor options? When and how should conflicts be disclosed? (Loewenstein et al., 2012)	Psychology and neurobiology of addiction (Robinson & Berridge, 2000) Social transmission of overeating and addictive behaviors (Christakis & Fowler, 2007) Classic judgment and decision-making effects (Kahneman, Slovic, & Tversky, 1982) Psychology of attention (Pashler, Johnston, & Ruthruff, 2001) Consumer discounting of known conflicts of interests (Cain, Loewenstein, & Moore, 2011)	Comparative study of regulations, food environments across time and place (Perez-Ferrer et al., 2019) Scale and nature of industry lobbying (Brownell & Horgen, 2004) Pressures to make products complex, e.g., to reduce competition (Célérier & Vallée, 2013) Race-to-the-bottom: If some firms exploit conflicts, then they may outcompete those that are more scrupulous (Schwarcz, 2008)
How systemic problems arise from individual frailties	Welfare-destroying arms races over "positional" goods (Frank, 2005) Psychological factors underlying market instability (Barberis, 2018; Shiller, 2000)	How might positional externalities be minimized? (e.g., through a consumption tax, Frank, 2008) "Frictional" taxes to reduce trading volumes and, perhaps, market volatility (Hanke, Huber, Kirchler, & Sutter, 2010) How should crypto-currencies be regulated? Should they be banned? (Rogoff, 2022)	Relative nature of magnitude perception (Laming, 1997; Weber, 2004) Hedonic adaptation to objective improvements, including salaries (Clark et al., 2008) Neural and cognitive basis of imitation (Hurley & Chater, 2005) Social transmission of information (Boyd, Richerson, & Henrich, 2011) Naïve extrapolation in forecasting (MacKinnon & Wearing, 1991)	Conspicuous consumption (Veblen, 1899) Amplifying power of marketing, advertising, conventional, and social media Industry lobbying for financial deregulation (Igan & Lambert, 2019) Network structure of financial markets (Gai & Kapadia, 2010) Presence of algorithmic trading in financial markets (Sornette & Von der Becke, 2011)
Improving forecasting of likely impacts of s-frame changes on behavior	When will s-frame policies be accepted or flouted? And by whom? (e.g., Brehm, 1966) Will s-frame interventions have the desired effect and/or generate negative unintended consequences?	Will mask wearing be publicly adopted? (e.g., Dimant, Clemente, Pieper, Dreber, & Gelfand, 2022) Will social distancing rules be flouted? Who will take up, be suspicious of, or actively oppose vaccination?	Social norms are continually renegotiated, rather than being fixed, and hence can change rapidly (e.g., Chater, Zeitoun, & Melkonyan, 2022) Political and social "identity" (Tajfel & Turner, 1979) may decisively influence beliefs and attitudes, especially in a highly polarized society (Huddy, 2001)	Comparison with similar challenges and interventions, across time and between countries (Clark, Davila, Regis, & Kraus, 2020; Newey, 2020) Social and mainstream media environment Levels of trust in government and other people, social cohesiveness, political polarization (Iyengar & Westwood, 2015; Putnam, 2000)
Making systemic changes more "ergonomic" and appealing	How can carbon taxes be designed to best obtain public support? (Carattini et al., 2019) How to discourage single-use plastic bags? (Disney et al., 2013)	Tax or rebate? Hypothecation of taxes to increase public support? Framing and grouping of issues and policies (e.g., is carbon dioxide [CO_2] emission classed as pollution?)	Classic judgment and decision-making effects (Kahneman et al., 1982) Psychology of perception, attention, memory, and relevance to usability (Norman, 1988)	Nature of policy innovation, design, and implementation process (openness to scrutiny, external input, who is involved) (Murray, Caulier-Grice, & Mulgan, 2010) Use of testing, focus groups, experimentation, and polling to fine-tune messaging

(*Continued*)

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

Table 2. (*Continued.*)

Question for i-frame analysis	Example issues	Key policy choices	Supporting input from the behavioral sciences	Examples input from system level
Building the information environment for debate over support s-frame reform	Building consensus over "the facts" Reducing political polarization (Rollwage, Zmigrod, de-Wit, Dolan, & Fleming, 2019) How to build trust between individuals	Reducing concentration of media ownership? Treating social media as platforms or publishers, or a hybrid? (Samuelson, 2021)	The "credulous mind" (Fessler, Pisor, & Holbrook, 2017; Pennycook & Rand, 2019) Social psychology of groups (e.g., in-group/out-group thinking, social identity)	Who controls the media environment? State and nonstate actors influencing social media; disinformation and bots Social media echo-chambers (Cinelli, De Francisci Morales, Galeazzi, Quattrociocchi, & Starnini, 2021) Lobbying on social media regulation
Better quality s-frame decision making: improving the policy-making process	Improving government policy-making processes (Sunstein, 2022b)	How should policies be proposed and by whom? Who is consulted inside and outside government, and how does that input block and/or modify policy?	"Defensive" decision making Poor prioritization by policy impact (e.g., Toma & Bell, 2022) Overconfidence "Not invented here" Avoiding "groupthink" (Packer, 2009)	Governance processes; principal–agent problems (Miller, 2005) Corruption, lobbying Openness to public scrutiny Systems for collecting and evaluating relevant information on policy outcomes (Sanderson, 2002)
Better quality i-frame decision making: helping individuals make better choices	Consumer choice Improving professional decisions (e.g., in medicine, financial advice, safety-critical engineering)	When does more information help? And how is that information presented? When does it help to know about other people's choices How to learn from mistakes, rather than cover them up How to reduce conflicts of interest When are "league tables" helpful?	Classic judgment and decision making (Kahneman et al., 1982) Limits of attention and memory Social cognition Nudges: Defaults, social proof (Thaler & Sunstein, 2008) Role of automation and artificial intelligence (AI) (Briganti & Le Moine, 2020) Checklists (Gawande, 2009) Fast-and-frugal heuristics (Marewski & Gigerenzer, 2022)	Availability of trusted product information and reviews Access to own choice-relevant data (e.g., following Mydata principles[a]) Existence of a market for "choice engines" (Thaler & Tucker, 2013) to help manage complex choices No blame culture: Allowing system improvement to reduce individual errors (Khatri, Brown, & Hicks, 2009) Independence between operation and safety decision making (e.g., airline safety) Collecting and analyzing incident data

[a]https://www.mydata.org/participate/declaration/

3.3.4. Avoiding psychologically naïve policy prescriptions

A central topic is behavioral economics is the impact of incentives on behavior (Gneezy, Meier, & Rey-Biel, 2011). Everyday psychological intuitions, rational choice models, and reinforcement learning theories in psychology (Skinner, 1938), neuroscience (Schultz, Dayan, & Montague, 1997), and machine learning (Sutton & Barto, 2018) emphasize the power of incentives. But, although carrots and sticks matter, an overly simple view of human psychology as maximizing utility may lead to incomplete policy prescriptions.

One weakness of the rational, maximizing perspective is that it underplays the importance of perceived autonomy, fairness, wider ethical considerations (Rai & Fiske, 2011), and the "logic of appropriateness" (March & Olsen, 2008) that guides so much human behavior (i.e., doing what we are believe we are *supposed* to do). Thus, a criminal justice system based on deterrence, reliance on share-options to incentivize management, or attempts to pay for prosocial behavior and fine antisocial behavior, may need to be reconsidered. As ever, direct evidence from comparison across nations, organizations, and real-world incentive systems will likely play a dominant role in evidencing any s-frame policy changes (e.g., Jeppson, Smith, & Stone, 2009; Nagin & Pepper, 2012).

A second complication with a purely incentive-based approach to policy is public "reactance" against incentives for policies which citizens see as ineffective, unfair, or infringing liberty (Taylor &

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Asmundson, 2021). Such reactance need not be grounded in justifiable concerns or firm evidence, but also in baseless conspiracy theories (e.g., COVID is a hoax, COVID vaccinations lead to sterility, etc., e.g., Imhoff & Lamberty, 2020). In such circumstances, incentives may be counterproductive, by increasing suspicion of government motives.

3.4 Wider issues for the role of behavioral science

3.4.1. Implications for research methods

In a policy-making regime emphasizing s- over i-frame reforms, there will be an expanded role of the social and behavioral sciences in predicting the likely consequences of alternative s-frame reforms (see, e.g., Janusch et al., 2021). We discussed above how emphasis on the "gold standard" of field experimentation may reinforce to the focus on i-frame policies. Yet quasi-experimental studies can often substitute for experiments, when different countries, states, and other entities implement specific reforms at different times. Similarly, regression discontinuity designs are informative when a policy measure is applied based on an abrupt qualifying threshold (e.g., income, age, or test scores). Pioneered by psychologists in the 1960s (e.g., Campbell & Ross, 1968; Campbell & Stanley, 1963), these and related approaches have been refined by economists. These developments provide valuable tools for rigorously evaluating s-frame policies.

3.4.2. Building the information environment for debate about s-frame reform

Meaningful debate over s-frame reform, in whatever domain, requires meeting key preconditions for constructive discussion, and opponents of s-frame reform will often work hard to undermine these preconditions. Three factors appear particularly crucial to stymying agreement: Lack of a sufficient common ground on the relevant "facts"; excessive polarization, such that any issue becomes a proxy for all others (and perhaps for social identity); and lack of trust in the good faith of the "other side." Opponents of s-frame reform engage in disinformation (e.g., big tobacco on the dangers of smoking; the fossil-fuel industry's attempt to undermine climate science; Oreskes & Conway, 2011), thus undermining a common ground of facts from which consensus might be reached. Another common tactic is to align policy problems with existing polarized debates (e.g., painting climate activists or healthcare campaigners as anti-capitalist or anti-freedom). Personal attacks (e.g., on climate scientists[60] or public health experts), further undermine trust in the good faith of those with whom we differ; and acrimonious social media interactions are often sufficient to block reasoned debate.

Improving the information environment for public debate, and countering active attempts to corrupt it, is a key research topic. Without high-quality public debate based on a shared evidence base, gaining support for systemic change is likely to be very difficult. How can such a goal be furthered? We suspect that substantial s-frame changes are likely to be required, for which consensus will be difficult precisely because that basis has been progressively undermined. It is outside our scope and expertise to identify the most effective s-frame measures: But possibilities include dramatically reducing the concentration of media ownership; imposing rules of impartiality on news providers; treating social media providers as publishers (and hence subject to the laws and regulations that apply to them); associating social media profiles with traceable human identities (addressing both the prevalence of bots, malicious disinformation, and allowing legal redress to defamatory posts); and requiring social media companies to open their algorithms to public scrutiny. Which of these policies will be effective? Which will backfire? Although the specifics of many of these issues are new, some insights can be gleaned by experiences in other countries at different points in time. Insights from social psychology on belief and attitude formation, trust, in-groups and out-groups, social identities, and so on, will also be clearly relevant in predicting which interventions are likely to work.

3.4.3. Where to draw the line on "heavy-handed" paternalism

We advocate a more heavy-handed public policy than that inherent in the nudge approach. But where should the line be drawn on regulation? The behavioral and brain sciences won't answer this question. The public, through normal democratic processes, must balance freedom-to-choose and freedom-from-temptation (or addiction). But behavioral insights should inform this debate, for example, regarding the power of visceral impulses (hunger, thirst, sex, pain, etc.) which can overwhelm a person's attention and drive behaviors that may not align with their long-term interests (Critchley & Harrison, 2013; Loewenstein, 2006). The physiology and psychology of addiction is particularly crucial (e.g., Elster & Skog, 1999) to distinguish addiction from free consumer choice (Heather & Segal, 2017). Similarly, understanding of individual differences, including psychiatric disorders, will help in clarifying whether some groups of people may be especially vulnerable, and how they can be protected.

Exploitation arises, too, from cognitive rather than motivational vulnerability. Products can be misleading and overly complex; advice can be distorted by conflicts of interest (see Table 2). Drawing the line between acceptable marketing (e.g., legitimately putting goods and services in a good light) and malpractice cannot, again, be resolved by scientific evidence – it is political choice to be made by the electorate and its representatives. Here too, insight from the behavioral and brain sciences should inform such deliberations. For example, if product complexity is too great for people to make stable choices (or assess which products are appropriate for which people or purposes), this "sludge" may bamboozle consumers into make choices against their own interests (Sunstein, 2020; Thaler, 2018; Thaler & Sunstein, 2021). Similarly, the fact that people largely discount disclosed conflicts of interest (Loewenstein, Sah, & Cain, 2012) should raise alarm bells for regulators relying on mandatory disclosure (e.g., Loewenstein et al., 2014). If privacy disclosures are demonstrably incomprehensible, they clearly cannot usefully inform choice.

4. Conclusion

Our goal has been to provoke discussion of how behavioral science can best inform public policy. We have argued that our field has been excessively focusing on policy interventions targeting individual behavior, and that (1) many critical public policy challenges arise from problematic systemic policies, which are defended by the commercial interests they benefit; (2) those commercial interests promote the virtues of i-frame solutions, while lobbying against s-frame reform; (3) many behaviorally oriented academics, including ourselves, have inadvertently reinforced the ineffective i-frame perspective; and (4) i-frame interventions yield disappointing results, and more importantly, can reduce support for effective s-frame policies.

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

We have focused on how behavioral scientists have inadvertently assisted efforts by corporate interests to resist systemic changes, but the idea that corporate interests craft the rules to benefit themselves is hardly original (see, e.g., Acemoglu & Robinson, 2012). Nor is the idea that commercial interests promote individualistic perspectives to avoid regulation. Giesler and Veresiu (2014, p. 841) coin the term "responsibilization" to refer to processes "through which responsibility is shifted away from the state and corporations" and toward the "responsible consumer." Giridharadas (2019) notes that we seem to have collectively

> lost faith in the engines of progress that got us where we are today – in the democratic efforts to outlaw slavery, end child labor, limit the workday, keep drugs safe, protect collective bargaining, create public schools, battle the Great Depression, electrify rural America, weave a nation together by road, pursue a Great Society free of poverty, extend civil and political rights to women and African Americans and other minorities, and give our fellow citizens health, security, and dignity in old age.

We see informing s-frame interventions as the future of behavioral public policy. Behavioral scientists' excessive enthusiasm for i-frame policy has reduced the impetus for systemic reform, just as corporations interested in blocking change intend. We have been unwitting accomplices to forces opposed to creating a better society.

We echo Furman's (2016, p. 8) call for "behavioral scientists to look further up in the branches toward higher-hanging and potentially better fruit. That entails starting from the big questions… and then determining what behavioral insights and research, often as complements to more traditional policy tools, are needed to help solve them."

Acknowledgments. The authors gratefully acknowledge invaluable research and editorial help from Aden Halpern, help on the privacy and education sections from Alessandro Acquisti and Najeeb Shafiq, respectively, and valuable comments from Max Bazerman, Linda Dezso, Angela Duckworth, Simon Dedeo, Emily Ho, Cait Lamberton, and Jules Lobel, Cass Sunstein and Richard Thaler. This paper has benefitted enormously from comments from four anonymous reviewers and from discussions with researchers with a wide spectrum of viewpoints (some, but by no means all, overlapping with our own), including Peter Bayliss, Ed Gardiner, Craig Fox, David Hagmann, Dave Nussbaum, Adam Oliver, Magda Osman, David Weiss, and Ivo Vlaev. The authors also thank Laura Jekel and Rosa Stipanovic for their invaluable help with references and proofreading.

Financial support. Nick Chater was supported by the ESRC Network for Integrated Behavioural Science (grant number ES/K002201/1).

Competing interest. Both authors have served on the academic advisory board of the UK Behavioural Insights Team. N. C. is co-founder and director of Decision Technology (www.dectech.co.uk), a research consultancy that has worked on consumer behavior with retailers, banks, energy companies, the gambling industry, food delivery companies, café chains, telecoms and media companies, and charities. G. L. consults with health insurers Florida Blue, Highmark, and United Healthcare. None of the ideas expressed in this paper are supportive of the interests of these organizations, and in some cases could be viewed as conflicting with them.

Notes

1. Many in our field have taken a broader perspective. E.g., Oliver (2013) includes chapters promoting the perspective we advocate here (e.g., Marteau et al., 2012; Verplanken & Wood, 2006).
2. This is the subtitle of Halpern (2015), a strategy Martin, Goldstein, and Cialdini (2014) label "the small BIG." Similarly, Kahneman (2013) sees the goal as "achieving medium-sized gains by nano-sized investments."
3. A reviewer pointed out the potential value of an i-frame "tip" to eat citrus fruits to avoid scurvy. But such important matters are rarely left to individual choice, but imposed by s-frame ntions. Cook (2004) notes "the *compulsory* dministration of genuine lime juice *under supervision* in the merchant service seems to have exerted a significant effect" on reducing scurvy in the British merchant navy in the nineteenth century (p. 224, emphasis added).
4. Mertens, Herberz, Hahnel, and Brosch (2022) analyze more than 200 nudge interventions, acknowledging that publication bias may undermine their positive results. Indeed, one reanalysis finds no evidence of the effect of nudges once publication bias is taken into account (Maier et al., 2022). (See https://www.economist.com/science-and-technology/2022/07/27/evidence-for-behavioural-interventions-looks-increasingly-shaky.)
5. Crucial for present argument is the overemphasis on individual causes *where situational factors are decisive* (e.g., Jones & Davis, 1965). The secondary claim, that this overemphasis is reduced for one's own behavior is controversial (see Malle, 2006). The precise nature of the bias (e.g., Gawronski, 2004; Gilovich & Eibach, 2001; Sabini, Siepmann, & Stein, 2001) and its rational basis (Walker, Smith, & Vul, 2015) are not crucial here.
6. Raimi (2021) proposes strategies to encourage proenvironmental behaviors without crowding out public support for climate policies.
7. https://www.nytimes.com/2022/02/18/business/china-coronavirus-vaccines.html
8. https://www.ft.com/content/bb1de4e4-7b42-43a0-b118-bb35719daca1ch
9. See, e.g., Haynes, Service, Goldacre, and Torgersen (2012) and Halpern and Mason (2015).
10. Two notable s-frame studies are the RAND health insurance experiment, in which individuals were randomly assigned different health insurance policies (see Aron-Dine, Einav, & Finkelstein, 2013), and the Move To Opportunity experiment in which families in multiple cities received different types of housing support (Chetty, Hendren, & Katz, 2016). Recent field experiments testing conditional and unconditional cash transfers are another example. Although influential, these studies are expensive (e.g., the RAND study costs roughly $295 million in 2011 dollars).
11. See Deaton (2020) and Deaton and Cartwright (2018a, 2018b) for a parallel critique of experimental development economics, and Akerlof (2020) on how methodological preferences shift research and policy priorities.
12. E.g., data on people who move location suggest that eliminating "food deserts" would have little impact on nutrition (Allcott et al., 2019a).
13. See https://en.wikipedia.org/wiki/Perverse_incentive
14. We are *not* claiming that the focus on the i-frame in behavioral science is *responsible* for persistent social problems. The influence of academic policy research is surely modest compared with the vast commercial and political forces (and inertias) within and between nations.
15. See, e.g., the US Environmental Protection Agency's carbon calculator; and the New York Times guide on "How to Reduce Your Carbon Footprint." BP's wider campaign won a Golden Effie in 2007, a major advertising industry award (https://www.effie.org/case_database/case/NA_2007_1528).
16. BP's approach has been widely adopted by the media (e.g., the New York Times has published dozens of articles on how individual behavior can combat climate change). Environmentalists have developed sophisticated analyses of how individuals can reduce their carbon footprints (e.g., Goodall, 2007).
17. The i-frame perspective can also drive a wedge between supporters of s-frame reforms. Mann (2021, p. 82) notes "Dividers have sought to target influential experts and public figures in the climate arena as 'hypocrites' by accusing them of hedonistic lifestyles entailing huge carbon footprints." This also emphasizes the i-frame by implying that advocates of s-frame reform should prioritize personal i-frame change (Attari, Krantz, & Weber, 2016). Fossil-fuel industry allies have also "carbon shamed" climate scientists and activists for driving, flying, or eating meat (Woodward, 2021).
18. E.g., Coca-Cola financially supported academics to argue that "Americans are overly fixated on how much they eat and drink while not paying enough attention to exercise" (O'Connor, 2015).
19. This opposition includes personal attacks. Searching the website of the "Center for Consumer Freedom" that says it is "supported by restaurants, food companies, and thousands of individual consumers" yields 275 results for food policy researcher "Kelly Brownell," many of which taunt him for his physical girth.
20. Although not generally agreeing that the primary problem is exercise, not diet.

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

21. See the words of Ric Keller, a Florida Republican Congressman who sponsored a bill to ban lawsuits against food companies paralleling those that have been executed against tobacco companies. Speaking to CNN, Keller said "We've got to get back to those old-fashioned principles of personal responsibility, of common sense, and get away from this new culture where everybody plays the victim and blames other people for their problems" (Barrett, 2004). In the same CNN segment, then House Majority Leader Tom DeLay, added "It's hard to believe that trial lawyers want to make the claim that 'Ronald McDonald made me do it.' The point of this debate [is] all about personal responsibility. If you eat too much, you will gain weight."
22. Agribusiness and the food industry spend accordingly, with over 1,000 lobbyists and a budget of $106 million in 2020, according to the website "OpenSecrets." A New York Times investigation (Jacobs & Richtel, 2017) that reviewed corporate records, epidemiological studies, and government reports, concluded that, "a sea change in the way food is produced, distributed, and across much of the globe is contributing to a new epidemic of diabetes and heart disease, chronic illnesses that are fed by soaring rates of obesity in places that struggled with hunger and malnutrition just a generation ago." Focusing on Brazil, the article documents payments totaling $158 million to Brazilian legislators by food and beverage conglomerates, opposing government promotion of breast-feeding, bans on junk food advertising to children, and sugar taxes.
23. Much of this work has been conducted with help from consultants such as Howard Moskowitz (who holds a Harvard psychology PhD).
24. There were, admittedly, problems with the old system of pensions, both because companies used unorthodox accounting approaches to under-fund them and because pension liabilities could be eliminated through bankruptcy.
25. http://www.pbs.org/wgbh/frontline/article/teresa-ghilarducci-why-the-401k-is-a-failed-experiment/
26. See https://www.thinkingaheadinstitute.org/research-papers/global-pension-assets-study-2021/
27. The Australian system is also a defined-contribution system, but a far superior one to those prevailing in the United States and the United Kingdom. Unfortunately, similar to these other systems, it does typically require workers to make their own investment decisions.
28. The title of one project on their website, "Preparing for retirement reforms: Potential consequences for saving, work, and retirement plans," seems to refer to potential reforms to the defined-contribution system. But quite the opposite. It takes as given that Social Security (a kind of crude defined-benefit plan) will become insolvent, and asks how defined-contribution plans might make up the difference.
29. https://www.ipe.com/auto-enrolment-grows-globally/10029254.article
30. Helping customers obtain good quality, independent, financial advice (to help with their individual pension decision making) is also viewed as potentially important.
31. In a 2019 discussion with behavioral economists and policy specialists, Stephen Dubner congratulated Thaler for work on auto-enrolment and auto-escalation, which he called "the most successful nudge, and the greatest triumph to date of behavioral economics." But Dubner then, continued, "So, congratulations, and thank you. But: what does it say about the field of behavioral economics, and behavior change generally, that this largest victory took place a couple decades ago? Where are all the other victories?"
32. https://www.aeaweb.org/webcasts/2020/aea-afa-joint-luncheon-nudges-are-not-enough
33. See https://humaninterest.com/learn/articles/average-401k-match/
34. https://plasticoceans.org/the-facts/
35. Dunaway (2017) notes "By making individual viewers feel guilty and responsible for the polluted environment, the ad deflected the question of responsibility away from corporations and placed it entirely in the realm of individual action… The Keep America Beautiful leadership lined up against the bottle bills, going so far, in one case, as to label supporters of such legislation as 'communists.'"
36. https://inudgeyou.com/en/green-nudge-nudging-litter-into-the-bin/
37. https://www.zerowastescotland.org.uk/litter-flytipping/nudge-study
38. There is some controversy over the replicability of "watching eyes" interventions, but a recent meta-analysis concludes in its favor (Dear, Dutton, & Fox, 2019).
39. See https://www.ecowatch.com/plastic-recycling-myth-2647706452.html and its embedded links for relevant online discussions.
40. Plastic bag taxes do have unintended consequences, such as increased sales of other environmentally problematic bags (e.g., Taylor, 2019).
41. Here, too, organizations masquerading as proenvironmental and proconsumer groups have been created to advance corporate interests. E.g., the "Alliance to End Plastic Waste" (https://endplasticwaste.org/en/about) that advertises itself as a collective "working together to end plastic waste" is funded by Shell and ExxonMobil, chemical companies including Covestro and Dow, and others. The Washington Post (https://www.washingtonpost.com/blogs/govbeat/wp/2015/03/03/a-plastic-bag-lobby-exists-and-its-surprisingly-tough/) documents a $3 million campaign by the misleadingly labeled "American Progressive Bag Alliance," "which is supported by major plastics manufacturers" that derailed a statewide plastic bag ban set to start in 2015 (the ban was subsequently implemented).
42. https://www.pwc.co.uk/services/legal/insights/implications-of-european-and-uk-extended-producer-responsibility-changes.html
43. https://worldpopulationreview.com/country-rankings/smoking-rates-by-country. Note, however, that cigarette consumption per person is slightly lower in France than in the United States, which has more casual, and fewer heavy, smokers (see https://tobaccoatlas.org/challenges/product-sales/).
44. https://chibe.upenn.edu/news/the-healthy-nudge/
45. E.g., the UK National Institute for Health and Care Excellence is empowered to make difficult cost–benefit decision on drugs and services covered by the National Health Service (NHS).
46. Note that this would not necessarily entail eliminating private insurance. Several well-functioning systems, such as those in Holland and Switzerland, retain private insurers, but regulate the terms of competition far more tightly than does the United States.
47. Private schools offer bursaries to poorer children, and top universities engage in outreach. Such actions provide a defense of the huge educational inequalities, while surely only scratching the surface of the problem.
48. E.g., a summary of stereotype threat interventions in *The Conversation* reported that "black participants performed worse than white participants on verbal ability tests when they were told that the test was 'diagnostic' – a 'genuine test of your verbal abilities and limitations.' When this description was excluded, no such effect was seen."
49. Although the state-of-the-art in privacy regulation, General Data Protection Regulation (GDPR) may already have been coopted by industry (Utz, Degeling, Fahl, Schaub, & Holz, 2019).
50. www.getbadnews.com
51. https://www.nytimes.com/2019/01/15/health/sacklers-purdue-oxycontin-opioids.html
52. https://www.nytimes.com/2022/01/26/opinion/oregon-drug-decriminalization-addiction.html
53. Addiction is, of course, a much broader problem: People become addicted to attention (as many tweeters have discovered), games, or gambling. In each case, the same i-frame arguments are made by commercial interests who would lose from tighter regulation. Schüll (2012) describes how slot machines are designed to be addictive, and how casinos and slot machine manufacturers influence policy makers, the public, and even gamblers to believe that the problem is with the gamblers and not the technology. Schüll cites a 2010 white paper released by the American Gaming Association titled "Demystifying Slot Machines" which asserts that "the problem is not in the products [players] abuse, but within the individuals."
54. https://commonslibrary.parliament.uk/research-briefings/cbp-7654/
55. https://www.pewresearch.org/fact-tank/2022/02/03/what-the-data-says-about-gun-deaths-in-the-u-s/. Switzerland has high gun ownership (individuals can keep guns after military service) but fairly low gun violence. But regulation is far stricter than in the United States (Fisher & Keller, 2017).
56. Chicago sociologist, Robert Vargas, critiques the lab's work: "the root of the problem lies in the Crime Lab's strong focus on individual behavior." https://www.chicagomaroon.com/article/2020/6/11/time-think-critically-uchicago-crime-lab/
57. Governments substantially *boosted* smoking through much of the twentieth century (Stern, 2019). Cigarettes were included in World War I rations; and of the $3 billion dollars of "food-related" funding for Europe in the Marshall Plan, $1 billion dollar was earmarked for tobacco, with the expressed aim of increasing future demand (Proctor & Proctor, 2011).
58. Similar strategies may work elsewhere. Powell and Leider (2021) examined the impacts of Seattle, Washington's sweetened beverage tax (SBT) using a

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

difference-in-differences estimation approach with Portland, Oregon, as the comparison site. Two-years post-tax, volumes of taxed beverages fell by 22%, with especially large declines for family-size items and soda.

59. Sunstein (2020) and Thaler (2018) called malevolent nudges "sludge" – e.g., defaulting consumers into products they are unlikely to want, or auto-renewing services they would otherwise terminate.

60. https://www.theguardian.com/environment/2017/feb/22/climate-change-science-attacks-threats-trump

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Open Peer Commentary

Why a group-level analysis is essential for effective public policy: The case for a g-frame

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doi:10.1017/S0140525X23000894, e148

Abstract

Societal problems are not solved by individualistic interventions, but nor are systemic approaches optimal given their neglect of the social psychology underpinning group dynamics. This impasse can be addressed through a *group*-level analysis (a "g-frame") that social identity theorizing affords. Using a g-frame can make policy interventions more adaptive, inclusive, and engaging.

> I know we need a system change rather than individual change, but you cannot have one without the other. If you look through history, all the big changes in society have been started by people at the grassroots level. No system change can come without pressure from large groups of individuals. (Greta Thunberg, Brilliant Minds Conference, Stockholm, June 13, 2019)

We agree wholeheartedly with Chater & Loewenstein (C&L) that the behavioral and brain sciences have focused far too heavily on the psychology and behavior of people as individuals, and that i-frame policy interventions have not lived up to the expectations of their devotees and those who they influenced. In large part this is because i-frame interventions are built on a limited understanding of human psychology that neglects the capacity for internalized group membership to shape and transform individuals' cognition and behavior (Turner, Oakes, Haslam, & McGarty, 1994). However, by the same token, focusing on systemic, "big-picture" solutions alone will not in itself result in more effective public policy because this approach too fails to engage with these same group memberships and associated group dynamics. Accordingly, to overcome the impasse identified by C&L, we argue that behavioral scientists and policymakers need not just to resort to an s-frame, but in addition to develop and employ a *g-frame* – a *group*-level analysis that focuses on how cognition and behavior are shaped *and transformed* by membership in social groups.

The g-frame is informed by research in social psychology, in particular the social identity approach (Tajfel & Turner, 1979; Turner et al., 1994). This frame views human psychology as fundamentally social. In particular, in all social contexts, individuals' perception, cognition, emotion, and behavior are shaped by their group memberships (Turner et al., 1994). From this perspective, social change is produced by collective action in which individuals are empowered to enact change through their membership of social groups (Drury & Reicher, 2009). Moreover, from this perspective, the apparent "frailty" and "fallibility" of individuals can be understood as the consequence of an i-frame that privileges and fetishizes the study of people *as isolated individuals* rather than as social actors who function and progress as interacting collectives. Thus, although individual workers and tenants have limited capacity to improve their working and living conditions, the unions and associations they join have much more power to do so. Individually we kneel, together we stand.

Yet although s-frame interventions are more powerful than i-frame interventions in this regard, using top-down approaches to public policy without accounting for the psychology of group life also runs into problems. Three are particularly significant.

A major limitation of purely top-down interventions is that they fail to acknowledge that people generally only have power to enact systemic-level change to the extent that they already have power within the system – with the result that s-frame

solutions typically reinforce the status quo by representing the interests of powerful groups such as ethnic majorities or corporations while marginalizing minority groups (e.g., Fekete, 2004; Levine-Rasky, Beaudoin, & St Clair, 2014; Merino-Pérez & Segura-Warnholtz, 2021). Ironically, this means that enthusiasm for "nudges" is ultimately driven and sustained by an s-frame underpinned by a g-frame. Indeed, like most social and political theorizing, the i-frame is typically a manifestation of a worldview that is shared and promulgated by people who act not as individuals but *as a group* (Mols, Haslam, Jetten, & Steffens, 2015). Moreover, it is this capacity to act as a group that gives them power (Turner, 2005). Importantly, thought, it is the capacity for their opponents to do the same that allows them to resist and challenge that power and to imagine and drive *social change* (Haslam & Reicher, 2012).

Relatedly, a second problem is that top-down s-frame interventions often exclude the very people they are meant to help. For example, a report into the Australian government's 2007 "emergency intervention" into Aboriginal communities in the Northern Territory found that regulating the goods that people were allowed to buy led to members of those communities feeling disempowered and disengaged (O'Mara, 2010). More generally, rather than recruiting people's energies, such policies can easily suppress them.

A third issue is that group-level factors affect whether systemic interventions gain traction. In particular, social identity-related dynamics determine whether, and how much, people support and engage with interventions (Mols et al., 2015). For example, resistance to COVID-19 lockdowns was driven in part by people's alienation from, and lack of trust in, government and an associated sense that these measures were illegitimate (Hornsey, 2020; Reicher & Stott, 2020). "Nothing about us without us" is not just a powerful rallying call, but also a template for (dis) engagement.

It follows from the previous points that a key way to develop the s-frame and increase its impact is to align it with a g-frame, so that the material and psychological dimensions of change buttress (rather than undermine) each other. Such an approach acknowledges the power of social systems to produce change but recognizes – and seeks to harness – the power of groups to deliver this. In the domain of mental health, for example, this suggests that rather than seeing depression, anxiety, and loneliness as individual-level cognitive problems, these conditions often have structural determinants that can best be tackled through collective efforts (Haslam, Jetten, Cruwys, Dingle, & Haslam, 2018). Likewise, environmental research emphasizes the importance of collective efficacy beliefs in motivating collective action on climate change, and it also highlights the importance of interventions that build and mobilize change-focused groups and communities (Masson & Fritsche, 2021).

In this way, as Greta Thunberg recognized, progress in social policy is ultimately driven and delivered not by an s-frame alone, but by an s-frame that is married with a g-frame which recognizes that structural progress is best realized through the mobilization of shared understandings and energies. Indeed, it is because C&L's review helps to develop this g-frame that we are so receptive to it.

Financial support. This research received no specific grant from any funding agency, commercial, or not-for-profit sectors.

Competing interest. None.

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Behavioral mechanism design

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doi:10.1017/S0140525X23000870, e149

Abstract

The authors make a convincing case that behavioral scientists have mistakenly focused on improving individual decision making and in so doing have deflected attention from necessary changes in the rules of the game – societal institutions and policies – that shape individual decisions. To address this problem a behavioral science of public policy requires rethinking fundamental economic concepts including preferences and incentives.

Chater & Loewenstein (C&L) have produced a powerful manifesto (with a bit of *mea culpa* thrown in). They claim that behavioral scientists (themselves included) have mistakenly focused on improving individual decision making (the "i-frame"), and in so doing have unwittingly deflected attention from necessary

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

changes in the rules of the game – societal institutions and policies – that shape individual decisions (the "s-frame"). They provide convincing evidence that:

> …public relations specialists representing corporate interest have deflected pressure for systemic change by reframing social problems in i-frame terms [and] to back i-frame interventions that pose little threat to the status quo while simultaneously lobbying heavily against proven s-frame policies that threaten their interests (target article, sect. 1, para. 22).

C&L advocate "applying behavioral insights to s-frame reforms" and provide a series of important suggestions in this direction. I'm sorry that C&L did not address how economics – in light of these new behavioral insights – would have to change to contribute to this project (Loewenstein is an economist). This would require a new approach to mechanism design, the field of modern economics that – like Adam Smith, David Hume, and the other classical economists – unabashedly engages in social engineering, by deriving systems of property rights, incentives, prohibitions, and other rules of the game ("mechanisms") that will support desired societal outcomes.

Over the past three decades, behavioral evidence has challenged two assumptions that were once standard among economists: That people are good at maximizing expected utility and that we are amoral and self-regarding. So (here comes my behavioral economics bumper sticker): People are both dumber and nicer than we thought. My response is a mini manifesto for a science of s-frame reforms without the brainy and self-interested *Homo economicus*, summarized in three points (I wonder if C&L agree).

First, we have to give up the idea that a single concept – utility – can be used both to predict behavior and to evaluate the results of a policy or set of institutions. Evidence that we are not very good choosers – as Daniel Kahneman showed – is very bad news to economists (Kahneman, 1994). It means that in order to explain behavior we need to extend "preferences" beyond "tastes" (something worth satisfying) to encompass weakness of will, bad habits, even addictions.

But if we incorporate these self-harming and regret-inducing reasons for behavior into our utility function, utility is no longer something that a benevolent planner or a citizen would like to see maximized. As a result, our workhorse concepts such as Pareto efficiency lose their normative appeal. Does satisfaction of a nicotine-craving count as a plus when we tote up economic benefits and costs? Or a racist desire to interact only with members of one's own ancestral group? When evaluating a successful drug cessation program, do we really want to include as a cost the forgone drug induced high of a recovered formerly addicted person (Chaloupka et al., 2014)?

Second, we have to give up the idea that whatever utility is, it is not comparable across people. Jeremy Bentham and the other classical economists conceived of what we now term utility as "pleasure and pain" experienced by people in differing and comparable degrees. If we can compare utilities across people, then given Gossen's "law of the saturation of wants" ("diminishing marginal utility" to economists) we can (and often do) conclude that transferring wealth from the very rich to those of limited means will do more good than harm.

The dictum that we cannot (and must not) compare utilities across people was introduced to economics – ostensibly on grounds of parsimony – almost a century ago by Lionel Robbins. It is still widely accepted and taught to students, who find it odd once they realize that it precludes not only the (above) utilitarian argument for redistribution of wealth, but also statements like: "I'll pick up the kids today, dear, it will be *less trouble for me than for you*." Denying the coherence of such statements (the offending phrase is in italics) precludes the most elementary sentiments of regard for others that are commonly observed in experiments and essential to a well-ordered society.

Third, we have to give up trying to design institutions and policies that can be expected to work well no matter what people are like. This means abandoning the assumption that everyone is a self-interested "knave" (David Hume's dictum, echoing Machiavelli; Hume, 1898), recognizing that widely shared ethical and other-regarding values are essential to policy implementation, and taking on board the possibility that our favorite policy instruments – incentives and constraints designed for knaves – may sometimes be ineffective, even counterproductive.

Given its currency in legal, economic, and policy-making circles it may seem odd that nobody really believes the assumption that people are amoral and self-interested to be literally true. Instead, the assumption has been advanced on grounds of prudence, not realism. Even Hume, just a sentence after announcing his maxim about citizen-knaves, warned the reader that the maxim was false in fact.

But letting *Homo economicus* be the behavioral model of the citizen, the employee, the student, or the borrower when it comes to designing laws, policies, and business organizations is anything but prudent. Policies that follow from this paradigm sometimes make the assumption of universal amoral selfishness more nearly true than it might otherwise be. Consistent with the research half a century ago by Edward Deci, Mark Lepper, and their coauthors, recent experimental evidence suggests that incentives and constraints sometimes crowd out other-regarding and ethical preferences (Bowles & Polania-Reyes, 2012; Deci, 1971; Lepper, Greene, & Nisbett, 1973).

In a similar vein C&L warn of "public 'reactance' against incentives for policies which citizens see as ineffective, unfair, or infringing liberty" (target article, sect. 3.3.4, para. 3) referring to evidence from the COVID pandemic (on which, see also Schmelz, 2021). No matter how cleverly designed to harness the "avarice" of knaves (as Hume put it), incentives cannot alone provide the foundations of good governance (Bowles, 2016).

C&L provide a rich starting point (including a gold mine of references) for the formulation of a behavioral mechanism design, whether along the lines proposed above, or in some other direction. Progress in this project may require going beyond the i-frame and s-frame dichotomy (a brilliant rhetorical device for the purposes of C&L's manifesto) to include intermediate arenas of sociality in communities and civil society, in other words a c-frame (Bowles & Carlin, 2020).

Acknowledgments. The author acknowledges the Behavioral Sciences Program of the Santa Fe Institute and Caroline Seigel of the SFI library for support of this work. The author thanks Mirta Galesic and Elisabeth Wood for helpful comments and Juan Camilo Cardenas for suggesting the c-frame idea.

Financial support. This research received no specific grant from any funding agency, commercial, or not-for-profit sectors.

Competing interest. None.

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The influence of private interests on research in behavioural public policy: A system-level problem

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doi:10.1017/S0140525X2300095X, e150

Abstract

Chater & Loewenstein argue that i-frame research has been coopted by private interests opposed to system-level reform, leading to ineffective interventions. They recommend that behavioural scientists refocus on system-level interventions. We suggest that the influence of private interests on research is problematic for wider normative and epistemic reasons. A system-level intervention to shield research from private influence is needed.

We offer a philosophical perspective on this important programmatic article, focusing on three related constructive critiques and suggestions.

Our first point focuses on the background normative framework for public policy evaluation. Following the majority of work in this area, Chater & Loewenstein (C&L) primarily evaluate policies in terms of how effectively they promote welfare. They present a range of evidence that i-frame interventions often fail to benefit their targets, relative to s-frame alternatives. This forms the basis of their central critique of the i-frame agenda, which they argue has been coopted and exploited by private interests opposed to s-frame reforms.

This is a powerful line of criticism. Welfare promotion is obviously one extremely important dimension of policy evaluation. If i-frame interventions yield meagre welfare gains, that is a good reason to oppose them and the private influence that promotes them. But welfare is not the only dimension of evaluation. Alongside maximising human welfare, we also care about a plurality of other goods, such as fairness, equality, prioritising the worst off, as well as democratic values. Crucially, we are often prepared to trade-off some degree of welfare promotion for the sake of these other values (few of us are full-blown utilitarians). This is important because advocates of i-frame interventions (such as "nudge" proponents) often appeal to non-welfarist values, such as liberty and autonomy, in defence of an i-frame approach. So, a complete normative evaluation will need to compare i-frame and s-frame interventions in terms of a plurality of values.

More positively, we want to suggest that C&L's welfare-based critique of i-frame interventions (and the private influence behind them) may be bolstered by reflecting on these wider values. To illustrate, consider two plausible (and non-exclusive) ways of understanding the value of democracy. On one view, democracy is valuable because it gives citizens control over their collective lives, thereby promoting their autonomy (Lovett & Zuehl, 2022). On another view, the value of democracy inheres in the fact that it gives citizens similar levels of political influence, thereby avoiding objectionably inegalitarian social relations (Christiano, 2008; Kolodny, 2014; Viehoff, 2014). If, as C&L persuasively argue, i-frame interventions are a means by which private interests exert influence on public policy, this plausibly undermines the values of democratic autonomy and equality (Bartels, 2016, Ch. 11; Christiano, 2012; Lovett 2024). When private actors are able to leverage their wealth to influence policy making, this both undermines regular citizens' control over policy decisions (thereby undermining their autonomy) and places them in a subordinate relationship to the wealthy (thereby undermining equality). Hence, the case against private influence over public policy need not be restricted to its effects on welfare. C&L's critique of the i-frame research agenda can be waged on multiple fronts.

Our second point is that private influence not only comes with normative disadvantages, but has also been shown to be epistemically harmful in a variety of contexts. C&L's critique focuses on how private interests can affect which research questions are asked, what studies are thus carried out, and how they are adapted for policies. However, private influence penetrates deeper, often affecting the actual results of whatever research is carried out and thus how the research questions are answered. For instance, it is a well-known problem in pharmaceutical research that researchers with industry ties are much more likely to produce studies that draw proindustry conclusions, even without any obvious biasing of the research methods used (see, e.g., Lexchin, Bero, Djulbegovic, & Clark, 2003). These effects on study results are part of a well-studied suite of mechanisms by which industry influence has subverted the scientific pursuit of truth. These include deliberate (and very subtle) strategies designed to maintain ignorance (Pinto, 2017) or to sustain self-serving consensuses that may diverge from the best evidence (Holman & Bruner, 2015).

Take, for example, a tactic from the tobacco industry's war on cancer research (Oreskes & Conway, 2011) that is evidently still in operation today (Adams, 2011). Industry conducts proprietary meta-research into which methods are reliable and which not. With this knowledge in hand they fund less reliable research that investigates (matters pertinent to) policies they wish to

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

subvert. This prevents consensus forming simply by ensuring that enough erroneous results are disseminated to perpetuate academic debate (Weatherall, O'Connor, & Bruner, 2020). Importantly, these strategies for directly influencing and perverting the process and outcomes of scientific enquiry will be available to private interests whether the research questions pertain to s-frame or i-frame interventions.

Finally, in light of these wider problems with private influence (and the subtle and subversive ways in which it operates) we believe the solutions suggested by C&L are insufficient. The overall tenor of their proposal is to stress greater personal awareness of, and willingness on the part of the researcher to personally take steps to counter-act, psychological or methodological biases in favour of i-frame and against s-frame interventions. Somewhat ironically, these recommendations have a rather i-frame flavour: Give researchers information and encourage them to make better individual choices. And, for that reason, they cannot hope to counter the systematic ways in which private interests bias not only the choice of interventions to study and implement, but also the outcomes of research. Moreover, the methods and results of industry science are often proprietary and not shared with the broader community (Bright & Heesen, 2023). Industry may thus have more information about how to exploit human psychology than outsiders, further undermining the efficacy of C&L's proposed solution. We suggest – turning the article's main contention back on itself – that we should also consider s-frame interventions that target the research field. First and foremost: What can be done to better shield research from the influence of private interests?

Financial support. Liam Kofi Bright was supported by Leverhulme Foundation (Leverhulme Prize 2020). Jonathan Parry was supported by UKRI grant EP/X01598X/1.

Competing interest. None.

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"More effective" is not necessarily "better": Some ethical considerations when influencing individual behaviour

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doi:10.1017/S0140525X23001127, e151

Abstract

Chater & Loewenstein make a persuasive case for focusing behavioural research and policy making on s- rather than i-interventions. This commentary highlights some conceptual and ethical issues that need to be addressed before such reform can be embraced. These include the need to adjudicate between different conceptions of "effectiveness," and accounting for reasonable differences between how people weight different values.

In their article, Chater & Loewenstein (C&L) support the preferential use of system-level interventions, largely because of their greater effectiveness. It is, however, unclear whether or not the apparent increased "effectiveness" of s-interventions is sufficient to justify their use in preference to individual level (i-) interventions. The authors note the risk of "heavy-handed 'paternalism'" in adjudicating between "freedom-to-choose and freedom-from-temptation," and suggest it should be tempered by "democratic processes." I argue, here, that difficulties in striking a balance between different values are a core reason why s-interventions are controversial, and might limit the reach of C&L's conclusions. Although I agree with much of their characterisation of the unfortunate neglect – by both behavioural scientists and policy makers – of s- in favour of i-interventions, there remain important ethical reasons why it is not so straightforward to adopt s-interventions.

One reason for preferring choice-preserving interventions is they allow governments to avoid taking strong positions on the rankings of controversial values (such as health, environment, leisure time, religion, close relationships). Although it is impossible to govern without making some assumptions about what people (should) value, avoiding ranking such values or predetermining how people must trade them off with one another is often desirable. Yet a number of the interventions C&L appear to implicitly endorse take strong positions on the relative importance of such values, for instance, by banning plastic bag use, or addressing the "urgent" problem of misinformation through "dramatic tightening of regulation of social media."

To better illustrate the problem, consider a helpful analogy C&L provide to assist the reader in seeing why it is foolish to get stuck in i-intervention thinking. C&L describe a slum landlord who claims his tenants' poor health is a result of a lack of hand hygiene, rather than a lack of sanitary housing. Although we might readily accept that such a landlord should be required (morally and perhaps legally) to improve his housing stock,

other examples might raise questions. For instance, skiing injuries could be reduced by encouraging people to wear helmets (i-intervention) or by requiring ski resorts to make their runs flatter (s-intervention). C&L's arguments suggest that, because the latter would surely be much more effective, we should endorse this s-intervention over the alternative i-intervention. Yet it is not obvious that this really is a preferable approach to the problem.

There are a number of issues at stake here. First, it is not as straightforward as is perhaps implied by C&L to judge what should count as the most "effective" intervention. Public health promoters will presumably judge whatever intervention results in the biggest increases in public health (however they choose to define this) as the most effective. But other groups and individuals might reject this – health is not the only thing that matters. Economists might focus instead on productivity; artists might think that cultural richness is more important. Returning to the ski slope example, if we make the ski slopes flatter, people go slower and get less pleasure. There are also fewer accidents. It is not self-evident whether or not this is a net improvement.

A second issue is who's job it is to shoulder the burden of making changes that will result in the desired improvements, and to what extent coercive force (or more moderate punishments or rewards) may be used in order to ensure adherence. C&L point to the enthusiasm for individual responsibility shown by corporate opponents of s-interventions. Yet freedom and responsibility are not purely the invention of commercial actors seeking to promote their own interests. The authors point to the (sometimes extensive) influence of the social and built environment on people's behaviour. Indeed, this might give us pause when considering the extent to which individuals are responsible for that behaviour. For instance, if the main determinant of whether or not one eats junk food is whether or not there is a fast-food outlet nearby, we might question whether people's dietary behaviour is a result of freely made choices, consistent with responsibility, or is instead "controlled" by the actions of others. But this "pause" is not equivalent to a robust conclusion that freedom and responsibility are absent, or unimportant. It is a far from settled topic within philosophy and interdisciplinary work in ethics (Brown & Savulescu, 2019; Cavallero, 2019; Davies, De Marco, Levy, & Savulescu, forthcoming; Segall, 2009).

The values at stake in the obesity case and other examples provided by C&L are not self-evident. Although it may be reasonable for states to take health as an uncontroversial "good," this does not mean it may be pursued at all costs. The appeal of i-interventions is to avoid making too many controversial value weightings, and instead to facilitate individuals to weigh up their own values and act accordingly. In order to show that i-interventions are no good, it is not enough to simply show that they don't reduce obesity or alcohol consumption to exactly the amount deemed by health promoters, behavioural scientists, or governments to be the "correct" level. It needs to be shown that i-interventions fail to facilitate decision making (or behaviours) by individuals that reflect their values and promote their interests. This might well be the case, particularly when commercial interests are unaligned with individual interests. It is not, however, enough to show that the greater "effectiveness" of s-interventions straightforwardly justifies their use. Nor does the relative enthusiasm of commercial interest groups for i-interventions show that individual choice has a dramatically reduced role to play in behavioural research or public policy.

Financial support. This work was supported by a grant from the AHRC (AH/W005077/1) and the Wellcome Trust (WT203132/Z/16/Z).

Competing interest. None.

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Community-engaged research is best positioned to catalyze systemic change

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doi:10.1017/S0140525X23001024, e152

Abstract

Addressing many social challenges requires both structural and behavioral change. The binary of an i- and s-frame obscures how behavioral science can help foster bottom-up collective action. Adopting a community-frame perspective moves toward a more integrative view of how social change emerges, and how it might be promoted by policymakers and publics in service of addressing challenges like climate change.

Chater & Loewenstein (C&L) provide a compelling case that behavioral science needs to expand beyond individual-focused (i-frame) research if it wishes to engender systemic change. However, we believe their conception of system-focused (s-framed) research is too simplistic. We propose an alternative frame, the community-focused (c-frame), which provides a bridge linking the i- and s-frames, while also highlighting the interdependence between the two. The c-frame foregrounds the role of public and activists in shaping public policy and the role behavioral science can play in studying and fostering systemic change through bottom-up collective action. If behavioral scientists are to contribute to positive social change, and we strongly believe they should (Nyborg et al., 2016), then research that pursues bottom-up solutions and the empowerment of historically marginalized groups is both an effective and desirable path forward.

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

The i- versus s-frame distinction assumes a limited policy space where policy occurs either at the level of top-down institutions or atomized individuals, yet this conception has two core problems. First, it presumes an ahistorical theory-of-change characterized by paternalism. In their implied (but not stated) theory-of-change, positive social change occurs when elite institutions and actors (including highly educated scientists) take benevolent and coercive action against bad faith private actors who are at their most harmful when unencumbered by (other) elite institutions. Yet many of the solutions presented as "s-frame interventions"' (per Table 1 in the target article) are policies rooted in collective action. Employer-provided pensions are listed, yet largely exist in the United States as a result of decades of labor action (Sass, 1997), long ignored by behavioral scientists (Lott, 2014), during which workers regularly risked death at the hand of their employers and the government (Adamic, 1931/2022). Environmental regulations are also listed as s-frame solutions, yet their history is often one of ardent collective action and meek government response, not benevolent administrators acting against fossil-fuel interests without impetus. From 1970 to 2020, the largest protest in US history was the 1970 Earth Day protest, where 1-in-10 people in the United States participated (Rome, 2013). This is not to suggest that social progress is unaided by government policy, quite the opposite. Rather, C&L point to paternalism as the social process that led to the adoption of these policies, instead of their adoption being a response to demands made of the powerful by the collective.

In many cases, s-frame solutions pursued without considering bottom-up, c-frame approaches will ultimately serve the corporate interests C&L believe the s-frame overcomes. Some i-frame solutions like individual carbon footprint analysis have, in practice, been implemented to deflect attention from systemic policies (Turner, 2014). Corporate interests have also, however, aggressively lobbied governments for "s-frame" policies that support their bottom line and ultimately obstruct aggressive climate action (Brulle, 2018). Focusing exclusively on either of these frames obscures the role that community-engaged behavioral science can play in informing large-scale policy responses. Bottom-up action often presents the greatest threat to corporate environmental degradation, as evidenced by the documented success of social movements, often led by indigenous and historically marginalized groups, in curbing fossil-fuel emissions (Thiri, Villamayor-Tomás, Scheidel, & Demaria, 2022). The Intergovernmental Panel on Climate Change's (IPCC's) most recent AR6 concluded with high confidence that many national-level climate policies that center just transitions were established in response to movement-based collective action (IPCC, 2022).

The behavioral sciences have informed our knowledge of individual and collective action and public buy-in to policy and new technologies, and could be leveraged to build social movements and democratize structural change. For example, social norms promote cooperation in social dilemmas (Ostrom, 2000), facilitate the coordination of large groups of people (Roos, Gelfand, Nau, & Lun, 2015), and mobilize collective action. The tendency of individuals to conform or coordinate with those around them can reinforce existing norms, even harmful ones, but can also trigger rapid social change (see Constantino et al., 2022, for a review). These social dynamics can account for the outsized impacts of policies such as financial subsidies on rooftop solar adoption and cycling infrastructure on biking (Centola, 2021; Kaaronen & Strelkovskii, 2020), and have been proposed as one mechanism for stabilizing the Earth's climate (Otto et al., 2020). Appealing to norms and emotions that motivate individuals to align their actions with peers can transform grassroots efforts into social movements (Aron, 2022), and are also crucial for effective governance of common-pool resources by maintaining cooperation and reciprocity (Ostrom, 2000). Indeed, top-down attempts by external actors to regulate commonly owned resources can erode the social norms that enforced sustainable practices in the first place (Ostrom & Nagendra, 2006). Rather than adopting a coercive perspective on behavior change, c-frame research acknowledges that durable social change can result from collective or coordinated action by groups of individuals.

The c-frame is also ideally suited to understanding and resolving community-level tensions that arise with systemic change and disruption. In August of 2022 the United States passed the Inflation Reduction Act, the largest piece of climate legislation to date, in part because of the efforts of activists. The potential for it to drive an equitable and rapid transition to a net-zero carbon economy depends crucially on demand-side factors. The massive infrastructural and social changes accompanying a rapid energy transition will alter the livelihoods of many communities, opening the possibility of locally concentrated opposition to infrastructures that confer a general public benefit (Stokes, 2016). The challenges inherent in such a transition can drive the formation of unlikely coalitions that come together to support or oppose certain issues (Ciplet, 2022). Studying these dynamics while embracing community-engaged research may help to resolve disagreements and inform the design of policies that are palatable to a broad range of constituents, and contribute to research exploring the transformative role of deliberative democracy to climate action (Dryzek & Niemeyer, 2019; Willis, Curato, & Smith, 2022).

Tackling complex social problems, including climate change, requires a holistic approach that grapples with the relationships between individuals and the systems in which they exist. A c-frame approach will move behavioral science beyond an i- and s-frame dichotomy toward a more nuanced understanding of how individual, social, and structural change happens in practice.

Competing interest. None.

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Use behavioral research to improve the feasibility and effectiveness of system-level policy

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doi:10.1017/S0140525X23000985, e153

Abstract

Individual-level interventions are inadequate to address complex societal problems. Meaningful solutions require system-level policies that alter the incentives that govern behavior. We argue that individual-level interventions can help improve both the feasibility and effectiveness of system-level interventions, especially when designed as an integrated policy package.

Chater & Loewenstein (C&L) offer a compelling case that scholars in the behavioral sciences need to reflect on the current state of their research and consider how to better contribute to addressing societal challenges. They document the limits of behavioral interventions (i.e., nudges) in solving the most pressing social problems and argue that the focus on individual-level interventions can crowd out more effective system-level policy changes. C&L correctly acknowledge that the two approaches are not mutually exclusive but point out the obvious – that incentives matter, tradeoffs exist, and narratives shape debates. We elaborate on these points by suggesting that, in terms of addressing societal challenges, the most important contribution of behavioral research is not to pursue alternatives to system-level change but rather to find ways to use behavioral insights to advance system-level policies.

Interest in applying behavioral interventions or nudges to address societal problems emerged, in large part, because of the political barriers that obstruct system-level policy change. The appeal of nudges is that they maintain freedom of choice while contributing to solving the problem at hand. But the very thing that makes nudges more politically viable – maintaining personal freedom – also makes them less effective (Hummel & Maedche, 2019). Behavioral interventions can unquestionably be useful in some settings, such as solving coordination problems or helping people with weak or ambiguous preferences find their way with a default or information (Thaler & Sunstein, 2008). However, our most pressing social problems are complex dilemmas, such as climate change or coronavirus disease-2019 (COVID-19) vaccinations, in which there are competing interests or a tension between what is best for individuals and what is best for society. Behavioral interventions are ill-equipped to adequately resolve such conflicts. Meaningful solutions require system-level policies that alter the incentives that govern behavior.

Promising policy options exist for nearly every social problem. It is the inability to implement these system-level policies that prevents progress on a wide range of issues. From controlled experiments, studies show that people often reject policies even when the policy unambiguously improves individual and collective material wellbeing (Cherry, Kallbekken, & Kroll, 2017; Dal Bó, Dal Bó, & Eyster, 2018). Work has begun to identify the behavioral underpinnings of policy resistance, but more can be done to identify ways to make system-level change more likely and more effective.

Carbon taxes offer a prominent example. Despite widespread support among experts, carbon tax proposals are usually met with fierce opposition from the public and vested interests that perceive them as coercive, ineffective, and unfair (Bergquist, Nilsson, Harring, & Jagers, 2022). Behavioral research has explored ways to alter the design of a carbon tax to alleviate the perception of coerciveness, ineffectiveness, and unfairness (e.g., Cherry, Kallbekken, & Kroll, 2012). The perceived coerciveness of a proposed carbon tax can be diminished by including individual-level interventions that invite ways to lessen the burden of the tax – for example, a congestion charge can include nudges to use an expanded and improved public transportation system (Franssens, Botchway, Swart, & Dewitte, 2021). The perceived effectiveness of a carbon tax can be enhanced by earmarking the revenue to related programs that generate an additional stream of benefits – for example, revenues directed to environmental measures (Kotchen, Turk, & Leiserowitz, 2017). And perceived fairness can be addressed by using the tax revenue to offset the harm imposed by the behavior targeted by the tax or the tax itself (Kallbekken, Kroll, & Cherry, 2011).

Also consider the behavioral tendencies, such as status quo bias and affective forecasting, that contribute to people's

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

resistance to new policies (e.g., Pedersen, Friman, & Kristensson, 2011). Studies show that opposition to a proposed policy can diminish significantly after the policy is implemented and people experience the benefits of the new policy (Schuitema, Steg, & Forward, 2010). The challenge is that policies are proposed to people who have no experience with the policy. But implementation can be reimagined. For instance, researchers and policymakers have considered a process that starts with a temporary trial run of the policy, followed by a proposal of the policy to a more informed and experienced public (Cherry, Kallbekken, & Kroll, 2014).

Beyond improving the feasibility of system-level change, behavioral research can also improve the effectiveness of policies after implementation. Research should explore how combinations of individual-level nudges and system-level policies can be more effective together than if either are adopted alone (Carlsson, Gravert, Johansson-Stenman, & Kurz, 2021; Stuber, Hoenink, Beulens, Mackenbach, & Lakerveld, 2021). Consider a proposal that combines a carbon tax with behavioral interventions that encourage energy efficiency. The behavioral intervention can make it easier for people to exhibit the desired response to the carbon tax, whereas the financial incentives from the carbon tax can boost the effectiveness of the behavioral intervention (Kallbekken, Sælen, & Hermansen, 2013). Policy packages have become a tool for policymakers (e.g., European Green Deal, Inflation Reduction Act of 2022, etc.), and behavioral research can offer important insights on the potential for combining and sequencing policies to be more effective, as well as more politically feasible (Kallbekken, 2023).

The global community faces unsettling threats that require system-level policy solutions. Behavioral interventions alone are playing at the margins: Moving behaviors that are not overly costly for individuals to change and offering inadequate headway with our most pressing social challenges. Behavioral interventions may, however, provide pathways to overcome the barriers to implementing promising policies and to help make those policies more effective. This potential is likely greatest for designs where the elements are considered in conjunction during the design phase, rather than as add-ons, developing a comprehensive policy package that simultaneously addresses incentives and behavior.

Financial support. T. L. C. is supported by a National Science Foundation grant (SES2033855).

Competing interest. None.

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Don't throw the individual perspective out while waiting for systemic change

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doi:10.1017/S0140525X23000948, e154

Abstract

Although it is clear that i-frame approaches cannot stand alone, the impact of s-frame changes can plateau. Combinations of these approaches may best reflect what we know about behavior and how to support behavioral change. Interactions between i-frame and s-frame thinking are explored here using two examples: alcohol consumption and meat consumption.

Behavioral research has disproportionately focused on i-frame solutions, likely inadvertently contributing to institutional agendas to maintain the status quo. Nonetheless, Chater & Loewenstein (C&L) may not have fully addressed who else the i-frame approach may be appealing to: Individuals who voluntarily seek support to reduce their alcohol consumption, quit smoking, or change their eating habits are also likely attracted to, and

benefit from, the availability of these solutions. Although many people feel the relative ineffectuality of individual efforts to generate change at scale, they also desire agency over their choices and are uncertain that systemic change will come. This can generate ambivalence from simultaneously experiencing detachment from personal responsibility, desire for choice, and skepticism toward corporations or governments perceived as resisting change for financial or political reasons. Attempts to support behavioral change should bear these apparent contradictions in mind and reflect what we understand about behavior as well as possible.

Within the field of health behaviors, behavior is understood through social-cognitive theories as the outcome of both internal and external factors. Our success in changing our behavioral patterns is affected by our environment, intentions, motivations, self-efficacy, knowledge, perceived behavioral control, and their interplay. This suggests that interactions between s-frame and i-frame thinking best reflect our understanding of how behavior works. With this framing, we explore two examples: alcohol consumption and meat consumption.

Alcohol consumption is culturally embedded in many societies, and here it is not clear that s-frame interventions are the only option to effect change. Sweden is often lifted as an example of strong s-frame solutions for alcohol consumption: high taxes and a sales monopoly. Nonetheless, the prevalence of harmful drinking has remained at ~30% over the past decade (Guttormsson, 2022). That is not to say that these policies did not have an effect – they certainly did – but their impact seems to have largely plateaued. With little-to-no noticeable shift in the average rate of harmful drinking attributable to s-frame policy in recent years, what is a citizen to do? An individual seeking help should be able to get that help instead of waiting for the next wave of policy reform. The availability of i-frame interventions is particularly important if s-frame changes risk inadvertently leaving at-risk groups behind or not fully accounting for health inequalities. For example, introducing minimum unit pricing (an s-frame intervention) on alcohol in Scotland may have increased financial pressure for economically vulnerable groups, whereas no clear evidence that alcohol consumption or dependence decreased among individuals drinking at harmful levels was found (Holmes et al., 2022).

Interestingly, younger people in Sweden are drinking less, whereas older individuals seem to be drinking more (Guttormsson, 2022). This trend among younger individuals is difficult to ascribe to changes in policy (Törrönen, Roumeliotis, Samuelsson, Kraus, & Room, 2019) as, if anything, the availability of alcohol has increased since 1995 because of a series of changes in national alcohol policy to align Sweden more closely with European standards (Källmén, Wennberg, Leifman, Bergman, & Berman, 2011). Rather, a shift in social norms among young people appears to have occurred, such that it is no longer taken for granted that drinking is normal or necessary in social environments. These influences are instead superseded by increased focus on personal safety and health as well as prioritization of other recreational activities. Taken together, this may have created a social landscape among younger people where there is less pressure to drink and abstinence is more socially acceptable than before (Törrönen et al., 2019).

From the viewpoint of individuals, reducing alcohol consumption can generate personal, tangible benefits in health and well-being within a comprehendible timeframe. Engaging with behaviors related to environmental sustainability though requires individuals to change their behavior to influence something seemingly less personal and tangible that occurs on a longer timescale: climate change. Reducing our consumption of red meat, especially beef, can improve the environmental sustainability of our diets. A slow but steady decline in red meat consumption has occurred in Sweden since 2016. This has been attributed to an increase in public awareness of the environmental impact of meat, as well as issues of animal welfare, price, and health (Swedish Board of Agriculture, 2022). Although it does not specifically set targets for reducing red meat consumption, the National Food Strategy for Sweden (Swedish Government Prop, 2017) does highlight the importance of consumers' ability to make informed sustainable food choices, providing an s-frame backdrop. The trend of decreasing red meat consumption may therefore represent an indirect effect on behavior whereby increasing general awareness about the (un)sustainability of the food industry among more individuals influences subjective norms and increases social pressure to make behavioral changes. Similar effects have been discussed for behavioral intentions regarding waste separation (Wang, Wang, Zhao, & Yang, 2019).

The environmental toll of the food industry has been part of the public consciousness in Sweden since before the National Food Strategy, and external factors aside from policy also play a role. For example, the popularity and availability of alternative proteins and meat-free products mimicking the functional and sensory aspects of meat has increased dramatically in European markets. This makes it easier to accommodate the needs of meat-avoiding friends and family in social situations, and in turn word-of-mouth and social exposure increase awareness of such alternatives (Collier, Normann, Harris, Oberrauter, & Bergman, 2022; White, Ballantine, & Ozanne, 2022). In other words, individual actions support change in the s-frame, which in turn can enhance social inclusion effects. It remains likely that a carbon tax or specific meat tax would impact meat consumption behavior (e.g., Säll & Gren, 2015), and that individuals would adapt to such s-frame changes more quickly than they expect – as C&L describe. However, indirect s-frame approaches may help effect measurable behavioral change via shifts in awareness and norms among individuals while such reforms are debated, designed, and drafted.

Very few would argue that i-frame interventions alone are sufficient, but they are relevant in concert with s-frame reforms - the impact of which can plateau. Exploration of the examples discussed here suggests that i-frame and s-frame approaches exist on a continuum, and that interactions between them reflect what we understand about behavior and how change can be created and sustained.

Financial support. This research received no specific grant from any funding agency, commercial, or not-for-profit sectors.

Competing interest. M. B. owns a private company (Alexit AB) that maintains and distributes evidence-based lifestyle interventions to be used by the public and in health care settings. E. S. C., K. L. H., and M. J.: none.

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Real systemic solutions to humanity's problems require a radical reshaping of the global political system

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doi:10.1017/S0140525X23001061, e155

Abstract

Society's problems cannot be alleviated via mere policy interventions, whether individual- or system-level, when the system is the problem. To bring about true and lasting change to the better, we must replace the present global political-economic system – oligarchic capitalism backed by the power of the state – with one that would let the people take charge of their lives.

Chater & Loewenstein commendably urge behavioral scientists interested in helping solve society's problems to shift the traditional focus from individual (i-frame) interventions toward "value-creating system-level change" (s-frame). Unfortunately, attempts at incremental change from within, through such s-frame policies as regulation and taxation, are unlikely to be of much use if the problems we face arise from the very nature of the system, which, moreover, is designed to resist any reform – as is arguably the case.

The system, which we have collectively allowed to come to dominate public and private life virtually everywhere on the planet, is capitalism, defended and perpetuated by political oligarchy through the repressive apparatus of the state. This characteristic fits well the big nation-state players – including the self-styled "democratic" capitalist West, the state capitalist People's Republic of China, and the kleptocratic capitalist Russian Federation – as well as the smaller ones, whether they hew to one of the big blocs or are nominally non-aligned.

This system is inherently hostile to s-frame interventions for the public good because it exists to serve the interests not of the general public but of power elites. In the West (the tacit focus of the target article) it makes a mockery of democracy by shutting out of the political process, by means of miseducation (Freire, 1974; hooks, 1994), propaganda (Herman & Chomsky, 2002), and personal and structural violence (Graeber, 2006; Hirschfield & Simon, 2010), movements that seek to disrupt or even just weaken the corporate oligarchy. As a result, even if some interventions succeed, the traditional power elites – including corporations that literally, and entirely legally, don't care about human life or well-being (Mulgan, 2019) – have their way more often than not (Gilens & Page, 2014).

As an aside, it is worth noting that sustained corporate propaganda (Kavanagh & Rich, 2018; MacLeod & Chomsky, 2019) permeates the public discourse not only in the traditional and newer social media, but also in scientific communications. It is exemplified by the unquestioning use in the social sciences literature (including the target article; no blame for what clearly is a systemic ill) of expressions such as "polarization," which hides the fact that one of the two poles, represented in the United States, the United Kingdom, and several other "democracies" by major political parties, is unvarnished fascism; "healthcare industry," which deflects attention from the atrocity of abandoning people's health to moneyed interests, as does the seemingly innocuous phrase "cost of living" (see Edelman, 2023, Ch. 4); and of course "public relations," a euphemism for corporate and state propaganda.

To see how "society's most pressing problems" (using a phrase from the target article, long abstract; also sect. 3, para. 5) are inherent in the nature of the system that propaganda shields from scrutiny, it is worth rehearsing the "*specific ways* in which capitalism is *bad*," as listed by Brighouse (2021): Capitalism perpetuates eliminable forms of human suffering; blocks human flourishing; perpetuates eliminable deficits in individual freedom; violates egalitarian principles of social justice; is economically inefficient in certain crucial respects; promotes consumerism; threatens important values; corrodes community; limits democracy; in a world of nation states, fuels militarism and imperialism; and is environmentally destructive (see also Graeber, 2006; Harman, 2010; Sullivan & Hickel, 2023).

The catastrophic effect of capitalist hegemony on the environment (Armstrong McKay et al., 2022) is probably the most pressing issue on the social sciences' agenda at present. It is also the strongest argument against settling for incremental policy adjustments that leave the system in place: We simply cannot afford to wait and see whether trying to change the system from within will work.

Interestingly, in both notable exceptions to the global political order – the Zapatista autonomous areas in Chiapas, Mexico (Anderson & Springer, 2018; Maldonado-Villalpando, Paneque-Gálvez, Demaria, & Napoletano, 2022) and the Autonomous Administration of North and East Syria, or Rojava (Dirik, 2022; Piccardi & Barca, 2022) – the people place environmental protection and justice at the top of their political agenda.

This positive aspect of anarchist praxis can be contrasted with the persistent failure of environmental policy initiatives in the

"democratic" West. This should not surprise us: per David Graeber's (2004, p. 9) *Against policy (a tiny manifesto)*,

> The notion of "policy" presumes a state or governing apparatus which imposes its will on others. "Policy" is the negation of politics; policy is by definition something concocted by some form of elite, which presumes it knows better than others how their affairs are to be conducted. By participating in policy debates the very best one can achieve is to limit the damage, since the very premise is inimical to the idea of people managing their own affairs.

Perhaps other societal problems too, which we all face together, can be dealt with better if the present global political-economic system is replaced with one that would have the people take charge of their lives. To that end, social and behavioral scientists can help by describing historical and anthropological alternatives to the present order (cf. Graeber & Wengrow, 2021), by promoting education for critical consciousness (Freire, 1974; Suissa, 2019), and by studying and teaching effective organizing for true freedom and social justice – long-standing goals of liberation psychology (Martín-Baró, 1996) and humanistic sociology (du Bois, 1983).

Competing interest. None.

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Behavioral winter: Disillusionment with applied behavioral science and a path to spring forward

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doi:10.1017/S0140525X23000912, e156

Abstract

Chater & Loewenstein thoughtfully express their disillusionment with contemporary applied behavioral science, particularly as it pertains to public policy. Although they fault an overemphasis on i-frame approaches, their proposed alternatives leave doubt regarding whether behavioral science has much, if anything, useful to offer policy. We offer two critical principles to guide and motivate more relevant behavioral science.

We share Chater & Loewenstein's (C&L's) disillusionment with the current state of applied behavioral science (see Gal & Rucker, 2022). We concur a predominant focus on i-frame (nudge) interventions has not helped much and, in some cases, may have harmed the public by diverting attention from s-framed solutions. However, although we generally agree with C&L's overarching observations and sentiment, we have concern that the alternatives they contemplate cast doubt as to the relevance of behavioral science to policy. Namely, it is unclear that a case has been made that behavioral science is poised to offer insight and to inform, in a meaningful way, s-framed interventions.

Consider the five main public policy problems listed in Table 1 of the target article. It is unclear why any of the proposed s-level interventions require, or even benefit from, insight from behavioral science. The idea that structural change that prevents or discourages a behavior (e.g., a tax leveraged against sugar drinks) leads to a reduction in such behavior (e.g., less consumption) is not a special insight of behavioral science. To the degree such interventions are not implemented, it is not because of a lack of understanding nor communication of behavioral science, but because of the lack of political will and lack of public support to bear the costly tradeoffs involved.

Furthermore, most of the examples of policy that the authors explicitly offer as being based on "behavioral insights" (in target article, sect. 3.3) strike us as mundane and lacking any true insight. For example, avoiding "not invented here" syndrome, encouraging debate within groups, reducing bureaucracy, and

making forms clear, are run-of-the-mill advice offered in popular management or information design books. To attribute such common wisdom to "behavioral science insights" seems inappropriate. Regarding climate change, their proposed intervention to increase public support for decarbonization could be viewed as akin to manipulating, and misleading, the public to believe they will get something for nothing (i.e., green energy at no net cost). Here, the idea that people like getting something for nothing is neither, in our view, a behavioral insight nor is such an implementation truthful as presented.

Thus, although we see promise and agree with C&L's general observations, we suggest that behavioral science must go further than emphasizing the need for s-frame interventions if we wish to contribute meaningfully to policy conversations. Next, we offer two principles to guide more relevant and more imaginative behavioral science inspired policy.

The relevance of behavioral science must be founded on theoretical understanding and insight, not extrapolation of effects

A key to making behavioral science relevant to application is the development of theoretical insights about behavior. Theory should be at the crux of application because each setting is unique; the effect of an intervention in one setting can never be directly extrapolated to another. Theoretical understanding, regardless of the source, is what allows us to generate valid explanations for the effects of interventions in novel settings.

Theoretical insights come from developing and testing theories of behavior using experimental and other methods with no special status to "gold standard" controlled field trials or quasi-experiments focused on examining the effects of interventions (Gal & Rucker, 2022). Although documenting effects is a part of science, we believe too many behavioral scientists have focused on identifying effects rather than on explanations of why those effects occur (i.e., theoretical insights). At the same time, many also confound and mistake descriptions of effects for theoretical explanations.

To illustrate, after observing a phenomenon wherein losses appeared to loom larger than gains, behavioral scientists declared loss aversion a key feature of a "descriptive theory" of choice; that is, a description of an effect rather than an explanation (for a review, see Gal & Rucker, 2018). Yet, despite lacking theoretical insight, researchers subsequently attempted to export loss aversion to new settings beyond those in which it was described. Unsurprisingly, these attempts have failed (e.g., Ferraro & Tracy, 2022; O'Keefe & Jensen, 2007).

Behavioral science must strive for imagination in application

The dominant nudge approach has, in our view, been characterized by a lack of creativity and mundane solutions (e.g., send text reminders to encourage remembering an appointment). We believe much of this lack of creativity is because of a procedure of extrapolating generic interventions tested in one context to another as opposed to designing a solution specific to a problem (Gal & Rucker, 2022). To foster a more relevant behavioral science, imagination is needed in application. Imagination in application is important because behavioral insights cannot be applied directly; they must be translated or incorporated into interventions or other approaches to address specific problems. Doing this effectively will often benefit from, if not demand, finding non-obvious solutions – imagination.

To illustrate the value of imagination in application, research suggests that certain behaviors, including environmentally friendly behaviors (Brough et al., 2016) or seeking mental healthcare (Li & Gal, 2021), are stereotyped as feminine and this deters men from engaging in them. How to apply this insight, however, cannot be extrapolated from this finding, but requires imagination. One approach might be to attempt to weaken the stereotypes attached to these behaviors through persuasive messaging (i.e., that such behaviors do not reflect on one's masculinity). Alternative approaches might involve accepting that the stereotypes exist and focusing on framing specific green behaviors in more masculine ways (e.g., buying an electric car offers faster takeoff) or reducing the visibility of such behaviors (e.g., allowing men to receive mental health treatments relatively discreetly and anonymously). Regardless of the specific strategy, the point is that imagination in application is important for increasing the relevance of applied behavioral science.

In sum, agreeing with and building on the target article, we see a "behavioral winter" of sorts in terms of policy relevance is upon us. Yet we believe that policy relevance requires more work beyond noticing the value of s-frame interventions. We have offered two principles that we believe are essential for a spring of more relevant behavioral science to emerge.

Competing interest. None.

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Optimizing behavior change through integration of individual- and system-level intervention approaches

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doi:10.1017/S0140525X23001012, e157

Abstract

We contend that individual-level ("i-frame") intervention strategies can be appropriately integrated with system-level ("s-frame") strategies to optimize population-level behavior change. We outline instances of effective "i-frame" interventions, and how coordinated, integrated, well-resourced interventions that encompass components at both levels, and has organizational and user-group support, may optimize sustained behavior change intervention efforts, and allay practices that undermine "s-frame" components.

We broadly endorse Chater & Loewenstein's (C&L's) contention on the limited long-term efficacy of interventions that target individual behavior change ("i-frame" interventions), and concur with their suggestion that advocacy for, and emphasis on, "i-frame" interventions, may have potentially deleterious effects on behavior change strategies (e.g., legislation, taxation) that focus on systemic change ("s-frame" interventions) by opening opportunities for organizations to reduce investment in – or even actively oppose – them. Nevertheless, we propose that outright dismissal of "i-frame" interventions is imprudent, and argue that such interventions should be important components of coordinated, integrated, multi-strategy behavior change interventions. Our premise has two bases. First, there is evidence that well-designed and resourced "i-frame" interventions can lead to sustained behavior change (Hagger, Cameron, Hamilton, Hankonen, & Lintunen, 2020). Second, use of "i-frame" and "s-frame" intervention strategies together as part of an integrated approach, may be optimal in bringing about sustained behavior change and allay organizational practices that undermine "s-frame" strategies. Next, we outline examples of "i-frame" interventions that have been efficacious and effective in producing long-term behavior change, and, critically, examples of integrated interventions that encompass "i-frame" and "s-frame" components.

Although C&L acknowledge that some "i-frame" interventions are successful, their overall contention is that such approaches seldom lead to sustained behavior change. However, they neglect to note the many other instances where "i-frame" interventions, correctly implemented and resourced, have demonstrated efficacy and effectiveness, including in high-quality effectiveness trials. For example, graphic-warning labels on tobacco products have been shown to substantially reduce use and promote quit attempts (Brewer et al., 2016; Durkin, Brennan, & Wakefield, 2012). C&L's concerns regarding "i-frame" interventions may stem from the observed high variability in their efficacy and effectiveness, likely attributable to numerous contextual and structural factors. For example, "i-frame" interventions are seldom sufficiently scaled and have limited ongoing resource investment that ultimately mean sustained change is not realized (Hagger & Weed, 2019). Such interventions also tend not to have sufficient engagement from stakeholder and user groups, and support from the systems required to implement them (Koorts et al., 2018).

Thus intervention success is often not a function of the "frame" of the intervention per se, but the lack of peripheral support for the interventions to be efficacious and effective in situ. Such support may include sustained funding necessary for the key intervention components to be delivered in the requisite dose and according to protocol, buy-in from key networks and stakeholder organizations responsible for their instigation and delivery, and other structural aspects important to maintain engagement (e.g., public buy-in, resource availability). Efforts to garner such support and the networks necessary for optimal, per-protocol "i-frame" intervention delivery have been elevated to the same level of importance as the development of the content and protocol of the intervention itself. This elevation has been mirrored by the emergence of the field of implementation science, which aims to study and develop models on how practices that have shown promise in efficacy trials, including those adopting "i-frame" strategies, into effective, sustained, and feasible practices in community settings (Luszczynska, Lobczowska, & Horodyska, 2020).

The imperative of including structural support for "i-frame" interventions so they can be effectively implemented to produce sustained behavior change highlights the need for an integrated approach that encompasses "s-frame" strategies. The kinds of systemic supports required for "i-frame" interventions to be successful are often those that demand structural changes in the organizations and networks responsible for intervention implementation and delivery, and also in the community contexts in which interventions are delivered. This implies that a coordinated approach in which behavioral scientists work alongside implementation scientists, organizational leaders, and policymakers, and community and user groups to identify the intervention components and elements that need to be put in place to affect sustained change in the target behavior is necessary. Such an approach has been documented in formal protocols developed by implementation scientists modeling the logistics and networks required to produce efficacious and effective interventions that lead to sustained behavior change (e.g., Feldstein & Glasgow, 2008; Glasgow, Vogt, & Boles, 1999).

C&L indicate that there are occasions where "i-frame" and "s-frame" strategies have been effectively integrated. In fact, there are many successful examples. One of the most successful examples comes from Australia's campaign to change sun-safety behaviors that led to the first decline in the rate of increase in skin cancer incidence for 40 years. The sustained coordinated approach involved large-scale, well-resourced "i-frame" messaging on use of protective clothing, sun screen, and head coverings ("slip," "slop," "slap"), alongside "s-frame" policy and legislation change including mandating use of sun-protective clothing for children in schools, manufacturing requirements for clothing to be ultraviolet (UV) protective, and banning solariums (e.g., Montague, Borland, & Sinclair, 2001; Walker et al., 2022). In another example, UK hospitals aiming to prevent nosocomial infections introduced "i-frame" messages, prompts, and education to hospital staff on "non-touch" techniques alongside "s-frame" components such as sourcing and availability of antibacterial products and changes in policy on aseptic-handling procedures for patients (e.g., Rowley, Clare, Macqueen, & Molyneux, 2010). These examples stand as blueprints for an integrated approach to behavior change. Common elements include buy-in from stakeholder organizations and user groups, systematic coordination of networks and program elements, adoption of evidence-based "i-frame" behavior change techniques, and sufficient resourcing and leadership to implement concomitant "s-frame" policy changes. We also note the imperative for advocacy work aimed at engaging stakeholder organization leadership and user groups for such coordinated approaches to be effective. Advocacy work may involve the instigation of precursory behavior change interventions that promote attitude or "culture" change

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

within leadership and organizations. Furthermore, given the coordinated approach that integrates "i-frame" and "s-frame" components includes organization involvement and buy-in by design, it is also likely to allay the kinds of nefarious practices that undermine "s-frame" intervention components highlighted by C&L.

In summary, we echo C&L's call for broader application of "s-frame" strategies for behavior change, but argue that integration of "i-frame" and "s-frame" strategies informed by behavioral and implementation science should optimize intervention efficacy and effectiveness and inhibit undermining practices.

Financial support. This research received no specific grant from any funding agency, commercial, or not-for-profit sectors.

Competing interest. None.

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Behavioral public policy in practice: Misconceptions and opportunities

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doi:10.1017/S0140525X23000924, e158

Abstract

I greatly respect the authors of the target article. However, in contrast to the target article's assertion, practitioners of behavioral public policy are indeed involved in developing and promoting systemic solutions. Its "i-frame"/"s-frame" distinction is incoherent, unhelpful, and obscures promising future directions for behavioral public policy. Its content and presentation undermine its stated goals and encourage sweeping dismissals of the field.

First, I set out empirical concerns. Several assertions in the target article are the result of misunderstandings or the selective use of evidence. As someone who has led work in this field for over a decade, I disagree strongly that the goal of behavioral public policy has been "to provide an alternative to traditional s-frame policies" (target article, sect. 1, para. 6). Instead, the goal has been to integrate behavioral science into existing policy approaches, as shown by the development of a broader "behavioral insights" agenda (Strassheim & Beck, 2019). Chater & Loewenstein focus too much on the political arguments made for nudges, and neglect the fact that a technocratic rationale for behavioral science was being advanced in parallel (Hallsworth & Kirkman, 2020). The technocratic strand took a much more systemic view of policy-making issues, and was embedded in institutional decision-making frameworks (Whitehead et al., 2017).

The authors prominently feature a quote from David Cameron when campaigning to be UK Prime Minister in 2009. Yet there are several contemporaneous quotes that take a very different view. For example, a UK government document from around 6 months later, which directly informed the creation of the Behavioural Insights Team, explicitly states that the application of behavioral science "powerfully complements and improves conventional policy tools, rather than acting as a replacement for them… sustainable changes in behaviour will come from the successful integration of cultural, regulatory and individual change" (Institute for Government & Cabinet Office, 2010). The report explicitly rejects the idea that "'behaviour change' can be understood as simply a novel alternative to, say, legislation" (p. 52).

Moreover, the target article fails to engage in any depth with evidence of what "nudge units" actually do, nor the processes of public administration more generally. Frequently, the target article tries to draw a direct connection between academic papers on the one hand and specific policies on the other, while avoiding any serious engagement with how the policy-making process works – and the role that behavioral scientists actually play in it. Several ethnographic studies document the actual practices of "nudge units" and other practitioners (e.g., Ball & Feitsma, 2020; Feitsma, 2019). Such studies reveal that "behaviour experts are misrepresented by the behavioural policy frontstage with respect to the complexity of their endeavours" and that behavioral science is "also incorporated at earlier stages in the policymaking process," rather than just being used as tweaks to implementation (Feitsma, 2019).

What these studies also show is that practitioners attempt to enhance, support and, yes, critique (where appropriate) "traditional" policy-making options – a sharp contrast to the caricature of policy entrepreneurs who always shove nudges to the front of the queue. In the United Kingdom, the contribution that behavioral science made to national obesity policy was to emphasize

the automatic and non-conscious dimensions of food consumption (e.g., Ello-Martin, Ledikwe, & Rolls, 2005; Hollands et al., 2015; Levitsky & Pacanowski, 2012). I personally presented and discussed this evidence with the relevant civil servants over the course of several years. Behavioral science was used to show that individual-level solutions (e.g., relying on exercise alone) were likely to be ineffective because of the power of environmental cues for eating – the precise opposite of what the target article asserts.

I agree that corporate lobbying can be a powerful force, and that corporations are likely to have incentives to emphasize individual behaviors and personal responsibility. But I absolutely do not agree that behavioral scientists have meaningfully contributed to this effort, even unintentionally. The target article offers five main arguments in support: Each of them invites rebuttal on empirical and theoretical grounds, and which I have done at length elsewhere (Hallsworth, 2023).

My next group of comments concerns the target article's theoretical basis. The target article introduces a distinction between the "i-frame" and the "s-frame." This distinction does not offer much clarity and holds up poorly under scrutiny. It does not take much time to think of "traditional" policies that incrementally tweak the rules of the game, rather than rewriting them – like not adjusting tax brackets for inflation. Moreover, several of the examples they give as "i-frame" or "s-frame" could easily be put in the opposite category. The moving to opportunity intervention, presented as an "s-frame" solution, clearly focuses on individual families and the social mobility effects on their children. Maybe you could resolve these taxonomic questions satisfactorily, with some effort. But it raises the question: Is this effort well spent?

Behavioral science should focus more on understanding the interactions between individual and system levels, rather than emphasizing a distinction between them. The target article often discusses the i-frame and s-frame relationship as if they are two separate domains that comment on each other. But it is often the interplay *between* individuals and systems that determines effects. This question is not purely academic: Some of the most exciting opportunities for behavioral public policy will come from a fusion with the insights offered by complex adaptive systems thinking. Complex adaptive systems show that system-level features of a system can emerge from the interactions of individual actors participating in the system, without direction (Boulton, Allen, & Bowman, 2015). So, rather than a separate "i-frame" and "s-frame," policy makers are often dealing with "cross-scale behaviors" (Schill et al., 2019).

My final concerns are pragmatic. The result of all these choices is that the target article paints a picture that is both overly negative and also simplistic. Accordingly, the target article has been presented as a damning criticism of the whole enterprise of behavioral public policy – "What Nudge Theory Got Wrong" (Harford, 2022). Already the target article has been used to argue that behavioral public policy should be reduced or even abandoned, rather than extended. This is all many readers will hear of the article, which is a shame: The target article's stated aim is to improve behavioral public policy and it offers solid recommendations, many of which are already in progress. These presentational and editorial choices undermine the target article's stated goals, making it curiously self-defeating – and actually impeding progress for the field.

Acknowledgments. I would like to thank George Loewenstein and Nick Chater for their courtesy and engagement, and to Katy Milkman, Michael Sanders, and Cass Sunstein for their comments on the draft of this paper. I also thank the organizers of the 2022 Annual Conference of the Center for Health Incentives and Behavioral Economics at the University of Pennsylvania.

Financial support. This research received no specific grant from any funding agency, commercial, or not-for-profit sectors.

Competing interest. I am employed by The Behavioural Insights Team, which is mentioned in the target article and which has been advised by Nick Chater and George Loewenstein.

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Moving from i-frame to s-frame focus in equity, diversity, and inclusion research, practice, and policy

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doi:10.1017/S0140525X23001115, e159

Abstract

Meaningful and long-lasting progress in equity, diversity, and inclusion (EDI) continue to elude academics, practitioners, and policymakers. Extending Chater & Loewenstein's arguments to the EDI space, we argue that, despite conventional focus on individual-level solutions (i-frame), increasing EDI also requires a systemic focus (s-frame). We thus call for the design, testing, and implementation of multipronged s-frame interventions.

Despite decades of research and intervention, social inequality remains stubbornly persistent and effective solutions continue to elude academics, practitioners, and policymakers. In the target article, Chater & Loewenstein (C&L) highlight the distinction between individual and systemic (i.e., i-frame and s-frame) approaches to behavioral change and challenge the emphasis and overreliance on i-frame interventions. We extend their arguments to organizational policies and initiatives designed to increase equity, diversity, and inclusion (EDI), a theoretically and practically important domain of behavioral change. Using the frameworks described in the target article, we argue that, despite conventional focus on individual-level solutions (i-frame), behavioral policy and initiatives for increasing EDI are particularly well-suited to a systemic focus (s-frame).

A myriad of research and policy has attempted to mitigate inequality and improve EDI, but has focused almost exclusively on i-frame change – attempting to change discriminatory and exclusionary behavior by focusing on *individuals*. For example, the $8 billion/year diversity training industry claims to improve EDI outcomes by teaching individuals about their unconscious biases, with the hope that this will translate to behavioral change (Kochan et al., 2003; Newkirk, 2019). Similarly, workshops and trainings advocating for the "lean in" approach also target individuals, encouraging women and minorities to take personal responsibility for overcoming bias and advancing their careers (Sandberg, 2013). Each of these approaches aim to "fix" individuals, either those who perpetuate bias and discrimination (e.g., via unconscious bias), or the women and minorities who suffer the consequences.

Although i-frame policies and practices are popular and lucrative, rigorous research demonstrates their limited effectiveness. For instance, although diversity training can improve attitudes toward EDI, there is very little empirical evidence of resulting behavioral change (Chang et al., 2019). Rather, seminal research points to negative repercussions including backlash and reactance (Kalev, Dobbin, & Kelly, 2006). Similarly, although the "lean in" approach aims to empower women to take control and overcome discrimination by diligently pursuing ambition and achievement, a wealth of theory and evidence documents backlash against women who behave in counter-stereotypical, assertive ways (He & Kang, 2021; Rudman & Glick, 2001; Rudman & Phelan, 2008).

These unintended consequences make sense against the backdrop of i-frame policy effectiveness described by C&L: i-frame interventions often generate null, mixed, or modest effects. For EDI, the limitations of i-frame interventions are compounded because the psychological biases that drive inequality and discrimination are often difficult to control with conscious effort, and because converting attitudes (intention) to behaviors (implementation) is extremely challenging (Gollwitzer, 1999).

Effectiveness aside, a more pernicious consequence of an i-frame focus in EDI is that it ultimately impedes progress by shifting responsibility away from organizations to make systemic changes. For instance, exposure to "lean in" messages creates and reinforces the belief that women can and *should* take responsibility for overcoming bias and closing gender gaps, ultimately undermining support for system-level change (Kim, Fitzsimons, & Kay, 2018). Worse, this focus has spurred on entire industries dedicated to expanding and capitalizing on i-frame approaches, thus further entrenching the policies and systems that create and perpetuate these very problems.

The predominant i-frame focus in EDI research and practice seems especially misguided when one considers the wealth of scholarship illustrating that inequality is a *structural* problem arising from unequal access to opportunities, and seemingly "meritocratic" processes that advantage certain identities and marginalize others (Acker, 2006; Amis, Mair, & Munir, 2020; Cheryan & Markus, 2020; Kang & Kaplan, 2019). By focusing on i-frame solutions, the root of the problem remains buried; individuals are unjustly forced to figure out how to navigate a system that is stacked against them and, at times, designed in ways that underpin their failure. Inequality is not an individual-level issue, but rather a *systemic* problem that requires *systemic* solutions. Absent any other supporting systemic intervention, changing individual behaviors is unlikely to close inequality gaps; the systems in which individuals are nested must be fundamentally altered.

Our aim is not to eliminate i-frame solutions to EDI, but to echo C&L by asserting that i-frame solutions alone are unlikely to solve the problem. Rather, we underscore the need for a complementary focus on s-frame approaches. An emerging body of research has begun this shift by applying behavioral science tools such as framing and choice architecture to change organizational policies, processes, and structures that create and perpetuate bias (s-frame). For instance, Rivera and Tilcsik (2016) find that changing evaluation ratings from 10-point to 6-point scales help to mitigate evaluation bias against women. High-performing women were less likely than their male counterparts to receive 10 out of 10 (a number associated with brilliance, which is associated with men), but just as likely as men to receive 6 out of 6 (a number that is not associated with brilliance). In our own work, we demonstrate how changing defaults can mitigate gender inequality in competition and opportunities for advancement. We found that although women are less likely than men to compete and apply for promotions under a traditional "opt-in" frame that requires self-nomination, using an opt-out choice frame (i.e., competing or being considered for promotion by default with the choice to opt-out) substantially attenuated and, at times, eliminated the gender gap (He, Kang, & Lacetera, 2021). Research and policies building on this body of work require organizations to re-examine their seemingly meritocratic and neutral policies, processes, and structures to determine whether and how their current systems advantage certain identities over others, and to experiment and re-design environments where bias and inequality are less able to hide.

An s-frame approach to behavioral science opens a new door of possibilities for behavioral change. Beyond the examples we provide here, other macro, structural perspectives must also be applied to design effective EDI interventions that foster more inclusive organizational outcomes and environments. Social inequality is a persistent, pressing issue for policymakers, scholars, and practitioners, the complexity of which calls for the design of multipronged interventions that shift away from overreliance on i-frame factors toward an s-frame mindset.

Acknowledgments. We are grateful to the Institute for Gender and the Economy (GATE) and the Behavioral Economics in Action Research Centre at Rotman (BEAR) for the continued support of our work at the intersection of behavioral change and equity, diversity, and inclusion.

Financial support. This comment received no specific grant from any funding agency, commercial, or not-for-profit sectors.

Competing interest. None.

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

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Unpacking the nudge muddle

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doi:10.1017/S0140525X23001140, e160

Abstract

Libertarian paternalism initially focused on policy domains in which the state was prohibited from interfering coercively in decision making out of respect for individual autonomy. Because adjustment of the s-frame was not an option, achieving better outcomes through manipulation of the i-frame seemed attractive. This original motivation was unfortunately lost in the transition from libertarian paternalism to the nudge framework.

I do not disagree with Chater & Loewenstein's (C&L's) central claim, that nudge-style interventions have been oversold as a way of achieving behavioral change, resulting in excessive focus on the i-frame in recent policy debates. I would like to insist, however, that the libertarian paternalism project as originally conceived by Sunstein and Thaler (2003) is not vulnerable to this objection. The problem arose because of a gradual expansion of their claims over time, along with a loosening of constraints on the circumstances of application. In the book *Nudge* (2008), Thaler and Sunstein offered inconsistent definitions of what constitutes a nudge, illustrated through policy interventions that extended far beyond the domain of libertarian paternalism. By offering a clear account of the relevant distinctions, I hope to show that there are circumstances in which the privileging of the i-frame over the s-frame in behavioral public policy remains appropriate. My central criticism of C&L is that they are insufficiently attentive to this point about paternalism, and so gloss over important differences between policy problems like obesity, where a concern for individual autonomy limits the range of s-frame interventions that can be undertaken, and climate change, where the full menu of s-frame options is available.

It remains the default assumption in most domains of public policy that the state should promote its objectives by adjusting the incentives faced by individuals, making behavior that it seeks to promote less costly and making behavior that it wants to discourage more costly. This standard approach is considered problematic, however, when the objectives being sought involve promoting the putative good of the same individual whose behavior is being incentivized. In this case, as John Stuart Mill (1867) observed, the intervention is either superfluous or will involve the state second-guessing the individual's own evaluation of the objective. Thus, Mill's argument categorizes interventions that involve interference with individual choice through reference to the individual's "own good" as objectionably paternalistic. This analysis has been sufficiently influential in liberal states that in many policy domains – such as nutrition and dietary choice – public officials are reluctant to engage in coercive intervention (understood broadly, to include both taxation and subsidization of options).

As the material circumstances of human life have improved and the number of unresolved collective action problems has dwindled, the proportion of human misery that is self-inflicted has steadily increased. This accounts for much of the enthusiasm that greeted the original proposal for libertarian paternalism. Sunstein and Thaler argued that, even in cases in which it would be impermissible for the state to change the incentives faced by the individual, it may be permissible to present the choice in a way that generates a psychological effect that favors some preferred option. In particular, if the effect is achieved through exploitation of a cognitive bias, one cannot really object to it as an infringement of individual autonomy, because the intervention only works on individuals who are failing to exhibit rational autonomy in their actions (Hansen, 2016). So long as the intervention does not change the rational structure of the decision problem, it cannot be construed as interfering with individual autonomy. It follows that the state need not stand by idly while individuals engage in self-destructive behavior, it can use insights from behavioral psychology to devise interventions that will be psychologically powerful and yet non-coercive (Sunstein, 2014). Or in the terms favored by C&L, even when the state cannot change the s-frame, it can still manipulate aspects of the i-frame.

In its initial formulation, libertarian paternalism was specifically aimed at the problem of developing policy in domains where standard forms of state interference were considered impermissible. Over time, however, Thaler and Sunstein, along with many enthusiasts, began introducing modifications that blurred these boundaries. The idea of a nudge was introduced, along with the suggestion that it might be permissible for the state to modify the incentives faced by individuals *just a little*, or that

coercive imposition of costs might be permissible so long as they were not that large, or non-pecuniary, or "easy and cheap to avoid" (Thaler & Sunstein, 2008, p. 6). The Cameron government in the United Kingdom took things a step further, expanding the use of nudge strategies to cater to what amounted to merely a political preference against state coercion. This lent support to the notion that psychological manipulation might be favored simply on the grounds that it was cheaper than the provision of incentives. Certain widely publicized efforts in the United Kingdom, such as the attempt to use the "watching eyes" effect to deter tax evasion, reflected this preoccupation. Paternalism was clearly not the issue here, because the state has no qualms about throwing people in prison to deter tax evasion as well.

Although C&L mention the paternalism issue briefly, they ignore the issue throughout the bulk of their discussion. Thus one finds climate change being discussed side-by-side with public health problems related to obesity, despite important structural dissimilarities between these policy domains. Greenhouse-gas emissions are a classic negative externality, and so only the most extreme libertarian doubts that states are entitled to act coercively to deter their production (e.g., through carbon taxes). Certain states have of course failed to implement appropriate charges, but this is because of political challenges largely unrelated to any neglect of the s-frame. With obesity, on the contrary, even the mildest liberal has reason to be cautious about giving state officials license to interfere with dietary choices. It is not merely corporate lobbying that has prevented action in this domain, there is also an important matter of political principle at stake. Yet in their discussion of obesity, C&L ignore the possibility that an aversion to paternalistic intervention might lead policymakers to favor i-frame interventions. This is unfortunate, because it was the promise of a more sophisticated approach to these questions that was responsible for much of the excitement generated by Sunstein and Thaler's initial proposal.

Financial support. This research received no specific grant from any funding agency, commercial, or not-for-profit sectors.

Competing interest. None.

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The real cause of our complicity: The preoccupation with human weakness

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doi:10.1017/S0140525X23000936, e161

Abstract

Chater & Loewenstein offer an incisive criticism of how behavioral sciences and public policy have become complicit with corporations in blaming public health and societal problems on individual weaknesses, thus deflecting support away from systemic reforms. However, their analysis stops short of holding the field to account in one important respect: its preoccupation with human irrationality and weakness.

Chater & Loewenstein (C&L) offer an insightful analysis of contemporary behavioral public policy. In many respects, I agree with them. Corporations and entire industries, driven by the relentless pursuit of profit maximization, have played a key role in creating numerous public health crises and societal problems: the obesity, diabetes, and opioid epidemics, widespread climate change denial, and a tsunami of misinformation, to name but a few. The big players' tactics have been chronicled in numerous eye-opening publications on topics such as Big Food (Stuckler & Nestle, 2012), Big Soda (e.g., Nestle, 2015), Big Pharma (e.g., Meier, 2018; Whitaker, 2010), and Big Tech (Zuboff, 2019). C&L (target article, sect. 2.1) also give credit to earlier observers (e.g., public health scholar Kelley Brownell) for calling out the corporations' strategy of "consistently cast[ing] societal problems as issues of individual weakness and responsibility, the solutions to which involve 'fixing' individual behavior" (target article, sect. 1, para. 7).

It turns out that by focusing on individual behavior and overlooking systemic factors, behavioral public policy has played into the hands of the corporations. Why has the field not noticed its complicity? C&L touch on some reasons. They seem to suggest that even behavioral scientists have succumbed to the fundamental attribution error, the tendency to overestimate the influence of individual factors on people's behavior while underestimating the influence of situational or environmental factors (target article, sect. 1, para. 14). Furthermore, behavioral scientists' focus on "frailties of thought and behavior as the source of problems" (target article, sect. 1.1, para. 6) seems to dispose them to believe that the solutions lie in interventions that address those individual frailties – especially if those interventions can be touted as more efficient and politically palatable than systemic policies.

In my view, C&L do not get quite to the heart of the matter. For decades, behavioral decision science and behavioral economics have not just "focused" on cognitive and motivational frailties, but been unhealthily preoccupied by them. Much of the field has subscribed to a single narrative, popularized in a nutshell as "human beings are fallible: lazy, stupid, greedy and weak" (The Economist, 2008). Propelled by the findings of the heuristics-and-biases program, behavioral scientists have drawn dire conclusions about human reasoning and rationality: People "lack the correct programs for many important judgmental tasks" (Slovic, Fischhoff, & Lichtenstein, 1976, p. 174), and "mental illusions should be considered the rule rather than the exception" (Thaler, 1991, p. 4). The capacity for individual self-control has also been slammed: "… nearly every major personal and social problem affecting large numbers of modern citizens involves some kind of failure of self-regulation, albeit in the context of broader social influences" (Baumeister & Vohs, 2004, p. 3). What those broader influences might be, the authors failed to specify. For decades, the behavioral sciences have provided the perfect backdrop for corporations to blame problems on individual weakness rather than on systemic factors.

To understand why behavioral public policy seems to have become the accomplice of corporate interests, we first need to confront what Lopes (1991, p. 65) called the field's "rhetoric of irrationality." Moving beyond this blinkered approach would allow us to see that the field's dire conclusions about human reasoning and rationality ignore both past and present lines of research that arrived at very different conclusions about human competences (see also Lejarraga & Hertwig, 2021); that many behavioral scientists appear to be drawn to human weaknesses, citing articles that report poor performance on average some six times more often than articles that report good performance (Christensen-Szalanski & Beach, 1984); and that this infatuation with the negatives of human cognition may make it difficult to acknowledge recent findings that go against the alleged stability and universality of foundational biases such as loss aversion (e.g., Gal & Rucker, 2018; Yechiam & Hochman, 2013). Second, we need to acknowledge that individual failings of self-control have been diagnosed in the broader context of consumer products and environments often hyper-designed to trigger addictive behaviors – to unhealthy food and beverages (e.g., Brownell & Gold, 2012; O'Connor, 2021), digital media (see Kozyreva, Lewandowsky, & Hertwig, 2020), and more. Third, the obsession with individual frailties, combined with the belief that they cannot be corrected, appears to prevent many behavioral public policymakers from exploring other interventions, such as "boosting" interventions. These aim to build on people's competences or develop new ones while preserving their liberty and promoting their agency (Hertwig & Grüne-Yanoff, 2017; Lorenz-Spreen, Lewandowsky, Sunstein, & Hertwig, 2020). Granted, boosting interventions also focus on the individual. But they typically do not blame harmful behaviors on insurmountable individual weaknesses and are not seen as stand-alone solutions, but as one of several complementary entry points for policy interventions (see Kozyreva et al., 2020). Indeed, boosting interventions may also be systemic – compulsory education may be the most successful s-frame boosting intervention ever. I believe that such competence-enhancing interventions are urgently needed for a range of reasons. Let me mention just two. First, s-frame interventions such as regulation and taxation cannot help but lag behind the rapid progress of many technologies. Digital platforms can, for instance, change key parameters of their algorithms or choice architectures overnight. Individuals need to be empowered to retain autonomy when regulation will not protect them (yet). Second, key s-frame interventions such as mandates or taxes may be politically unfeasible. For instance, very few countries imposed COVID-19 vaccine mandates on their populations.

To conclude, C&L offer a persuasive analysis of the role of behavioral sciences in reinforcing the i-frame perspective and thus "inadvertently" (target article, sect. 1, para. 7) helping corporations to oppose s-frame reforms. In one important regard, however, they stop short of holding the field to account. It is not just the focus on individual-level solutions that has led behavioral public policy astray, but – at least equally importantly – the fixation on cognitive and behavioral failings, the rhetoric of irrationality, and the one-sided picture of human competences we have drawn.

Financial support. The author received no financial support for the research, authorship, and/or publication of this article.

Competing interest. None.

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The social sciences are increasingly ill-equipped to design system-level reforms

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doi:10.1017/S0140525X23001152, e162

Abstract

Our social policy landscape is characterized by incrementalism, while public calls for more radical reform get louder. But the social sciences cannot be relied upon to generate a steady stream of radical, system-level policies. Long-standing trends in social science – in particular, increasing specialization, an increasing emphasis on causal inference, and the growing replication crisis – are barriers to system-level policy development.

The "behavioral turn" in public policy can be identified across a wide range of policy areas in recent decades. Whether the problem to be addressed relates to public health, the environment,

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

inequality, or human capital development, policies rooted in behavioral science have become commonplace. Chater & Loewenstein (C&L) well describe the consequences of this behavioral turn in policy-making, and the dominance of "i-frame" (individual-level) proposals for reform. But they underestimate the extent to which the more macro-oriented social science disciplines that they rely upon to propose sweeping "s-frame" (system-level) reforms – sociology, political science, and economics – are themselves compromised. Over the past half-century, social science has developed in ways that strongly constrain the types of policies on offer. Incrementalism characterizes our policy landscape, and even where s-frame reforms are proposed by social scientists, they are relatively modest as compared with the ambitious policies of the past. Here, I propose that several changes in scientific practice have led to i-frame reforms being prioritized over their more radical, s-frame counterparts.

First, true s-frame reform requires social scientists to propose policies that affect multiple social institutions (e.g., Jackson, 2020). The European welfare state reforms of the early–mid-twentieth century, for example, introduced policies to simultaneously improve health systems, education systems, pension and unemployment rights, and housing. But as the body of social science research grows larger, individual social scientists have become ever more specialized. Increasing specialization of research output is likely to produce increases in the productivity of academic researchers, but research shows that negative outcomes are also likely: Disciplinary silos temper innovation and inhibit communication across specialties (e.g., Jacobs, 2014; Sherif & Sherif, 1969), and those researchers who do engage in interdisciplinary research are less productive (Leahey, Beckman, & Stanko, 2017). A less appreciated side effect of increasing specialization is that social scientists are left with diminishing capacity to design more radical policies (Jackson, 2020; Jacobs, 2014). Specialized social scientists focus on individual social institutions (e.g., the education system), or even parts of individual social institutions (e.g., early childhood education), but system-level policies require breadth of knowledge and an understanding of multiple social institutions. It would be quite ineffective, for example, to attempt to eliminate racial inequality in US society by addressing a single social institution such as education while leaving policing, employment discrimination, and other areas untouched. But in a highly specialized research environment, it is more likely that incremental policies focusing on single institutions will be proposed, crowding out the development of s-frame policies.

Second, the causal revolution in social science has transformed both the practice of research and the evidentiary standards with respect to policy development and evaluation. Social scientists are increasingly expected to demonstrate causal effects through application of recognized methods of causal inference (Angrist & Pischke, 2010), and policy proposals that cannot call upon evidence gathered via experimental methods or alternative techniques of causal inference have little chance of gaining support. The nailing down of precise causal effects, whether in pure or applied research, necessarily entails focusing in on narrow questions and well-defined mechanisms.

There are, of course, good reasons to insist on the scientific soundness of policy proposals: Policy-makers have limited resources and limited political capital, and policies must therefore have a high likelihood of producing the outcomes that are promised. But we must also acknowledge that the popularity of i-frame proposals in part arises from stronger claims to empirical support. It is hard to imagine how the welfare state reforms of the last century could have been introduced under current evidentiary standards for policy implementation: These reforms were simply too expansive in their scope, and there was certainly no body of experimental or quasi-experimental evidence to support an overhaul of multiple institutions. If s-frame policies cannot gain the imprimatur of "scientifically sound," it will be difficult for such policies to challenge the dominance of i-frame policies. Advocates of s-frame policies, and particularly the more radical of these policies, must therefore consider how best to build a convincing evidence base in support of sweeping reform. Put simply, we need to build a science of radical reform.

Finally, it is important to consider the extent to which the replication crisis has led to poor-quality policy-making. One reason why i-frame policies became dominant in recent decades is because the research promised large effects for small investment. Even the most radical of s-frame advocates would be hard-pressed to object to i-frame policies that delivered effects of the size promised. Unfortunately, it has become increasingly clear that i-frame policies have failed to deliver on their promise, in part because this promise was built on weak scientific foundations.

Publication bias, p-hacking, insufficient replication, and other perversities of scientific practice are not just consequential for scientific work: Our policy suffers too. Take, for example, the nudge policies that were embraced by the Obama administration a decade ago. A recent comprehensive meta-analysis suggested that nudges "promote behavior change with a small to medium effect size," although there is also evidence of a "moderate publication bias" in the nudge literature (Mertens, Herberz, Hahnel, & Brosch, 2022, p. 1). In a reply to the paper, Maier et al. show that there is evidence for "severe publication bias" in the nudging literature, and that once this bias is accounted for, "no evidence remains that nudges are effective as tools for behaviour change" (2022, p. 2; see also Bakdash & Marusich, 2022). Although we might expect the replication crisis to have had consequences for the evidentiary foundations of s-frame policies too, the likely overestimation of the strength of evidence underlying i-frame policies is particularly damaging, given the understandable preference among policy-makers for policies that are both effective *and* cheap.

Our policy did not just get small: Social science helped to push it in that direction. Times demand a social science that allows us to take risks. Without changes to our science, the s-frame policy proposals that C&L praise will be all too scarce, and i-frame reforms will continue to dominate.

Acknowledgments. I thank David Grusky and Robb Willer for their comments on an earlier version of this commentary.

Financial support. This research received no specific grant from any funding agency, commercial, or not-for-profit sectors.

Competing interest. None.

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https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

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When nudges have societal-level impact

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doi:10.1017/S0140525X23000961, e163

Abstract

Individual-level research in behavioral science can have massive impact and create system-level changes, as several recent mandates and other policy actions have shown. Although not every nudge creates long-term behavior change, defaults and other forms of choice architecture can not only change individual behavior but also reduce inequities and lead to changes in public policy and norms.

Can individual-level research on nudges lead to dramatic system-level change? Yes it can and has, despite what Chater & Loewenstein (C&L) suggest.

Consider the December 2022 regulations passed through the US Congress, which included several mandates: Most US employers will be required to automatically enroll employees into retirement savings programs, auto-escalate employees' contributions unless they opt out, and provide monthly retirement income projections. These "s-frame" mandates were undoubtedly influenced by "i-frame" research on automatic escalation (Thaler & Benartzi, 2004), automatic enrollment (Choi et al., 2004), and other behavioral interventions (Goldstein, Hershfield, & Benartzi, 2016).

And these policies should have massive impact. Data from dozens of firms that have implemented automatic enrollment suggest that it more than triples retirement savings among the poor on average, substantially reduces retirement savings gaps, and increases net wealth at retirement among the poorest income decile by 12 percentage points (according to Choukhmane, 2023). This tremendous impact is not limited to retirement savings nudges. For example, interventions that reduce administrative burdens, remind people to enroll in insurance plans, and reduce failures to appear in court also markedly reduce inequities by helping low-socioeconomic status (SES) consumers most (Domurat et al., 2021; Fishbane et al., 2020; Herd & Moynihan, 2019; Johnson, 2022; Mrkva et al., 2021).

Importantly, behavioral insights can also be used to increase profits or harm consumers. Techniques that change the default option or the prominence or presentation of information can sometimes increase company profits by several million dollars (Goldstein et al., 2008; Kohavi & Thomke, 2017; Posner et al., 2023; Reeck et al., 2023), which explains why they are so prevalent among companies like Amazon and AirBnB. A major priority for behavioral policy in the present and future will be preventing these harms and protecting unwitting consumers from companies' tricks (via groups like the United States' FTC and the United Kingdom's CMA). Like helpful nudges, "evil nudges" and dark patterns also have disproportionate impact on the poor and can exacerbate disparities (Luguri & Strahilevitz, 2021; Mrkva et al., 2021). Efforts to protect consumers with behavioral insights, regulation, and s-frame mandates have potential to reduce disparities and help consumers. Whether used in situations that help or harm people, or that reduce or exacerbate disparities, what is clear is that effects of behavioral interventions are not always "disappointingly modest" (contrary to what C&L claim).

However, we do agree with the authors that researchers and policymakers should look for s-frame solutions when possible. We sympathize with C&L's desires for policies that have massive positive impact and certainly desire the same thing. Luckily, most behavioral insights teams are already looking at broad solutions that go beyond individual-level behavior (Herd & Moynihan, 2019; Mažar & Soman, 2022). Yet it is important to accelerate plans and efforts to develop and scale these solutions across organizations, better anticipate when these nudges will have positive versus negative distributional effects, and take full advantage of opportunities to turn i-level nudges into changes in systems, policies, and norms.

Financial support. A grant from the Alfred P. Sloan Foundation (G-2018-11114) supported this research.

Competing interest. None.

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Nudges, regulations, and behavioral public choice

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doi:10.1017/S0140525X23000857, e164

Abstract

Chater & Loewenstein have done a service to the field by raising the fundamental issue of how the political process distorts well-intentioned efforts at behavioral public policy. We connect this argument to broader research on government failure, particularly public choice theory in economics. We further suggest ways that behavioral research can help identify and mitigate such failures.

Public choice theory is the branch of economics that examines how politicians, civil servants, and voters make decisions (Mueller, 2003). We are delighted that Chater & Loewenstein (C&L) have brought public choice considerations to the behavioral public policy conversation. C&L suggest that political momentum around nudges has been coopted by concentrated interests to avoid more effective systemic interventions. We agree with C&L's core theses: Nudging is overemphasized in behavioral policy discussions; individual-level thinking is psychologically natural (Johnson & Nagatsu, 2023); but it cannot substitute for systems-level thinking about systemic problems.

We also agree with C&L that wise policy making must incorporate public choice considerations to avoid unintended consequences. Here, we apply that dictum to traditional "s-frame" regulations – complementing C&L's critique of "i-frame" nudging – through both a classic public choice lens and a newer *behavioral public choice* lens.

Classic public choice. Public choice economists have long observed how the political process can derail traditional regulations, such as taxes, subsidies, bans, standards, and regulatory agencies:

- The same concentrated interests that C&L rightly fear in the domain of nudging can also wreak havoc over traditional regulation (Olson, 1965). For example, although agriculture employs few workers, agricultural subsidies benefit the agricultural industry while exacerbating social problems such as pollution and obesity (Franck, Grandi, & Eisenberg, 2013). Anticompetitive airline regulation imposed price *floors*, leading to dramatically higher consumer prices until the 1978 deregulation (Maynard, 2008). To this day, the US tax preparation industry persistently lobbies against efforts to simplify the federal tax code (Elliot & Kiel, 2019).
- Large organizations frequently lobby for regulations that will stymie competition, often with little public benefit (Stigler, 1971). The saga of Turing pharmaceuticals drastically raising the price of off-patent daraprim (Pollack, 2015) shows how pharmaceutical companies can game safety regulations to make generic competition infeasible. "Certificates of need" restrict the supply of hospitals, while the American Medical Association's credentialing system restricts the supply of physicians. Even labor unions have lobbied for higher minimum wages while carving out exemptions for firms that employ union labor (Jamison, Zahniser, & Reyes, 2015).
- Voters often prefer counterproductive economic policies because they have little private incentive to form rational economic beliefs (Caplan, 2007; Downs, 1957), but a strong social incentive for ideological conformity (Kahan & Braman, 2006). Economists' views of trade, immigration, outsourcing, and technological innovation are far more favorable than voters' (Caplan, 2007). The median voter prefers much stronger restrictions on trade and immigration compared to the median economist, incentivizing politicians to adopt destructive systemic policies.

C&L are surely right that traditional regulations, whether through bans or incentives, will change behavior more than nudging. Yet a public choice analysis suggests that this is a reason for more, not less, caution in proposing regulation: *Poor nudging can waste resources; poor regulation can lay waste to us all.*

Behavioral public choice. We agree with C&L that the behavioral sciences are crucial for wisely crafting regulations. We suggest that a fundamental, yet neglected, extension of behavioral economics should be taken up in a new field of *behavioral public choice* that uses psychological principles to understand the behavior of political agents.

A foundational principle in public choice economics is *behavioral symmetry* (Buchanan & Tullock, 1962): Analyses of economic behavior should make the same assumptions about economic agents (consumers and firms) as political agents (politicians and voters). Behavioral symmetry was originally formulated to rule out the common assumption that economic agents are selfish, whereas political agents are benevolent. But it *also* rules out the assumption that economic agents are irrational whereas political agents are wise (Thomas, 2019). We fear that policy discussion often conjoins these fallacies: Selfish and irrational consumers, benevolent and wise politicians.

Behavioral public choice can restore behavioral symmetry by understanding how both economic and political agents are *boundedly rational.* A key goal would be to understand the bounds on political agents' rationality and to model implications for policy implementation (including both nudges and regulations).

Some inroads have been made already toward applying bounded rationality to political agents (e.g., Lucas & Tasic, 2015; Viscusi & Gayer, 2015). Indeed, the notion of the "behavioral bureaucrat" has been discussed as long as nudging itself (Jolls, Sunstein, & Thaler, 1998). Yet behavioral public choice has so far had disappointingly little influence on policy discussions. One reason may be that we know relatively little about behavioral bias in our capacities as voters, bureaucrats, and politicians, relative to our capacities as consumers, investors, and managers. This shortcoming, however, leads to exciting possibilities for socially impactful and innovative research:

- *Voters*. Voters have policy-relevant beliefs about the economy (e.g., zero-sum thinking or antiprofit bias; Bhattacharjee, Dana, & Baron, 2017; Johnson, Zhang, & Keil, 2022), about human behavior (e.g., the malleability of behavior; Khon, Johnson, & Hang, 2020), and the political process itself (e.g., the efficacy of the government in implementing policy; the perceived appropriateness and effectiveness of regulations vs. nudges; Sunstein, 2016). How do voters' beliefs and values influence democratic decisions (Caplan, 2007)?
- *Civil servants*. Civil servants who *implement* policy are the middlemen between politicians (who *set* policy) and voters (who are *affected* by policy). Thus, they are simultaneously making decisions on behalf of voters while they are accountable to political institutions. Although there is literature on how both delegation (e.g., Polman & Wu, 2020) and accountability (Lerner & Tetlock, 1999) affect decision making, the psychologically unique position of bureaucrats in governments and other organizations has been little studied.
- *Politicians*. As little as the psychology of bureaucracy has been studied, even less is known about the psychology of politicians. What are politicians' mental models of voters (what will maximize their vote share)? What measures could encourage politicians to carry out voters' will (as opposed to those of concentrated interests) or, indeed, to *ignore* their will in cases where voters' preferences are irrational or immoral (Brennan, 2016)?

Such investigations will prove crucial if behavioral science is to wisely contribute to effective policy, whether in the form of nudges, regulations, or new species of intervention.

Financial support. This research received no specific grant from any funding agency, commercial, or not-for-profit sectors.

Competing interest. None.

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Individual-level solutions may support system-level change â if they are internalized as part of one's social identity

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doi:10.1017/S0140525X2300105X, e165

Abstract

System-level change is crucial for solving society's most pressing problems. However, individual-level interventions may be useful for creating behavioral change before system-level change is in place and for increasing necessary public support for system-level solutions. Participating in individual-level solutions may increase support for system-level solutions – especially if the individual-level solutions are internalized as part of one's social identity.

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In order to address society's most pressing problems, change is needed at the system level. Chater & Loewenstein (C&L) argue that behavioral scientists should focus on research that informs such system-level solutions (e.g., carbon taxes to reduce greenhouse-gas emissions) rather than promoting individual-level solutions (e.g., carbon footprint calculators), as the latter are likely insufficient, less impactful, and ultimately undermine system-level approaches. Specifically, they claim that individual-level solutions generally produce negative spillover effects that reduce public support for system-level solutions. This is an important paper and the authors do an excellent job of highlighting the potential risks of individual-focused intervention. Unfortunately, many of their concerns about negative spillover are speculative and not yet backed by scientific evidence. Although we agree that system-level change is crucial for solving many of society's problems and that behavioral science can (and should) be used to inform such change, we are not convinced that individual-level solutions necessarily undercut system-level solutions.

In this commentary, we argue that negative spillover is not inevitable or even common. Moreover, social identity may be key to generating positive rather than negative spillover effects between individual-level interventions and system-level solutions. As such, individual-level change is often beneficial for achieving system-level change rather than undercutting it.

Prior research on behavioral spillover effects paints a complex picture. Although several studies have provided evidence for negative spillover (see target article), many other studies have also provided evidence for positive spillover effects (see Truelove, Carrico, Weber, Raimi, & Vandenbergh, 2014). For example, increasing individual-level proenvironmental behavior such as recycling or conscious consumption is associated with increased political activism and support for system-level solutions such as wind power (Thøgersen & Noblet, 2012; Willis & Schor, 2012). This may suggest that individual-level interventions help build public support that is necessary for system-level policy change – through positive spillover.

Studies on spillover effects have used a variety of methodologies and measures, producing contradictory results (e.g., Carrico, 2021). For example, a meta-analysis of 77 effects from studies of behavioral interventions to promote proenvironmental behavior found an *overall positive spillover effect* on behavioral intentions, a small negative effect on actual behavior, and no effect on policy support (Maki et al., 2019). Importantly, the direction and magnitude of spillover effects also varied across interventions, suggesting that there may be ways to increase positive spillover by using specific types of interventions or targeting specific types of behaviors or processes.

Social identity has been proposed as a key moderator of spillover effects in proenvironmental behavior (Truelove et al., 2014). Specifically, when a decision to act proenvironmentally is based on a social role or identity (e.g., the identity of an environmentalist) or when initial proenvironmental behavior is attributed internally (e.g., to one's identity as an environmentalist), positive spillover (vs. negative or no spillover) is more likely to occur (Truelove et al., 2014). People who reflected on proenvironmental behaviors in connection to their values or identity (relative to no reflection or identity irrelevant reflection) increased their support for a carbon tax (Sparkman, Attari, & Weber, 2021). Furthermore, people who were reminded of their previous performance of a range of proenvironmental behaviors were more likely to make "green" product decisions because of an increase in environmental identity (Van der Werff, Steg, & Keizer, 2013). Thus, when one's social identity as someone who cares about the environment is triggered or made salient, positive spillover is more likely to occur.

A similar phenomenon has been observed during the coronavirus disease-2019 (COVID-19) pandemic. A global study of 67 nations (with nearly 50,000 participants) during the pandemic found that people who supported individual-level behavior change, including reducing social gatherings, were far more likely to support system-level policies, like reducing social crowds ($d >$ 0.8; Van Bavel et al., 2022). In addition, national identification predicted engagement in and support for *both* individual- and system-level solutions, which suggests that people who cared more about protecting their social group/country were most likely to act to reduce the spread of COVID-19. Hence, this global dataset supports the idea that there may be an indirect path for individual-level interventions to increase support for system-level interventions when people are identified with a group or issue.

Finally, support for individual-level interventions may not necessarily crowd out support for system-level changes. C&L describe a *crowding-out effect*; when easy-to-achieve nudges (an individual-level intervention) were presented alongside system-level policies, people supported the easier individual-level option more (Hagmann, Ho, & Loewenstein, 2019). However, when the small impact of nudges and the low cost of the policies were highlighted, the crowding-out effect was eliminated without diminishing support for the nudge. Although C&L conclude that individual-frame solutions crowd out system-frame solutions, the research they cite shows that simply highlighting the realistic potential efficacy of behavioral nudges can reduce negative spillover. Thus, it seems the effects of spillover can be easily mitigated with accurate and effective communication.

We enthusiastically share the view that individual-level interventions should *not* replace efforts for system-level policy. However, our review of the literature indicates there are situations where individual-level interventions can have positive spillover effects that benefit (or at least do not harm) system-level change. System-level change takes time and – at least in democratic societies – requires public support. Individual-level solutions could help mitigate social problems before system-level change is in place, generate support among leaders and key stakeholders, and help generate the necessary public support for system-level reform (via positive spillover effects), especially if the individual-level solutions are internalized as part of one's identity. Considering social identity as key to generating positive spillover effects may help make sense of existing literature and provide testable predictions for future investigations.

Competing interest. None.

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https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

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The "hearts-and-minds frame": Not all i-frame interventions are ineffective, but education-based interventions can be particularly bad

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doi:10.1017/S0140525X23001036, e166

Abstract

Pitting i-frame policies against s-frame policies inadvertently propagates a false dichotomy that fails to distinguish between effective i-frame policies that directly change behaviors and ineffective education-based i-frame policies that try to change people's hearts and minds. We argue that people's fixation on changing hearts and minds may be an obstacle for behavioral science in policy.

At their best, dichotomies improve decision making by simplifying inherently complex phenomena and boiling down multivariate options to their most important features. At their worst, dichotomies conceal critical differences, painting a mirage of forced choice between potentially compatible alternatives. Unfortunately, despite its potential for advancing how people think about policy, we believe that the framework put forth by Chater & Loewenstein may inadvertently propagate a false dichotomy and unintentionally obscure two important and consequential elements of "i-frame" and "s-frame" policies. As such, we worry that this framework depicts policymaking as a forced choice between two distinct and seemingly uniform policy types.

First, the i-/s-framework fails to account for the fact that achieving lasting behavioral change does not require choosing the right *type* of policy but rather choosing the right *portfolio* of policies that build upon, interact, and complement each other. For instance, many American high school students who are eligible for federal financial aid fail to attend college because of financial barriers. Although policymakers may address this problem with an "s-frame" policy that increases the amount of federal aid, doing so doesn't exclude the implementation of additional, i-frame interventions that increase individual students' likelihood of applying for such funding. Indeed, simplifying how applicants fill-out the Free Application for Federal Student Aid (FAFSA) has been shown to increase the number of applications as well as the eventual number of students who enroll in college (Bettinger, Long, Oreopoulos, & Sanbonmatsu, 2012). Because simplifying application forms (i.e., an i-frame intervention) and increasing the amount of financial aid (i.e., an s-frame intervention) are not mutually exclusive, policymakers would be wise to incorporate *both* approaches to maximize their impact. Thus, depicting i-frame and s-frame policies as dichotomous and mutually exclusive options may distract policymakers from their potential integration and, as a result, limit their effectiveness in dealing with societal issues.

Second, the i-/s-framework fails to account for the fact that not all i-frame policies are created equal. Indeed, although "i-frame" policies vary considerably in both their focus and their effectiveness, this point can be easily overlooked when they are pooled together under one broad umbrella. For instance, although some i-frame policies focus on directly changing human behavior through "nudges" and behavioral interventions, other i-frame policies focus on changing people's *hearts and minds* based on the (often erroneous) assumption that education is sufficient for inspiring lasting behavioral change. To illustrate, consider the findings of one randomized controlled trial regarding the rise of antimicrobial resistance. Although an education-based "i-frame" policy that discouraged patients from needlessly taking antibiotics was completely ineffective in doing so, an "i-frame" policy that "nudged" doctors to compare how much antibiotics they prescribe relative to of their peers (i.e., a "social comparison nudge") led to a reduction of more than 76,000 prescriptions over a 6-month period (Hallsworth et al., 2016). Similarly, although an education-based i-frame intervention that taught students about the importance of the tetanus vaccine was remarkably ineffective in increasing vaccination rates, a *behavioral* i-frame intervention that simplified the act of getting vaccinated (e.g., giving students a map of the health center and prompting them to schedule a time in advance) was much more successful (Leventhal, Singer, & Jones, 1965). Thus, lest one throws the baby out with the bathwater, strictly dichotomizing "i-frame" and "s-frame" interventions obscures critical differences *within* each type of policy.

Despite its relative ineffectiveness, changing *hearts and minds* through education-based i-frame interventions tends to be surprisingly popular. As illustrated by the $8 billion diversity training industry (Bohnet, 2016), there is a strong demand for *education-based* interventions about diversity, equity, and inclusion (DEI), despite their relative ineffectiveness in reducing workplace discrimination (Chang et al., 2019; Kalev, Dobbin, & Kelly, 2006). And, although organizations that incorporate diversity training can signal commitment to social justice (Feldberg & Kim, 2018), there are clearly better and more effective i-frame interventions for solving DEI-related problems (e.g., name-blind applications, structured interviews, longer interview lists, etc.; Goldin & Rouse, 2000; Levashina, Hartwell, Morgeson, & Campion, 2014; Lucas, Berry, Giurge, & Chugh, 2021). Similarly, although a recent meta-analysis covering 201 studies found a surprisingly negligible effect of education-based i-frame interventions on financial behaviors (Fernandes, Lynch, & Netemeyer, 2014), almost half of all US states require some form of financial literacy education in high school curricula (Council for Economic Education, 2022). Thus, although we applaud the target article for highlighting people's aversion to "s-frame" policies, more research is needed to understand people's preference for *education-based* i-frame interventions over other, more effective i-frame interventions. In

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

addition to separating "s-frame" and "i-frame" policies, future research ought to distinguish between behaviorally focused "i-frame" interventions and education-based "i-frame" interventions that focus on changing their knowledge and attitudes.

What explains people's misplaced trust in education-based i-frame interventions? In our work, we find preliminary evidence that people put a premium on changing individuals' *hearts and minds*, prioritizing interventions that target beliefs and attitudes over ones that directly target behavior. Thus, beyond people's preference for changing individuals rather than systems, they also seem to favor changing others' attitudes rather than behaviors. Accordingly, when faced with a set of potential interventions, policymakers may not only need to overcome the allure of changing individuals, but also the allure of simply educating them. Similarly, when considering public reactions to potential policies, policymakers may not only have to deal with the seeming popularity of "i-frame" interventions but also with people's pernicious enchantment with an ineffective yet surprisingly popular subset of such interventions: The "hearts-and-minds frame."

Competing interest. None.

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On Skinner's pendulum: A framework for assessing s-frame hope

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doi:10.1017/S0140525X23001048, e167

Abstract

Unsatisfied with the effects of behavioral economics' i-frame, "technology of behavior," Chater & Loewenstein call for a pendulum swing back to the s-frame, suggesting that such an approach offers a more hopeful path toward societal well-being. In this commentary, I offer a framework to think about this pendulum swing, as well as the scope – and limits – of this hope.

Scientists periodically raise alarms that everyone is doing something wrong. Indeed, B. F. Skinner's (1971) classic *Beyond Freedom and Dignity* begins this way. Although the world celebrated scientific improvements in medical, political, and housing systems, individual well-being is stalled. Skinner blamed this on science's failure to understand human behavior, writing, "Better contraceptives will control population only if people use them… Overcrowding can be corrected only by inducing people not to crowd, and the environment will continue to deteriorate until polluting practices are abandoned" (p. 4). Thus, he called for a "technology of behavior" (p. 5), which would focus on causal relationships between environments and actions, unleashing the potential of system-level advancements. In Chater & Loewenstein's (C&L's) terms, Skinner said: Let the pendulum swing away from s-frames. i-Frame science is our responsibility and our only hope.

This proposal's prescience is perhaps nowhere as evident as in behavioral economics. Rigorous investigation of the environment's effects on behavior (e.g., choice architecture; Thaler & Sunstein, 2009) has produced an i-frame science with remarkable effects across a range of systems. (Happily, this was done without sacrificing the freedom Skinner seemed ready to forego.)

Four decades later, C&L suggest that we are in danger of doing the wrong thing again. Now, the i-frame is a distraction. The s-frame is our best hope. The pendulum should swing back.

Given that we remain pessimistic about many of the same problems that Skinner lamented (Parker, Morin, & Horowitz, 2019), this hope should be welcomed. But to their credit, C&L don't obscure concerns that might trigger objections: First, s-frame efforts are expensive and slow. Will people support them? Second, corporate interests preserving s-frames are powerful. Can we aggregate enough popular support to compete? Finally, i-frame strategies have been widely deployed and celebrated (e.g., Benartzi et al., 2017). Why wouldn't we use the power of i-frames in cases where they may create positive change?

These objections are not reason for despair. Rather, answering each yields a framework that clarifies the nature of the hope the pendulum swing might offer. First, we can predict when individuals will accept s-frame policies: When a behavior creates costs and benefits that extend to others (i.e., creates high externalities), policy interventions tend to be more accepted than when costs and benefits are isolated to the individual (Fitzgerald, Lamberton, & Walsh, 2016). Second, we can predict when support will aggregate to the point that it might counterbalance corporate interests: Homogeneity regarding a behavior's desirability will support aggregation more than would heterogeneity. Analyzing behaviors based on these factors allows us to address the third objection. When low externalities and high heterogeneity make s-frame policies infeasible, we may recommend i-frame approaches with less concern that they crowd out s-frame options.

Using Table 1 to apply this framework, we understand why some s-frame policies highlighted by C&L deliver on s-frame hope. First, consider inadequate retirement savings. The majority

Table 1 (Lamberton). Framework for analyzing i-frame and s-frame potential

	Locus of behavior's costs/benefits	
	Low externalities: individual	High externalities: communal/societal
Homogeneous perception of desirability	Exercise i-Frame approach: *Exercise nudges* s-Frame approach: *Community bike lanes*	Inadequate retirement savings s-Frame approach: *Pension reform*
Heterogeneous perception of desirability	Snacking i-Frame approach: *Nutrition information display*	Indoor smoking s-Frame approach: *Indoor smoking ban*

of US citizens see retirement accounts as desirable, and the costs of retirement-age insolvency to society are clear (Institute of Medicine, 2012). As such, this behavior falls in the upper-right quadrant; s-frame policies will be seen as acceptable and capture broad support. Thus, it is unsurprising that s-frame pension reform has been successful, as described in C&L (target article, sect. 2.2, para. 19).

As a contrasting example, consider snack choices. Rarely do we see personal snack choices as societally relevant – few externalities are salient. Further, the desire to restrain consumption is heterogeneous (Polivy, Herman, & Mills, 2020); not everyone regrets the choice of cake over fruit salad (Vosgerau, Scopelliti, & Huh, 2019). Thus, snacking falls in the lower-left quadrant. In this case, the *mea culpa* regarding i-frame work may be unwarranted. Effects may have been chilled because of the inhospitable system in which i-frame approaches were used, but experimenting with the display of nutritional information (Downs, Loewenstein) on snacks did not likely block a viable path to systemic change.

As a third example, consider exercise. Exercise's desirability has been broadly institutionalized (US Department of Health & Human Services, 2021), and the decision to exercise is driven by individual, not communal, self-determination (Ng et al., 2012). Thus, we may say that exercise falls into the upper-left corner. Here, i-frame interventions should resonate, whereas costly s-frame policies may receive less support. But if people agree that exercise is desirable, there is also hope for a certain type of s-frame policy: Those that can be undertaken without undermining individuals' personal cost–benefit assessment. For example, local governments may create bike lanes through s-frame policies, offering gains in well-being with only very diffuse personal cost. Doing so may, in turn, maximize the effectiveness of i-frame interventions.

Finally, consider indoor smoking bans, an s-frame "success story." This framework places indoor smoking in the lower-right quadrant. As C&L note, decades of research and government leadership made the undesirability of second-hand smoke obvious and the shared costs of the behavior clear. Thus, support for s-frame changes aggregated sufficiently to counter corporate interests, and the policy-level intervention was supported. Here, i-frame interventions alone would have nibbled around the edges, keeping policymakers and researchers from the focus on the s-frame that this behavior required.

This framework is only offered as a starting point; more questions may exist than answers. Where do behaviors fall? What shapes perceptions of externalities? How should we evaluate s-frame research's effects? In another four decades, we will know enough to decide again that some pendulum should swing differently. In the meantime, though, we have the responsibility – and the hope – to move beyond our entrenched s-frames. If we fail to do so, we may say more about our beliefs about our work's externalities and desirability than we do about science itself.

Financial support. This research received no specific grant from any funding agency, commercial, or not-for-profit sectors.

Competing interest. None.

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It's always both: Changing individuals requires changing systems and changing systems requires changing individuals

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https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

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doi:10.1017/S0140525X23001164, e168

Abstract

s-Frames and i-frames do not represent two opposed types of intervention. Rather they are interpretive lenses for focusing on specific aspects of interventions, all of which include individual and structural dimensions. There is no sense to be made of prioritizing either system change or individual change, because each requires the other.

We suspect others will stress that what Chater & Loewenstein (C&L) call s- and i-frame interventions are more complementary than they acknowledge. For example, vaccine mandates – a putatively s-frame intervention – may be more effective when combined with i-frame, text-based nudges (Patel et al., 2022). We wholeheartedly support research on complementarity between light-touch nudges and systemic reforms (Brownstein, Kelly, & Madva, 2022; Kelly, Faucher, & Machery, 2010; Madva, Kelly, & Brownstein, 2023; Milkman et al., 2021; Sparkman, Attari, & Weber, 2021). Although C&L gesture toward valuable forms of complementarity (target article, sects. 3.1–3.3), they systematically overlook a theoretically richer and practically more important set of interrelations between individuals and systems.

First, s- and i-frames are literally frames, not two opposed types of intervention. They are interpretive lenses for focusing attention on specific aspects of interventions. C&L treat nudges as paradigmatic i-frame interventions, but they could just as easily see them through the s-frame. Nudges change the structures within which individuals make choices – their choice *architecture* – rather than persuading individuals directly. Conversely, sugar taxes (an ostensible s-frame intervention; target article, Table 1) can be considered through an individualist lens; such taxes "responsibilize" (Shamir, 2008) obesity by shifting the burden of food choice to individuals – usually the most price-sensitive individuals with the fewest affordable, healthy options.

Thus C&L's taxonomy, despite its intuitive appeal, is ill-conceived. The "i-frame" collapses light-touch interventions like calorie labels with deep and thoroughgoing changes to beliefs, values, and habits. The "s-frame" collapses policy distinctions between carrots, sticks, taxes, bans, subsidies, and handouts – a motley crew that includes plastic-bag bans, health-food subsidies, changes to building codes, and nationwide overhauls to wealth redistribution and universal healthcare. This dichotomy seems gerrymandered to portray i-frame interventions as merely subsidiary, almost ornamental aids to "far more important" system change (target article, sect. 2.3, para. 5). "The *real* problem," C&L write, "lies not in human fallibility, but in institutions, laws, and regulations that render such fallibility irrelevant" (target article, sect., 3.0, para. 5, emphasis added). Given this, "behavioral scientists should prioritize applying behavioral insights to s-frame reform" (target article, sect. 1.0, para. 28).

Depicting i- and s-frames as opposed interventions leads to two foundational problems. The first is incoherence, as if one frame only regards individual behavior (and not the systems guiding that behavior) whereas the other only regards systems (rather than the individuals guided by those systems). Both taxes and nudges are changes to structures, themselves enacted by individuals, and designed to change individual behavior. Like all interventions, both involve individual and structural components. Acknowledging this doesn't forestall comparisons between interventions. It forces more productive comparisons regarding which interventions to compare, and how. One researcher might compare a carbon tax to a renewable-energy subsidy. Another might compare nudges to use less electricity to nudges to join local climate advocacy groups. The first compares two financially impactful policies, the second two nudges. Both comparisons can incorporate i-frame and s-frame questions. An i-frame question: Will individuals understand the tax better than the subsidy? An s-frame question: Which nudge will have stronger system-altering effects? We therefore acknowledge the practical utility of distinguishing individual from structural factors. Both are relevant to assessing interventions. A truly complementary approach will try to determine which bundles of structurally enabled, individually enacted, system-changing, choice-shaping packages are most effective and just, given their aims. It will not, however, contrast carbon taxes – seen purely as a policy change – to nudges discouraging electricity consumption – seen purely as attempts to change individual behavior.

The second foundational problem is that calls to prioritize system change over individual change are self-undermining. C&L nowhere acknowledge that changing laws, institutions, and social systems requires a critical mass of individuals – citizens, activists, politicians – to understand and desire system change. C&L's oppositional, either/or treatment thus obscures how nudges, education, and persuasion campaigns can be effective tools for boosting citizens' willingness to become politically active and support structural change. Elsewhere we've called for cultivating "structure-facing virtue": the *individual-level* disposition to know about, care about, and take action to *change systems* (Madva, 2019; Madva et al., 2023).

Consider, by contrast, C&L's passing shot at growth-mindset research encouraging students to think differently about individual-level traits like intelligence (target article, sect. 2.5, para. 3). C&L neglect to mention that students can adopt growth mindsets toward systems. Encouraging the belief that systems can change motivates individuals to change them (Johnson & Fujita, 2012; Stewart, Latu, Branscombe, & Denney, 2010). In fact, C&L implicitly acknowledge the importance of shaping how individuals think about systems when they recount corporations' devastating, wide-ranging, decades-long campaigns *to shape public thinking* to maintain the status quo. Corporations have poured staggering resources into coaxing people into embracing ideologies of personal responsibility to keep existing systems in place. Should we let corporations continue to brainwash us unfettered, or should we rigorously explore tactics for individuals to resist these ideologies?

Properly appreciating how s- and i-frames guide attention can facilitate a more comprehensive grasp of the factors contributing to social stability and change. We're sympathetic to C&L's speculation that undue academic attention to certain nudges has played some (unquantifiable) role in impeding various policy reforms. Yet C&L ignore a similarly plausible hypothesis running in the opposite causal direction: *Failed* efforts to change systems may drive researchers to explore reforms that can actually be put into and kept in practice. Gun control (target article, sect. 2.5.6) represents an agonizingly obvious example. Overwhelming majorities of Chicago's citizens and scientists prefer and have repeatedly sought impactful gun regulations. Their efforts have fallen short not because they discount s-frames but because of permissive gun laws in surrounding states, Supreme Court

decisions, and other factors beyond Chicago's control. Facing these obstacles to system change, what would C&L have Chicagoans do? Keep passing new laws for the Supreme Court to overrule? Invade Indiana and seize its guns? All things considered, Chicagoans have powerful enduring reasons to squeeze as much juice out of individual change as they can.

Of course, neither Chicagoans nor anyone else should quit pursuing policy change. Rather, debates about prioritizing changing people or changing policy should give way to investigations of how individuals, who are themselves shaped by social systems, can most effectively work together to understand, attend to, criticize, and change those systems when justice demands it.

Financial support. This research received no specific grant from any funding agency, commercial, or not-for-profit sectors.

Competing interest. None.

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Using effective psychological techniques to subvert a US sociopolitical context

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doi:10.1017/S0140525X23000869, e169

Abstract

Chater & Loewenstein argue for a shift in focus from individual- to structural-level approaches to societal ills. This is valid and important but overlooks the barriers inherent in the current US partisan context. Psychology can be applied to help people of mixed allyship join together, to effectively and quickly force institutions and corporations to accept structural change.

Chater & Loewenstein argue that the most efficient way to address pernicious problems like climate change is through structural and policy solutions over individual-level behavior change. Institutions and corporations often emphasize the role of the individual to avert responsibility for their externalities and maximize profits. For example, in 1953 beverage manufacturers created the first "greenwashing" campaign, "Keep America Beautiful," to shift responsibility for litter and pollution from single-use items onto consumers, while opposing legislation aimed at limiting such packaging (Corkery, 2019).

Policies are indeed efficient and effective, particularly when accompanied by mechanisms for compliance. However, top-down solutions are difficult to enact in strongly partisan nations like the United States, where corporations are people – people who can fund elections. For example, corporations donated seven times more to Republican than Democratic candidates in the 10 years following *Citizens United* ($282 versus $38 million; Lund & Strine, 2022), often to avoid regulations that protect human and environmental health.

Psychology as a field clearly favors individual-level solutions. There are over 17,000 articles in Google Scholar from the past 20 years that mention increasing individual recycling, many of which point to structural barriers that obscure how people are supposed to recycle (De Young, 1990; Roy, Berry, & Dempster, 2022). We can, however, employ psychology and its individual-level tactics to force institutions and corporations to make hard choices, for good. This is particularly true for corporations that are virtually agnostic as to their products, as long as they are lucrative. When people vote with their wallets, corporations follow. Public outrage, cancel culture, whistleblowing, and consumer trends abound in the United States and exemplify how quickly things can change when people demand it, particularly in a modern, media-rich environment.

Fast and large changes can also be enacted by passionate and informed individuals who come armed with compelling data and suggestions for policy (Amel, Manning, Scott, & Koger, 2017). For example, detailed and scientific descriptions of toxic pollutants in Rachel Carson's *Silent Spring* inspired many in the 1960s to fight for environmental protection; she is credited with the formation of the Environmental Protection Agency (Lewis, 1985). Ralph Nader published *Unsafe at Any Speed* in 1965, which led to congressional hearings, followed by automobile safety laws and the creation of the *National Traffic and Motor Vehicle Safety Act* of 1966 (Quazi, 1998). Such leaders are, in part, effective because of the collective action they inspire in larger grassroots movements (Amel et al., 2017).

Collective action is most effective when it becomes salient to the average person, through widespread media attention about well-known (and left leaning) companies, with accessible forms of participation (Banerjee, 2020; Bartley & Child, 2011; King & Soule, 2007; Leizerov, 2000; McDonnell, King, & Soule, 2015). For example, in 1999 Nike suffered one of the first outcries over sweatshop labor: protests at over 40 universities moved Nike to create a code of conduct for working conditions and audit compliance (McDonnell et al., 2015). Subsequently, a student

organization posted information online, protested on campuses, and engaged administrators causing multiple strike leaders to be reinstated at Nike, which also had to disclose the location of factories making university apparel (Carty, 2002). In 1999, Intel was pressured by privacy advocates to remove personal serial numbers (PSNs) from their processor through internet activism, which included pre-written email signatures and letters to CEOs (Leizerov, 2000). More recently, Target was pressured by the LGBTQ+ community to cease campaign finance contributions to antigay candidates through online videos and a Facebook boycotting group (Friedman, 2010), with 55,000 members.

Costly action is often inspired by empathy for those in distress, including strangers, other species, and the natural environment (Bickel & Preston, 2023; Preston & de Waal, 2002; Preston & Gelman, 2020). For example, a confederate flag flew at the South Carolina statehouse for 77 years through decades of protest but was quickly removed after a large protest regarding the killing of nine Black churchgoers (Holpuch, 2015). In 2015, a marine biology PhD student Christine Figgener posted a video depicting the removal of a plastic straw from a sea turtle's nose, which has been viewed 200 million times. The video struck a chord with viewers who could feel the turtle's pain as they forcibly pulled the embedded straw out with pliers for minutes while the turtle bled and cried out. Subsequently, Seattle (and Starbucks) eliminated plastic straws, which is minor on the scale of ocean plastic but still amounts to a billion straws per year at Starbucks alone (Rosenbaum, 2018). In both cases, a situation that brewed for decades finally came to a head when people's empathic response was elicited by the suffering of salient others.

Empathy for vulnerable others is one of the most powerful motivators of costly action (Bickel & Preston, 2023). Altruism is often inspired by helpless or vulnerable others who need immediate aid, when observers predict a successful response; this is because of our inheritance as a species that protects slowly developing offspring for an extended period (Preston, 2013, 2022). Positive states also inspire action in social, group-living species like humans, including social affiliation, belonging, beauty, and awe (Hauser, Preston, & Stansfield, 2014; Preston et al., 2021; Shiota, Papies, Preston, & Sauter, 2021). These affective biases are adaptive because they compel us to help those closest to us, in situations that matter, while limiting risk. Conversely, pernicious situations like climate change fail to inspire action specifically because they vastly exceed the human scale.

We recognize the authors' argument that system-level change is necessary to address the problems that society faces. We hope to add to the conversation about how such change can be achieved, even in our current political climate. Psychology can be applied to help people compel institutions and corporations to enact systemic change. Multisensory imagery and narratives can induce elevating and prosocial states, which are most effective alongside tactics that lower the bar for participation, nudge desired responses, and excite people to join the fight. Solutions work best, like people, together.

Competing interest. None.

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Expectations, opportunities, and awareness: A case for combining i- and s-frame interventions

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https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

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doi:10.1017/S0140525X23000997, e170

Abstract

We argue that: (1) disappointment in the effectiveness of i-frame interventions depends on realistic expectations about how they *could* work; (2) opportunities for system reform are rare, and i-frame interventions can lay important groundwork; (3) Chater & Loewenstein's evidence that i-frame interventions *detract* from s-frame approaches is limited; and (4) nonetheless, behavioural scientists should consider what more they can contribute to systemic reforms.

Chater & Loewenstein's (C&L's) conclusion that the effects of "i-frame" interventions have been disappointing depends on assumptions about their potential effectiveness. An oversimplified conception of individuals as passive actors – averse to mental effort and reliant on "automatic" responses – is likely to lead to unrealistic expectations regarding what i-frame solutions can achieve. An account that sees agents as active participants making decisions within varied choice environments lends itself towards more realistic expectations (and conclusions) about what can be achieved by i-frame solutions (Hertwig & Grüne-Yanoff, 2017; Newell & Shanks, 2023; Sher, McKenzie, Müller-Trede, & Leong, 2022).

Several commentators have noted that – because of the heterogeneity of policy problems, interventions, populations, and target outcomes – a more nuanced assessment of effectiveness is required. For instance, Simmons, Nelson, and Simonsohn (2022) conclude that considering only the *average* effect of nudges can obfuscate the effects of *particular* nudges (see also Hallsworth, 2022). Although DellaVigna and Linos (2022, p. 83) found an average impact of 1.4 *percentage points* (not per cent, as reported by C&L) over a control group take-up of 17.3 per cent, the usefulness of such an average when predicting the effectiveness of specific nudge interventions is questionable.

Notwithstanding contentions regarding the impact of i-frame interventions, the critical question is whether, overall, such interventions do *harm* by detracting from s-frame policies. Although this may *sometimes* occur – and so C&L provide a salutary warning – the case studies did not fully convince us of the extent of the problem. For example, although the BP carbon footprint campaign may have been successful in undermining efforts for systemic responses to climate change, we are unsure whether those efforts were *further* undermined by the i-frame interventions of behavioural scientists.

Moreover, because opportunities for systemic reform only occur infrequently (for instance, following a change of government, a policy review, or a major system failure), there are lengthy periods where important but less dramatic policy improvements can be made, and where there are limited i-/s-frame trade-offs because there is little political support or momentum for broader reform.

For instance, the Australian Government's central behavioural policy team, BETA, has worked on a wide range of i-frame interventions related to the details of regulatory design such as: Consumer bills or activity statements, product labels, consumer information sheets, and registration processes. These measures are pertinent because they all work within the existing regulatory framework and thus could detract from broader s-frame changes to that framework. In our judgement, however, this was rarely if ever the case.

Indeed, in some instances, i-frame interventions supported broader, systemic changes. For example, to combat harm from online wagering, Australian federal, state, and territory governments adopted a national framework that included prohibitions on lines of credit, inducements, and advertising of payday lending (Australian Government, 2018). It also included measures to help individuals manage their gambling, such as a requirement that customers receive meaningful activity statements from online gambling providers. A collaboration between academics and government officials tested statement designs on a simulated gambling platform and found the statements had a modest but material impact on the amount bet (Australian Government, 2020).

Such instances of i-frame solutions being introduced as part of broader systemic change question conceptions of i- and s-frame solutions as competing with one another. C&L, in their discussion on how s-frame reforms reduced smoking in the United States, point out that some policy solutions (i.e., mandated changes to package labelling) have an i-frame "flavor" thereby highlighting that delineations between the two frames can be somewhat artificial. Meaningful change is likely to emerge through a combination of changes to both the system itself and to the interface between the individuals and the system; as both represent a change to the environment in which decisions are made; they are likely to blend together as part of a battery of solutions aimed at a particular problem.

Furthermore, there are numerous i-frame interventions that do not compete with s-frame reforms. For example, employers have an important but challenging role in supporting workers to return to work after an extended illness or injury. Workplace regulations (system-level policies) alone are insufficient because supporting the return to work is an infrequent and atypical management challenge. Consequently, well-designed, timely materials for managers are likely to improve the return-to-work experience, without undermining any system-level reforms in the process (Australian Government, 2019, 2022). We expect that C&L would not quarrel with such work but we feel it deserves greater attention.

Nevertheless, we agree that behavioural scientists should consider how they can contribute to systemic reforms. We offer several suggestions that build on those offered by C&L. First, modesty – behavioural scientists should not overhype the potential impact of i-frame interventions beyond what is justified by their typically modest results. This will reduce the risk that i-frame interventions detract from broader s-frame measures. Second, trade-offs – behavioural scientists should be mindful of any trade-offs between i-frame and s-frame initiatives because of the political context or scarcity of academic or bureaucratic resources. Third, the stalking horse – working with government agencies on i-frame interventions can provide behavioural scientists with a valuable avenue to advise on behavioural insights relevant to systemic reforms. For example, designing consumer comparison sites may reveal complexity in financial products that the comparison site cannot readily simplify, and where regulation may be warranted. Fourth, problem diagnosis – BETA and other behavioural policy units have already contributed to s-frame interventions through better diagnosis of the policy problem. As C&L suggest, there is likely more that behavioural scientists could contribute here.

A final thought is the role that i-frame interventions can play in simply raising awareness in the general public of the need for behaviour change, and in turn increasing the potential for the public to support (i.e., vote for) system-wide reforms. Returning

to the carbon-footprint example, the evidence that carbon-footprint calculators actually reduce personal emissions is limited and mixed (Dreijerink & Paradies, 2020), but knowledge about how our personal actions *can collectively* make a difference in tackling environmental problems can be a powerful motivator for supporting proenvironmental action (Newell & Moss, 2021; Xie, Brewer, Hayes, McDonald, & Newell, 2019).

Disclaimer

These are Mr Greenwell's personal views and do not reflect the views of his employer, or the Australian Government.

Financial support. Funding from the Australian Research Council (DP1901675) is gratefully acknowledged.

Competing interest. None.

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Behavioral market design

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doi:10.1017/S0140525X23001139, e171

Abstract

When it comes to behavioral change, economic design and behavioral science are complements, not substitutes. Chater & Loewenstein give examples from policy design. In this commentary, I use examples, often from my own research, to show how behavioral insights inform the design of the rules that govern market transactions.

Many economic and social challenges, such as climate change, pandemics, and energy crises, require behavioral change. One approach is to use behavioral insights to influence people directly, and another is to change incentives through institutional design. In *behavioral market design* (Bolton & Ockenfels, 2012; Ockenfels & Rees-Jones, 2023), the two approaches feed off each other.

Auction design is one example. For instance, auctions such as eBay exhibit a lot of sniping (last-minute bidding), which hampers the market efficiency. Sniping is not easily explained by simple textbook economics, because eBay's proxy bidding system ensures that the highest bid wins at the "lowest possible price," regardless of the timing of the bid. Although there may be many reasons why bidders bid in the last minute, the data suggest that the interaction of "naïve" incremental bidding and the strategic response of sophisticated bidders to naïve bidding contributes to the phenomenon. Market design to eliminate sniping and to protect naïve bidders relies on such behavioral insights (Roth & Ockenfels, 2002; Ariely, Ockenfels, & Roth, 2005; Chen, Cramton, List, & Ockenfels, 2021 as well as Ockenfels & Roth, 2013 provide surveys).

Economic design frequently addresses cognitive limitations and considerations that go beyond financial gain and economic efficiency, such as privacy, fairness, and regret aversion. Exciting work at the intersection of economic design, computer science, and behavioral science – sometimes involving human subject experiments to test market innovations (Chen et al., 2021; Ockenfels, 2009; Roth, 2008, 2013) – attests to the complementarities between economic design and behavioral science (e.g., Bergemann, Breuer, Cramton, Hirsch & Ockenfels, 2023; Bichler, Ewert, & Ockenfels, 2023; Kearns & Roth, 2019; Meta Fundamental AI Research Diplomacy Team (FAIR) et al., 2022).

Market rules that harness human behavior can improve market outcomes. For instance, the sharing economy relies on people's willingness to provide honest feedback about their transactions to other market participants through "feedback systems." Feedback systems can suffer from free riding (no feedback) and low information value (feedback that is too compressed or biased). Behavioral science shows that promoting altruistic punishment and preventing counter-punishment is central to cooperation (Fehr & Gächter, 2000; Nikiforakis, 2008; Ostrom, Walker, & Gardner, 1992). Bolton, Greiner, and Ockenfels (2013) show how this can be achieved in feedback systems by changing the rules by which feedback information flows through the market, leading to more accurate reputation information, more trust, and more efficient trading. In response to such insights, eBay supplemented its old two-sided feedback system with a one-sided system (called "detailed seller ratings"), Airbnb created a blind feedback system where transaction partners cannot see each other's feedback until they have left their own, and Uber makes it difficult for passengers to identify a particular feedback giver (e.g., Bolton, Greiner, & Ockenfels, 2018, 2020, 2023; Fradkin, Grewal, & Holtz, 2019).

Nonsimultaneous chains in kidney exchange are another example where economic design relies on people's willingness to cooperate. Selfishness would suggest that people renege on their commitment once their intended donor gets a kidney, but this is a rare event, and market design relies on this to make kidney exchange work at scale (Ashlagi, Gilchrist, Roth, & Rees, 2011; Kute et al., 2021).

Cooperation is also key for successful climate policy. Chater & Loewenstein explain the limits of nudging individual climate action (also Berger et al., 2022). Individual climate action – as opposed to collective action – is often offset by crowding out and leakage effects, which in turn can interact with the design of climate markets. For example, because the cap in cap-and-trade markets determines total carbon dioxide (CO_2) emissions, nudging people to reduce their electricity consumption does not reduce emissions; it only reduces the CO_2 price. Choice architects sometimes fail to recognize this market-level leakage effect. Institutional architects, on the other hand, sometimes fail to take advantage of voluntary individual climate action when designing incentives (Ockenfels, Werner, & Edenhofer, 2020). Research at the interface of design and behavior may more effectively help promoting cooperation, for example by illustrating that reciprocity can be built into the design of climate negotiations (Cramton, MacKay, Ockenfels, & Stoft, 2017; Schmidt & Ockenfels, 2021).

One important way in which institutions are shaped is by people's attitudes about the appropriateness of market transactions. For example, selling kidneys for transplantation or trading university admissions is illegal in most countries (Roth, 2007) and voters often oppose carbon pricing (Dechezleprêtre et al., 2022). Also, in crises such as a pandemic or extreme energy shortages market mechanisms are sometimes seen as unfair or repugnant. For example, vaccine markets fail in part because the role of price in allocating vaccines is severely limited.

Finding institutions that avoid or mitigate these kinds of objections may determine the extent to which societies succeed or fail in dealing with the challenges of our time. A stream of recent research at the design–behavior interface is thus concerned with understanding the empirical nature of such behavioral constraints (Ambuehl, 2017; Ambuehl, Bernheim, & Ockenfels, 2021; Berger, Ockenfels, & Zachmann, 2023; Kölle, Kübler, & Ockenfels, 2023; Leider & Roth, 2010; Schneider et al., 2023). Another literature develops mechanisms that are consistent with the constraints imposed by attitudes about appropriateness. These include many well-known examples of markets without prices – matching markets – and "behaviorally robust" and ethically acceptable markets for crisis management (Cramton, Ockenfels, Roth, & Wilson, 2020; Kremer, Levin, & Snyder, 2020; Ockenfels, 2021, 2022; Prendergast, 2017; Roth, 2002, 2007).

Many economic and social challenges require changes in behavior. Behavioral change, in turn, requires knowledge about how people and institutions respond to each other. There have been some exaggerated claims about the role of choice architecture as a solution to major economic challenges, and about the role of experimental economics in market design. However, an increasing number of case studies and a rapidly growing demand for research at the intersection of economic design and behavioral science show that a careful merging of these research fields can pay great dividends.

Acknowledgments. I thank Al Roth and Sebastian Berger for very useful comments.

Financial support. Support by the German Science Foundation through Germany's Excellence Strategy (EXC 2126/1 390838866) and through the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation program (grant agreement No 741409) is gratefully acknowledged.

Competing interest. None.

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Misdiagnosing the problem of why behavioural change interventions fail

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doi:10.1017/S0140525X23001085, e172

Abstract

Routes to achieving any sort of meaningful success in the enterprise of behavioural change requires an understanding of the rate of failure, and why failures occur. This commentary shows that there is more to diagnosis of failures than fixating on micro- rather than the macro-level behaviours.

The reasons for why behavioural change interventions keep failing are multifaceted, and this is an important motif that runs through this commentary, and less so in the target article. The diagnosis it offers as to why behavioural change interventions are doomed to fail is that behavioural scientists are focusing on the wrong unit of analysis. Just like economists and social workers do, we first need to acknowledge micro (individual – or "i-frame"), mezzo (group), and macro (population – or "s-frame") level differences in behaviour. By shifting away from micro straight to macro level we have a better chance of unlocking the potential of behavioural change interventions, and at the same time avoid doing the bidding of private sector organisations.

First, researchers had already highlighted the serious problems involved in fixating narrowly on fitting an intervention to a target behaviour while neglecting the wider context where both are couched in (Meder, Fleischhut, & Osman, 2018). This is also where we begin to understand that a thorough diagnosis of failure requires a multidisciplinary approach.

Second, by focusing on where successes lie, we focus less on how they fail, how often they fail, and where they fail (Hummel & Maedche, 2019; Osman et al., 2020). By making inroads to classifying the many types of failures that have been documented (Osman et al., 2020), we can start to address these outstanding issues. Moreover, by doing this we can open up opportunities to work with decision sciences, data scientists, and social scientists to understand and explain why behavioural change interventions fail when they do, and what success realistically looks like (Cartwright & Hardie, 2012). A unifying causal analytic approach can help to build theories and new empirical practices (Bryan, Tipton, & Yeager, 2021; Osman et al., 2020) that can uncover which combinations of interventions can work (e.g., Osman et al., 2020).

Third, because we are offering practical solutions to public policy problems, such as those offered in Tables 1 and 2 of the target article, as applied by behavioural scientists, we confront the world of policy making. Maintaining a naïve understanding of the science–policy interface, where accessibility of evidence is viewed as a key to successful implementation (Reichmann & Wieser, 2022) is a considerable barrier to estimating realistic success rates of behavioural change interventions. We might think that the use of evidence works through what is often referred to as the policy cycle – agenda setting, policy formation, decision making, policy implementation, and policy evaluation (Lasswell, 1956). But public policy, public administration, and political science research show that this is ideal, and that there are at least six different competing characterisations of the policy-making process, and in each the uptake of scientific evidence is far from linear (Cairney, 2020). So, to inform public and social policy making, behavioural scientists need to at least acknowledge the considerations of the policy issues that need addressing from the perspective of those that are likely to be implementing the behavioural interventions.

Scientific progress depends on acknowledging failure, and the target article is an honest account of the limitations of past efforts to achieve behavioural change. However, viable solutions will depend on an accurate characterisation of the aetiology of the failings, along with a new theoretical account that sets the foundations for new theorising and empirical investigations.

Competing interest. None.

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An inconvenient truth: Difficult problems rarely have easy solutions

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doi:10.1017/S0140525X23000882, e173

Abstract

Individual-level interventions are often interesting and easy to implement, but are unfortunately ill-equipped to solve most major global problems (e.g., climate change, financial insecurity, unhealthy eating). Resources spent developing, pursuing, and touting relatively ineffective i-frame interventions draw resources away from the development and implementation of more effective s-frame solutions. Behavioral scientists who want to develop solutions to the world's biggest problems should focus their efforts on s-frame solutions.

Chater & Loewenstein's (C&L's) target article has generated an invaluable conversation about behavioral science's future. They make two incisive observations. First, behavioral scientists' i-frame interventions to tackle global challenges have been oversold. They will not move the needle on issues like climate change, income inequality, and unhealthy diets. Second, although well-intentioned, behavioral scientists studying i-frame interventions have inadvertently advanced corporate interests that vehemently oppose far more effective structural solutions. For these reasons, I agree that behavioral scientists should shift their focus away from i-frame interventions because doing so is at best having limited impact and at worst causing harm.

Some disagree with C&L on the grounds that we need both i-frame and s-frame solutions. But first, how do the two differ? In my view, an i-frame intervention is designed to shift the behavior of *individuals*, whereas an s-frame intervention is designed to shift the behavior of *populations*. s-Frame interventions are typically light touch or heavy-handed. For example, an energy company sending mailers comparing people's energy use to their neighbors is an i-frame intervention designed to address climate change. Governments mandating that companies do so is "s-frame-light." In contrast, a government carbon tax to curb fossil-fuel emissions is s-frame and will produce larger effects than the other approaches. So why not pursue all three? Can't we push for a carbon tax, while identifying behavioral interventions to get people to use less household energy? And given that many structural solutions may never be realized, shouldn't we focus on doable i-frame interventions?

Obviously, it is possible to pursue all three paths. But it is not possible to *focus on* or *emphasize* all three paths. Attentional and physical resources are limited. A researcher spending time investigating or promoting an i-frame solution is not spending that time investigating or promoting an s-frame solution. Funding dollars spent on i-frame research is not spent on s-frame work.

The focus on i-frame solutions is even more harmful than it sounds. The TED talk, op-ed, or podcast offering quick, sexy fixes to major societal problems is exciting. The truth, that many of our biggest problems require unsexy and politically difficult solutions, is less exciting. As a result, funders, policymakers, aspiring celebrity scientists, and concerned citizens are more motivated to believe in the promise of i-frame solutions than s-frame ones. Corporations that help drive our biggest societal problems (e.g., food companies that make and market unhealthy foods) are also more likely to promote i-frame solutions because they do not threaten their bottom lines. Further, they delight in the popularity of research that encourages people to view issues like unhealthy diets, climate disasters, and financial insecurity as matters of personal responsibility that must be dealt with by empowering individuals to exert greater self-control.

So where does this leave behavioral scientists who want to help solve global challenges? Typically, scientists ask questions they are curious about and that other scientists find interesting. This approach works well if you want to learn something about human psychology or offer self-help ideas or treatments for people. But if your goal is to contribute population-level solutions (which are required for most big challenges), a scientist must begin the research process by asking: (1) What is known about the problem drivers, (2) what has been tried, and (3) what solutions are most promising? Answering these questions will often require engaging content experts. If many i-frame interventions have proven unsuccessful and structural forces drive the problem, it becomes hard to justify continued pursuit of those interventions. For example, for the past 50 years, researchers have tested many i-frame solutions for unhealthy dietary habits that contribute to cardiovascular diseases and type 2 diabetes (Brownell, 2010). During that time, the problems have only gotten worse. There is now consensus across major health organizations and governments that structural changes to food environments are needed to improve diets. Therefore, *if* behavioral scientists want to generate solutions to this public health crisis, they should not invest deeply in i-frame interventions. There are cases where i-frame solutions may work for specific and well-defined behavioral challenges. For example, changing an electronic health record default from the prescription of costly brand name drugs to generic ones increased prescribing of more affordable generic drugs from 75 to 98% (Olshan, Rareshide, & Patel, 2019). *If* institutions widely adopt such practices it can positively influence a population, but scalability is hard to achieve.

Although pressing societal problems are rarely solved with easy-to-implement design changes, there is a clear role for behavioral scientists to advance knowledge on s-frame solutions.

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

Experiments can simulate structural policies to understand whether they work and how they can be altered to increase impact. For example, randomized controlled experiments with individuals can test whether a guaranteed income policy might improve financial security and health or have potential unintended consequences.

It is also important to recognize that some i-frame approaches can produce or undergird more significant s-frame change. C&L view interventions like conflict of interest disclosures and information provision strategies (e.g., restaurant menu calorie labeling) as i-frame. But this view is incomplete. For example, Chile has a law requiring foods high in salt, sugar, and fat to display stop-sign-shaped warning labels on their packaging. Although these labels can help individuals change their eating habits, this policy mandate dramatically altered the food choice context by making the toxicity of the food supply highly salient. This mass education effort might increase support for other s-frame policies. Further, the labeling system facilities the implementation of s-frame policies. Foods displaying warning labels in Chile cannot be sold in schools or advertised during children's television programing, and these policies have produced meaningful reductions in sugary drink and unhealthy food sales (Taillie et al., 2021; Taillie, Reyes, Colchero, Popkin, & Corvalán, 2020).

C&L have prompted valuable self-reflection. The behavioral sciences can and should inform the design of s-frame solutions for global challenges. But it requires a deep understanding of the problems, partnering with change agents (e.g., policymakers, advocates) who have policy knowledge, and committing to using our powerful tools to advance s-frame solutions *instead* of i-frame ones.

Competing interest. None.

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The psychology and policy of overcoming economic inequality

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doi:10.1017/S0140525X23001103, e174

Abstract

Recent arguments claim that behavioral science has focused – to its detriment – on the individual over the system when construing behavioral interventions. In this commentary, we argue that tackling economic inequality using both framings in tandem is invaluable. By studying individuals who have overcome inequality, "positive deviants," and the system limitations they navigate, we offer potentially greater policy solutions.

Economic inequality is a major global burden with perpetually negative individual and population consequences (Chancel &

Piketty, 2021). Greater income inequality correlates with lower life expectancy (Chetty et al., 2016b), suppressed economic growth (Bivens, 2017), and wider political polarization (Voorheis, McCarty, & Shor, 2015). More than 70% of the global population reside in countries where inequality is rising, exacerbating risks of conflict and slowing economic development (United Nations, 2020).

Policies addressing economic disparities directly through redistributive welfare programs or financial incentives (Barrientos, 2019) have potential to improve population well-being (Thomson et al., 2022). However, most have failed to mitigate growing wealth gaps and need to be integrated with other substantive efforts (Millán, Barham, Macours, Maluccio, & Stampini, 2019). Interventions are typically developed on the perspectives of economists and legislators, which often comprise condensed geographic and socioeconomic viewpoints (Bureau of Labor Statistics, n.d.). Thus, most policies fail to consider true behaviors and challenges of those who have successfully overcome significantly disadvantaged circumstances. Study of these "positive deviants" would better equip policies to support sustained and meaningful upward economic movement (Ruggeri & Folke, 2022).

Chater & Loewenstein provide a valuable opportunity to incorporate this thinking by differentiating systems (s-frame) and individuals (i-frame) in policies. In this commentary, rather than critique or debate that framing, we propose the tremendous potential for impact by incorporating both when designing policies to reduce economic inequality.

Consider how the COVID-19 pandemic added barriers globally to overcoming inequality while disproportionately burdening low-income individuals. The bottom 20% of earners in 2021 were nearly 7% lower than projected before 2020 (Sidik, 2022). Using data from a 60-country study ($n = 12{,}930$) on temporal discounting (Ruggeri et al., 2022), we classified 12.5% of participants as positive deviants (low-income childhoods yet healthy financial decision makers as adults). Figure 1 highlights how positive deviants were less likely to have been negatively affected economically during the pandemic than the 16.9% that remained low income as adults. Such patterns illustrate the benefits of upward movement (i.e., resilience against crises) and the self-perpetuating harms of economic inequalities (i.e., poverty increases financial vulnerability in a crisis).

The pandemic catalyzed a proliferation of redistributive initiatives, yet evidence of their substantive effects toward alleviating disparities is mixed. This is not unique to COVID policies: Table 1 summarizes major policies that lacked measurable impact on the trajectory of inequality. This is not a criticism of the

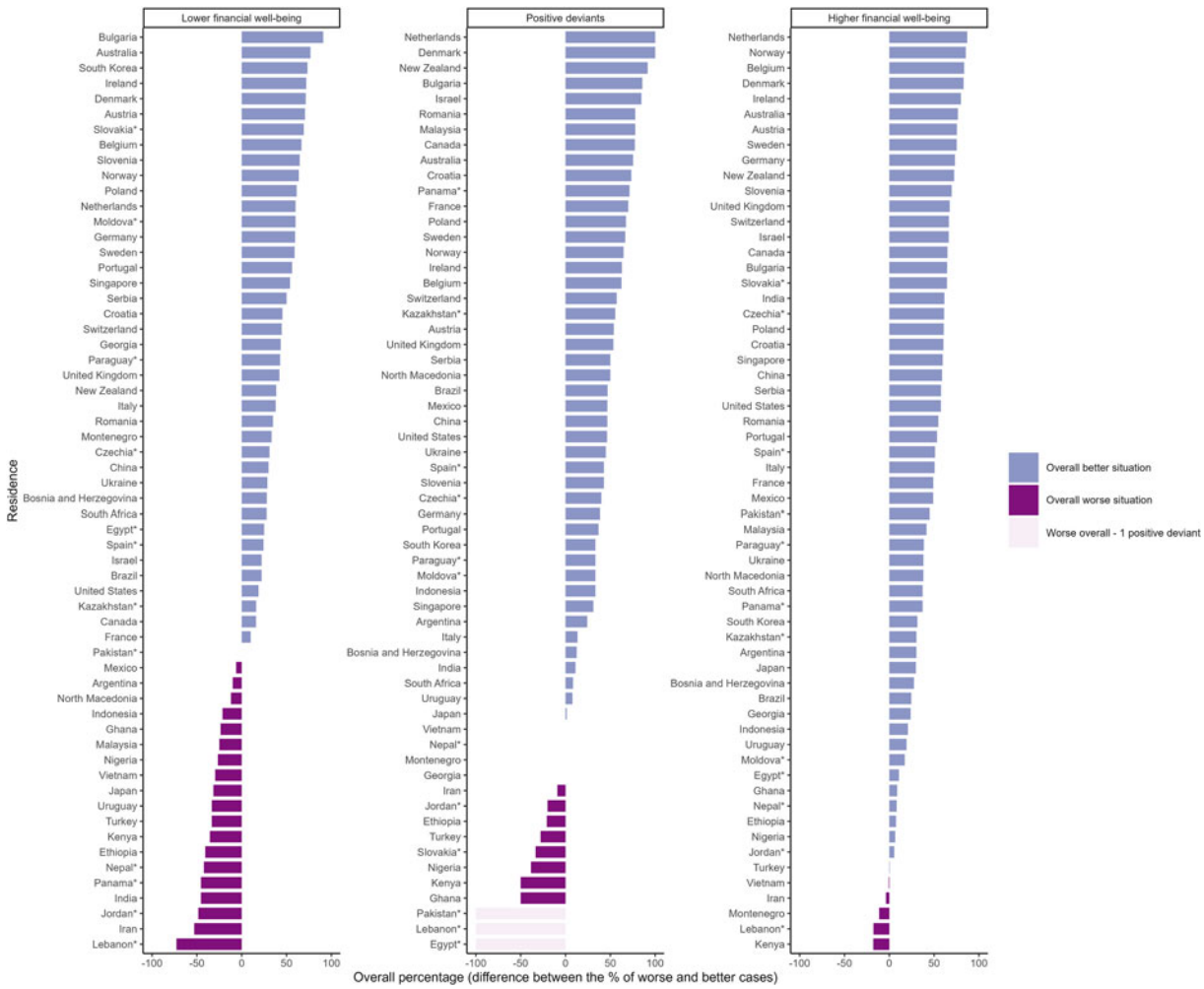

Figure 1 (Ruggeri et al.). Comparison of financial impacts of the COVID-19 pandemic in 2020 between financial circumstances. Each element is ordered by the rate of difference between those experiencing positive/neutral impacts and those experiencing negative impacts by country within each group. Pakistan, Lebanon, and Egypt had only one positive deviant, so the proportion is shaded to avoid skewing perception.

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

Table 1 (Ruggeri et al.). Examples of i-frame and s-frame policies aimed at reducing income inequality

Country	Policy name	Description	Framing
Germany	Child allowance (Kinderzuschlag)	Monthly payments to support children in low-income households, which increased the financial situation for 81% of recipients, but many eligible families did not apply out of a lack of awareness (Bonin et al., 2013).	i-Frame
Egypt	Takaful program	Gives cash transfers to low- and middle-income mothers on the condition that they send their children to school. Despite producing short-term benefits, the focus on middle-income families made the program less effective for the most vulnerable (Lara Ibarra, Sinha, Fayez, & Jellema, 2019).	i-Frame
Brazil	Family grant program (Programa Bolsa Familia)	A conditional cash transfer requiring certain familial behaviors such as mandatory school attendance for children and health measures to increase economic stability. Although the lowest 10% of Brazil's household incomes increased wealth by 23.5% between 2001 and 2004 (Hall, 2008), analysis concluded that this was more associated with increased wages and employment being the main factor of diminishing income inequality (Hall, 2008).	i-Frame
South Korea	747 Plan	An approach aimed at boosting the economy and increasing income per capita to US $40,000. However, individual disparities were overlooked by architects of the strategy and the approach ultimately failed to reach any of its economic goals, leaving income per capita (US$25,000) on a completely unchanged trajectory from the previous decades (Choi, 2022).	s-Frame
United States	Moving to opportunity for fair housing	Vouchers provided to impoverished families to move to neighborhoods with better quality housing, leading to children under 13 whose families moved to a lower-poverty area having an annual income that was 31% higher on average in their mid-twenties compared to the average income of the control group, while simultaneously producing negative impacts for children over the age of 13 (Chetty, Hendren, & Katz, 2016a).	s-Frame

policies themselves, but indicates the complexity of the problem and supports reframing policy creation.

Despite the minimal impacts of simple redistribution during the pandemic, valuable behaviors were still observed. Figure 2 displays spending patterns for approximately 6,000 low-income individuals that received a US Cares Act Economic Impact Payment of exactly $1,200. For the first $1,200 spent after receiving the stimulus check, 94% overall went to discretionary and

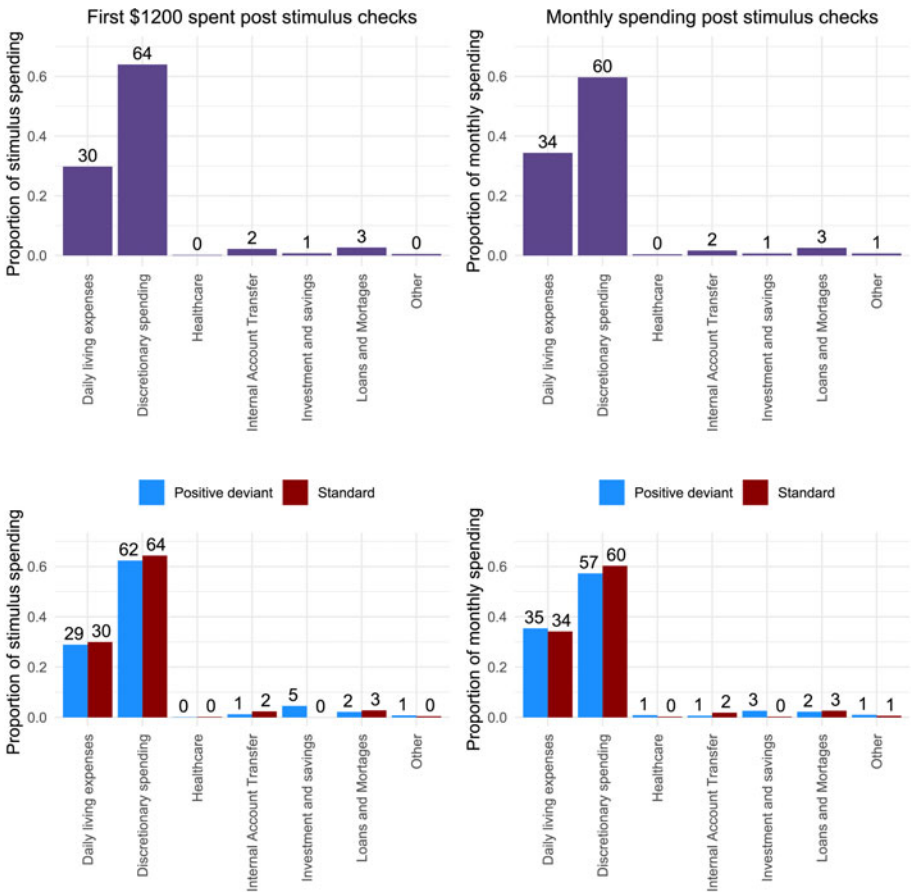

Figure 2 (Ruggeri et al.). Spending patterns in a low-income ($17,240–34,480) group in the United States, split by positive deviants and others, immediate spending post stimulus check and for the first month following the stimulus check.

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

daily living expenses. Among that group, about 4% of individuals allocated funds (5% on average) to savings or investments. This trend continued beyond the first $1,200 (3% on average) and is highly consequential: Individuals who saved money will have greater financial well-being over time than individuals who allocated entirely to near-term spending.

Finding these distinct patterns among positive deviants presents a potentially meaningful target for financial management policies. Misguided approaches might encourage a low-wage individual to save without addressing the cost of living, thereby superficially effective and simultaneously encouraging high-interest debt like credit cards (Sussman & O'Brien, 2016). Actionable insights on the behaviors of those who have overcome inequality, such as specific saving values (3–5%), may better position policies to reduce economic inequality at the individual level *because* they factor-in the context.

However, even with effective interventions, individual behavior cannot alone resolve wider structural barriers, such as inequitable pay. Consider that national rates of overcoming inequality are highly varied: In the dataset described earlier, positive deviance rates ranged from 0.8% (Egypt) to 26.2% (Canada). As individuals from countries with the largest income disparities demonstrate greater rates of high-risk behaviors and increased debt accumulation (Payne, Brown-Iannuzzi, & Hannay, 2017), policies cannot be presumed to be equally effective in all contexts. Heterogeneous national rates of overcoming inequality suggest variability in barriers, resources, and opportunities. For example, greater gender equality is associated with higher rates of female positive deviance (see Fig. 3), with no significant correlation for males. Similar patterns exist in US healthcare, where general wage increases overall were directly associated with decreases in the wage gap (Barry, 2021).

These patterns demonstrate the need to create policies that also address structural inequality. Such types of policies (see Table S4) have shown promise. Britain's Pay Transparency Initiative (Gamage, Kavetsos, Mallick, & Sevilla, 2020) made a clear, positive impact on reducing wage disparity. Similarly, Dutch requirements for corporate boards to comprise at least one-third women ensure greater participation at a level that removes salary ceilings (Women's Labour Force Participation, n.d.).

Our argument is, therefore, to blend the structural and the individual, rather than limiting to only systems or decision making in isolation. An effective example comes from a World Bank initiative in Uruguay (Ubfal, 2022), which successfully implemented a work–study intervention to reduce gender economic inequality through equal pay for students. Integrating individual working and financial behaviors along with implementing a policy environment that created equitable work opportunities resulted in significant, positive effects for girls who participated. There were also no negative effects for participating boys.

Despite increased investment into reducing economic inequality, even generous, accessible financial incentives have alone been ineffective at reducing inequality or even modestly advancing the economic position of those receiving payments (Jaroszewicz, Jachimowicz, Hauser, & Jamison, 2022). Rather than to continue approaches based on assumptions of normative behaviors, policies must concurrently target systemic factors and individual behaviors facing significant social and economic challenges, perhaps by encouraging the choices of peers who have overcome inequality. That means large-scale investment targeting barriers (e.g., pay gaps) must also be met with effective, individually relevant policies that reduce the risk of choices or behaviors that propagate inequality created by challenging circumstances. As demonstrated, such approaches will directly impact the well-being of individuals and populations.

Supplementary material. The supplementary material for this article can be found at https://doi.org/10.1017/S0140525X23001103.

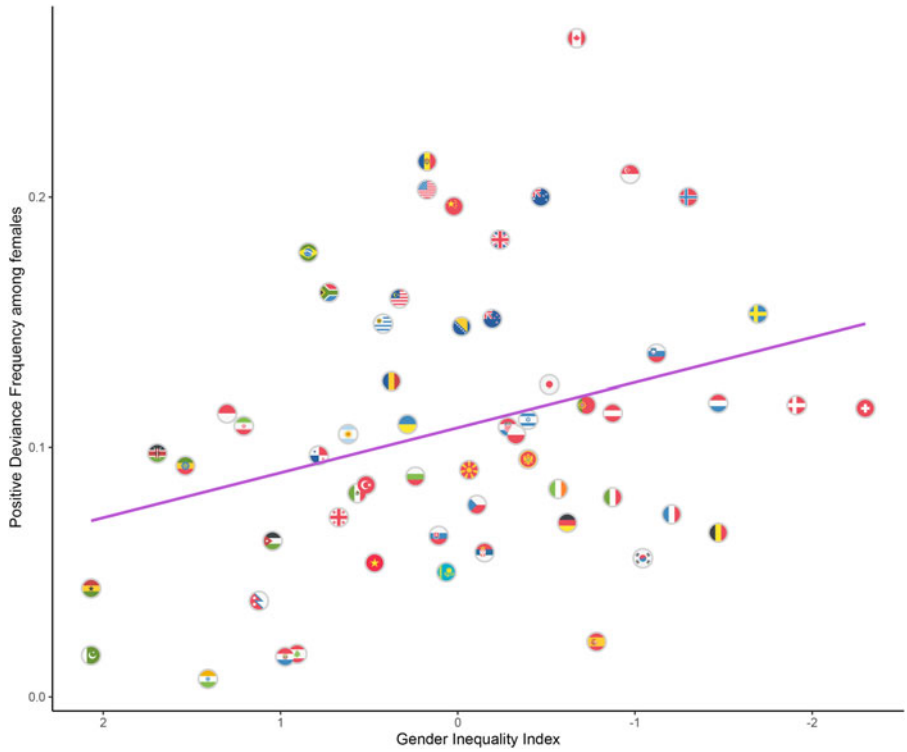

Figure 3 (Ruggeri et al.). Relationship between gender equality and rates of female positive deviance in 59 countries ($r = -0.31$, $P = 0.017$). Data from temporal discounting study and the UN's Gender Inequality Index. Gender inequality scores are reversed for easier understanding in the visual. Limitations to the data and analyses can be found in the Supplementary material (Methods and materials).

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

Data and materials' availability. All data are publicly available for the survey data used (https://osf.io/njd62/) and from the UN Gender Inequality Index (https://hdr.undp.org/data-center/documentation-and-downloads). Financial transaction data were provided through an agreement with Columbia Business School.

Acknowledgments. We acknowledge Corpus Christi College and the Centre for Business Research, Judge Business School, and University of Cambridge. We also acknowledge the Junior Researcher Programme as well as the Columbia Business School.

Authors' contribution. Conceptualization: K. Ru.; data analysis: K. Ru., G. A. R. L., N. A.-Z., M. H. A., S. P., K. Ra., Ž. M. R., E. G.-G., S. A.-J.; visualization: K. Ru., B. D., T. D., A. A. D., Z. H., F. N., M. V.; project administration: K. Ru., S. A.-J., M. P.; supervision: K. Ru., S. A.-J.; literature review, policy background: K. Ru., O. S. T., N. A., J. C., N. D., C. G., A. G., N. G., D. M. G., C. H., R. K., R. L., J. L., A. M. E. M., J. M. O., T. O., S. P., M. P., P. R., D. S. P., A. S.; writing – original draft: K. Ru., O. S. T.; writing – review and editing: K. Ru., O. S. T., T. F., M. P., S. A.-J; project administration: R. A. F., S. G., A. P.; visualization: Q. Y.; policy background: R. L., S. Y. P.; data analysis: K. B.

Financial support. This research was supported in part by the National Science Foundation (no. 2218595) and by Undergraduate Global Engagement at Columbia University. Additional support was provided to individual researchers from the Columbia University Office of the Provost, Masaryk University Centre for International Cooperation, and the Benjamin A. Gilman International Fund from the United States Department of State.

Competing interest. None.

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Structural problems require structural solutions

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doi:10.1017/S0140525X23001073, e175

Abstract

Chater & Loewenstein criticize behavioral scientists' reliance on individual-level ("i-frame") analysis, observing that this impoverishes policy interventions and stymies scientific progress. We extend their analysis to argue that structural factors bias and perpetuate behavioral science toward the i-frame. Addressing this problem fully will require structural changes to the training, peer review, and granting structures that confront research scientists.

Chater & Loewenstein (C&L) have offered a useful criticism of behavioral scientists' reliance on individual-level ("i-frame") analysis to investigate social problems, neglecting potential structural ("s-frame") interventions. They focus on the example of nudges, but the problem is applicable to the behavioral sciences generally. For example, the emphasis on reducing of individual-level racial prejudice has masked the much broader potential impact of addressing racism at the systemic level (Paluck, Porat, Clark, & Green, 2021).

C&L provide an important first step in drawing attention to this critical problem. We suggest building on their analysis by applying the content of their insight to the target of their criticism: Behavioral scientists' reliance on i-frame analysis. The priorities and activities of researchers throughout the behavioral sciences are affected by the field's structures and the social system in which those structures are embedded, not just by intellectual mistakes made by researchers about which frameworks to apply to a subject matter. We argue that structural changes are necessary for making good on the analysis they present, because the tendencies toward i-frame research and policy interventions that C&L identify are ones that are selected for and incentivized by these institutions.

Behavioral science research is structurally biased in favor of i-frame research in several respects. A hierarchically organized system of higher education trains and credentials most behavioral scientists, and a likewise organized system of research funding organizes their research activities.

The way researchers are trained ensures that i-frame research remains the predominant way of approaching psychological questions. Most published research in the behavioral sciences focuses on individuals rather than structural relationships. This includes the subdisciplines of psychology that aim to make contact with public policy interventions, like behavioral economics and social psychology. Extant research furnishes material with which new researchers are taught. Moreover, early career researchers are trained using an apprenticeship model. Senior investigators train lab members junior to them, which influences trainees' intellectual development (Feldon et al., 2019).

Beyond the training process for new scientists, the incentive structures of peer review further entrench the i-frame. "Peer review" can be interpreted generously here: It refers not only to the process of evaluating work for publication in academic journals, but evaluating job candidates, grant proposals, tenure and promotion cases, and award-worthiness. All of these are a form of *peer review*, and as such subject to structural limitations.

At a minimum, peer review places considerable practical obstacles in the way of generating pathbreaking s-frame work. Reviewers will be more likely to recommend for publication papers that are on topics and hypotheses that they study and support (NCR, 2005); tenure and promotion are subject to the same logic. This lends an inherent conservatism to the peer review process (Kuhn, 1970).

This problem is reinforced by the steadily rising median age of National Institutes of Health (NIH) grant recipients over the past four decades, which suggests an increase in the difficulty of accessing these grants (Lauer, 2021; Lauer & Roychowdhury, 2021; National Research Council, 2005). Researchers respond to this heightened risk by proposing more conservative projects that reflect the status quo (Luukkonen, 2012; National Research Council, 2005).

The risks of the bias toward the i-frame in training and peer review go beyond the question of which ideas get financial support – they also constrict what ideas are generated (Stanford, 2019). Grant-making processes are not simply making pathbreaking work harder to get funded. They are also selecting against the time, effort, and intellectual habits that might be required to come up with novel research in the first place. The greater prevalence of i-frame studies and training methods makes i-frame ways of interrogating problems more practically available than s-frame approaches. This in turn makes s-frame studies costlier to pursue for those few who still generate s-frame research projects after i-frame heavy professional training.

We should expect all of these factors to be robust against even the most cogently argued target articles. Behavioral scientists will likely continue to run the studies that earn them career advancement and research funding, despite compelling arguments against the predominant frames of their research.

There is nothing inherent to human behavior that requires the behavioral sciences to focus on the individual. There are a number examples of s-frame research that the field can look to. These include social dominance theory (Pratto, Sidanius, & Levin, 2006; Sidanius & Pratto, 2001); how class and social power affect prosocial behavior (Keltner, Van Kleef, Chen, & Kraus, 2008; Kraus & Torrez, 2020); how basic decision-making processes are influenced by resource scarcity and social location (Farah & Hook, 2017; Morton, 2017; Morton & Paul, 2019). We believe this research should complement rather than replace i-frame research.

Building a field that is hospitable to more s-frame research requires, at a minimum, reconstruction of the field's training and reward structures. Existing theoretical and empirical work suggests alternatives that could address these structural problems. There have been longstanding calls for the reintegration of approaches like action research and community psychology into academic institutions, which could help train new researchers in ways that encourage s-frame analysis (Lykes, 2017; Simon & Wilder, 2018). Possible alternatives to preproduction peer review of articles include postpublication review (Heesen & Bright, 2021; Rowbottom, 2022), and possible alternative research funding models include the use of grant lotteries rather than evaluated submissions (Adam, 2019; Ahmed, 2019; Avin, 2019; Currie, 2019). Regardless of whether we adopt these particular interventions, we will need to implement structural-level solutions if we want to make good on the promise of C&L's analysis.

Financial support. This research received no specific grant from any funding agency, commercial, or not-for-profit sectors.

Competing interest. None.

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https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

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Conspiracy theory

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doi:10.1017/S0140525X23001097, e176

Abstract

Chater & Loewenstein, superb and distinguished social scientists, have misfired. Their complaint is baseless: In the real world of policymaking, behavioral science is mostly being used to reform systems, not to alter individual behavior. Nor is there empirical support for the proposition that interventions aimed at helping individuals make systemic reform less likely.

Chater & Loewenstein (C&L), superb and distinguished social scientists, have misfired. In the real world of policymaking, behavioral science is mostly being used to reform systems, not to alter individual behavior. Nor is there empirical support for the proposition that interventions aimed at helping individuals make systemic reform less likely. Some conspiracy theories are true, but theirs is groundless.

The real world of policymaking

Some of the most significant uses of behavioral science involve fuel economy and energy efficiency mandates. To be sure, these mandates reduce the externalities that come from emissions of greenhouse gas and other air pollutants. But the overwhelming majority of their benefits involve internalities (in the form of consumer savings). Consumers can, of course, buy fuel-efficient vehicles and energy-efficient appliances if they like. For the consumer savings to count as part of the justification of the relevant regulations, public officials have had to argue, and have explicitly argued, that consumers are making mistakes – that some combination of present bias, myopic loss aversion, limited attention, and imperfect math skills lead them to purchase the wrong vehicles and appliances. Without the relevant behavioral findings, on which public officials have heavily relied, current fuel economy and energy efficiency mandates would fail cost–benefit analysis and would be exceedingly hard to justify.

Behavioral science has helped to underpin and spur numerous other regulatory mandates, including occupational safety regulations, food safety regulations, investor protections, tobacco regulations, and even the Federal Trade Commission's proposed ban on noncompete clauses. Other significant uses of behavioral economics involve taxes, default rules, and disclosure requirements. Cigarette taxes and taxes on sugar-sweetened beverages have been justified by reference to present bias. Drawing on behavioral findings about inertia, policymakers have automatically enrolled over 10 million poor children in free school meals programs. In the United States, the greenhouse-gas inventory, imposed on polluters, was directly spurred by behavioral science, and it has significantly reduced greenhouse-gas emissions.

Because behavioral scientists in or near the world of actual policymaking have been spending most of their time on system change, it is fair to wonder it is necessary to advise them to do so. It is a little like suggesting that professors of English literature should pay more attention to William Shakespeare.

C&L are unenthusiastic about nudges that target individuals, but their account is a lawyer's brief; the actual evidence does not support their negative conclusions. In any case, targets and tools can be combined in diverse ways. As the greenhouse-gas inventory example suggests, companies might be nudged by requiring forms of disclosure, and the result might be system-wide change. Of course mandates can be imposed on individuals; consider mandatory seat-belt usage, which has a plausible behavioral justification, as do restrictions on smoking.

The nonexistent crowd-out effect

C&L are worried about crowd-out. They argue that because of behavioral scientists' excessive enthusisasm for what they describe as i-frame interventions, system reform has become less likely. But if we were making a list of 100 reasons why system reform has not happened in some important area (such as climate change), the fact that some behavioral scientists have been enthusiastic about i-frame interventions could not possibly make the list.

Having worked in the US government for many years (and with numerous other governments less formally), on scores of legislative proposals and well over 2,000 regulations, I am unaware of *any* case in which i-frame interventions operated to deter or stop s-frame interventions. To be sure, there might be some such cases, but if anything, it would be more plausible to suggest that causation runs in the opposite direction: i-frame intervention alert policymakers (and others) to the existence of a problem, which spurs support for s-frame interventions.

Lacking evidence on behalf of their claim, C&L point to unreliable non-evidence, including surveys finding that if you tell people about an i-frame intervention, you can reduce support for an s-frame intervention. Nothing follows from those surveys. They do not show that the crowd-out effect is real or important – that in the actual world of policymaking (involving legislation or regulation, each of which has its own exceedingly complex processes and dynamics), fuel economy labels reduce support for fuel economy mandates, or graphic warnings on cigarette packages reduce support for cigarette taxes or bans on smoking in public places.

C&L offer a set of arresting stories about corporate campaigns, in which companies have drawn attention to the importance of

personal responsibility. But what lessons can be drawn from such stories? BP's interest in carbon footprints may or may not be laudable, but can anyone argue that it is the reason that the United States or the United Kingdom has not enacted carbon taxes, or what C&L want, which is morel extensive regulation? Does anyone think that if behavioral scientists had not supported antilittering campaigns, we would see more and stronger efforts to reduce plastic waste? Did recent legislation in the United States (the Inflation Reduction Act), in large part designed to reduce the risks of climate change, get enacted because behavioral scientists suddenly decided to retreat, or not to study individual behavior?

C&L offer a conspiracy theory. In their view, policy problems are easy, because good s-frame solutions are available. The obstacles, they think, are "the active and coordinated efforts to block s-frame reforms by concentrated commercial interests who benefit from the status quo" (target article, sect. 3, para. 3). In their account, the main problem lies in the machinations of "powerful groups" who maintain their power partly by "promoting the perspective that these problems are solvable by, and the responsibility of, individuals" (target article, sect. 3, para. 3). Those powerful groups have enlisted behavioral scientists, who turn out to be pawns or dupes, unwittingly contributing to the failure to implement the obvious solutions.

Powerful groups often resist desirable change, but C&L neglect two challenges: Tradeoffs and reasonable disagreement. There are no simple solutions to the problems posed by climate change, obesity, retirement policy, healthcare, privacy, and plastic waste. The good news is that behavioral science can make, and is making, significant dents in each of those problems. Incidentally, one of the ways that it can do that is by targeting individual behavior, with the laudable goal of improving people's lives. Behavioral scientists who seek to understand that behavior and to improve such targeting ought to be applauded, not scolded. As some government officials say: Better is good.

Competing interest. None.

Nudging is being framed

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doi:10.1017/S0140525X23000973, e177

Abstract

I make three points. First, the i-frame and s-frame are not helpful frameworks for thinking about behavioral public policy. Second, the authors ignore the role of politics: Policies (and the s-frame) require laws and regulations. Third, the research on retirement savings, which is all about the *system*, undercuts their claims.

When Cass Sunstein and I wrote the book *Nudge* we had two goals. First, provide a foundation for the elusive middle ground between libertarian anarchy and a tightly controlled nanny state. That foundation was based on the premise of "libertarian paternalism": Strategies for helping people achieve their goals without forcing anyone to do anything. Our friend George Loewenstein and colleagues had a similar vision (Camerer, Issacharoff, Loewenstein, O'Donoghue, & Rabin, 2003). Devising policies that are somewhere between the extremes in our polarized world can be essential because, by definition, official public policies require *political* support, either via government legislation and/or regulation.

Our second goal was to use the findings of behavioral science to inform such policies, to give the policies the best chance of achieving the desired goals. In the United States, and many other countries, the rules and regulations of governments at every level tend to be written by lawyers (including legislators) who are advised by economists. There is a Council of Economic Advisors in the White House, but no Council of Behavioral Scientists. We thought that highlighting the insights from other social sciences might help government officials to devise better policies. Much to our surprise, hundreds of governments, beginning with Britain and the United States, have created organizations of behavioral scientists that have become known colloquially as "nudge units."

According to Chater & Loewenstein (C&L) our efforts and those of all behavioral scientists have been an enormous failure. C&L assert that behaviorally inspired interventions are not only ineffective, but also they are downright harmful. They argue (with no plausible supporting evidence, or even a single compelling example) that by trying to improve the current state of affairs in various domains we all have deterred some stronger measures that would be better.

The problem, C&L assert, is that behavioral scientists have been concentrating their efforts using something they call the i-frame instead of using the much more effective s-frame. Unfortunately, neither of these terms is clearly defined in the article. The i-frame obviously has something to do with individuals, but what constitutes an s-frame intervention is not spelled out, though in the domain of retirement savings it seems to favor mandates over policies that permit citizens to opt out.

This is an odd critique on many levels. One obvious question is: Who do C&L think is limiting themselves to the i-frame? Certainly not Cass Sunstein and me. Cass has served in various administrative roles in government where he got to design or modify actual policies, and in our book *Nudge*, at least three quarters of the chapters are explicitly about structural policy designs. *Choice architecture, our primary tool, is policy infrastructure.*

An important point to stress is that behavioral scientists, whether they are in academia or nudge units, do not have the authority to experiment with most of the rules and regulations in a given domain. No nudge unit has the ability to say, hey, let's try a carbon tax in half the country and strict emission rules in the other and see how it goes. In practice they are often limited to messaging campaigns, which are less impactful.

This implies that the range of interventions studied by behavioral scientists is truncated by what I call *permission bias*: You can only test what you can get the approval to try. It is wrong to infer from this fact of life that behavioral scientists are using the wrong "frame." Rather, they face constraints! It also makes it problematic to judge the potential impact of possible behavioral policy interventions based on the set of randomized controlled experiments behavioral scientists have been allowed to run. In many cases social scientists must rely on natural quasi-experiments made possible when governments decide to change the rules or offer a new program. As I explain below, the United Kingdom has provided

such an opportunity in the domain of retirement savings that demonstrates the potential effectiveness of nudging.

Retirement savings is an attractive topic for behavioral economics research because the task is "difficult" in two ways. First, the mathematical problem of how much to save and how to invest the money is hard, even for an economist. Second, saving for retirement requires exerting self-control in order to delay consumption for decades. The traditional economic approach to this problem is simple: People solve the math problem optimally, and they implement the appropriate plan. (Economic agents excel at both mathematics and willpower.)

In four decades of behavioral economic research on this topic, the focus has always been on making the *system* work better for humans. Isn't that the s-frame? Do C&L think we have been just going around quoting Ben Franklin's line: "A penny saved is a penny earned?"

As C&L note, the early systems devised to help households save for retirement took the form of both public and private "defined-benefit" plans that guarantee a retirement income stream which depends on years of work and level of pay. These plans are *easy* for participants because there are few choices to make aside from when to retire, but they are costly to administer. The plan sponsor (e.g., government, employer, or union) has to set aside large amounts of money for decades and deal with multiple risks including the returns on the portfolio and what is called "longevity risk": The chance that participants live longer than expected. Defined-benefit plans were not perfect for all participants either. The plans were especially attractive to employees who worked with one employer (or union) for most of their career, and who had the good luck that their plan sponsor fully funded the plan, invested wisely, and did not go bankrupt. Defined-benefit plans were particularly good for high-paid workers because the pension depended on final salary. C&L seem to be afflicted by defined-benefit plan nostalgia. They probably also miss Pan Am and TWA, companies with defined-benefit plans that went bankrupt.

Historically, when it became legal to offer defined-contribution plans in the 1990s, virtually all new firms adopted this framework, and some older companies transitioned to it. As C&L acknowledge, defined-benefit plans are becoming rare, and there are virtually no new ones being created. Given this, it is hard to buy C&L's contention that the efforts by behavioral economists to make defined-contribution plans more user-friendly deterred the return of defined-benefit plans. Private sector defined-benefit plans, like typewriters and dial telephones, are obsolete technologies few people pine for. Meanwhile, governments are finding that pay-as-you-go social security systems that have a defined-benefit structure are facing funding crises in an era of increasing life expectancy and declining birth rates.

In trying to improve the growing number of defined-contribution plans, behavioral economists realized that participants needed help in three domains: Signing up for the plan, saving enough to provide for their retirement needs, and investing the money wisely. The practical solutions to these problems were automatic enrollment (make joining the default), automatic escalation or Save More Tomorrow (gradually raising the saving rate over time), and well-designed default investment products. None of these features existed in 2000, but now, two decades later, all are common in a majority of plans. Accomplishing this had to begin with convincing both regulators and legislators to make these options legal.

In the United States in 2005, the only default investment product that had a legal safe harbor was a money market fund or some equivalent low-return product. The Department of Labor had to be convinced to create new types of what they call Qualified Default Investment Alternatives. Then, in 2006 Congress passed the Pension Protection Act making automatic enrollment and automatic escalation clearly legal, and offering employers an incentive to adopt them. A law called SECURE 2.0 just passed at the end of 2022 which (in a limited way) further encourages the use of these nudges. Bottom line: Changing laws and regulations is hard and can take decades. Such work is not usually rewarded in academia.

C&L question whether these behaviorally informed innovations actually work. A relatively new program launched in Britain demonstrates that they can (Nest Insight, 2022). The National Employment Savings Trust (NEST) pension scheme was created to make sure that all employees had access to a workplace retirement savings plan even if their employer did not offer one. (A similar plan is badly needed in the United States.) Firms were required to offer a workplace plan if they didn't have one (with a government-run option available at low cost) and to automatically enroll workers who were 22 or older and made more than £8,105. Cleverly, the initial minimum savings rate was just 1%, to avoid "pay-stub shock," but it was steadily increased to 8%: 5% from the employee and at least 3% from the employer, though most large employers actually contribute more. Opt-out rates have remained around just 8%, and nearly everyone elects the low-cost default investment fund. There are over 17 million workers in the plan now. This is a remarkable success.

C&L are critical of the NEST plan calling the Australian alternative "far superior," though it is hard to see what criteria they are using to make this claim. Yes, the Australian plan is mandatory for workers and until recently had a slightly higher savings rate of 9% (that is now being gradually increased to 12%). But the design of the plan has distinct flaws: There are hundreds of investment options, which is too many, and fees can be high. Why are C&L such fans of the Aussie plan? The key factor seems to be inability for employees to opt out, though a bit later they refer to this as a "relatively minor feature." Call me confused.

A proper s-frame evaluation would recognize that a required plan might be less attractive than one that allows opt out and still achieves 92% participation. Even people who do not value freedom of choice per se might be persuaded by the fact that those who do opt out of automatic enrollment tend to have what seem to be good reasons (Chalmers, Mitchell, Reuter, & Zhong, 2021). Another feature of the Australian plan that C&L praise is the prohibition on workers borrowing from their accumulated savings, even in the case of an emergency. I am not sure why this is a plus. Isn't it possible that borrowing against retirement savings to finance a new furnace or medical expense is better than using a credit card or payday lender? One study in the United States concludes that 401(k) loans "are neither a blessing nor a bogeyman" (Beshears, Choi, Laibson, & Madrian, 2008).

In conclusion, the philosophy of nudging is partly based on humility. Proponents are humble about the ability of human beings to solve all problems themselves, but are also humble about the ability of an outside party to always know what is best. The requirement that citizens are able to opt out acts as an insurance policy against overreach by plan designers. Crucially, it can also sell the policy to legislators, as it did in the United Kingdom.

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

In contrast, C&L seem to think less highly of people and more highly of governments than I do. They are so sure that they know what is best that they want to require it, and they appear confident that governments will share their values.

To this all I can do is to channel Mick Jagger and say: "You can't always get the government you want." If you want to advocate for more intrusive government actions, you better be confident that the government will make those choices wisely. Alas, your government may not share your "frame."

Acknowledgments. I acknowledge helpful comments from David Laibson, Daniel Kahneman, and Cass Sunstein.

Financial support. This research received no specific grant from any funding agency, commercial, or not-for-profit sectors.

Competing interest. None.

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Moral psychology biases toward individual, not systemic, representations

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doi:10.1017/S0140525X23001000, e178

Abstract

We expand Chater & Loewenstein's discussion of barriers to s-frames by highlighting moral psychological mechanisms. Systemic aspects of moralized social issues can be neglected because of (a) the individualistic frame through which we perceive moral transgressions; (b) the desire to punish elicited by moral emotions; and (c) the motivation to attribute agency and moral responsibility to transgressors.

Many societal ills are rooted in deep systemic causes that nonetheless operate through the behavior of individuals. This leaves ambiguity as to where the responsibility lies, and Chater & Loewenstein (C&L) propose that people resolve this ambiguity with a bias toward overrepresenting the role of individual behavior compared to systemic factors. They describe this bias as arising from several psychological mechanisms, including the fundamental attribution error, a present-biased emotional system that is not adapted to a systemic analysis of problems, functional fixedness, and so on. Missing from this predominantly cognitive list, however, are mechanisms related to morality. Without disputing the contributions of more cognitive processes, we contend that the emerging science of moral psychology implies additional pathways that explain why people overemphasize the role of individuals in the most pressing issues of our time.

The relevance of morality is inherent to a great many of these issues: Questions of police brutality, sexual harassment, the redistribution of wealth, and the rights of non-citizens, to name a few, evoke moral values of harm, justice, and group loyalty. But morality can also become attached to social issues that seem on their surface morally neutral (Rhee, Schein, & Bastian, 2019), if these arouse certain moral emotions, such as guilt, anger, outrage, and disgust (Clifford, 2019; D'Amore, van Zomeren, & Koudenburg, 2022; Rozin, Lowery, Imada, & Haidt, 1999; Wisneski & Skitka, 2017). For example, in the lab, people who were made to feel disgusted by or guilty about their meat consumption later moralize this issue (Feinberg, Kovacheff, Teper, & Inbar, 2019).

If social issues frequently take on moral significance, any analysis of how people respond to them must take into account moral psychology, whose primary function is to enable people to distinguish between *individuals* who are trustworthy and reliable and those who might exploit or harm them (Goodwin, Piazza, & Rozin, 2014). In fact, most documented reactions to moral violations focus on the level of individuals and attributions of responsibility internal to those individuals.

This individual lens is apparent as soon as people encounter a moral violation. When a person witnesses, for example, a police shooting of an unarmed Black man, a case of sexual harassment, or workers being exploited, his mind sees a vulnerable patient being harmed and automatically seeks to complete the picture by identifying an intentional moral agent to shoulder the blame (Gray, Young, & Waytz, 2012). This dyadic template leaves little room to conceive of the role of broader systems, because the agentic member of the dyad must, by definition, have "the capacity to intend and to act (e.g., self-control, judgment, communication, thought, and memory)" (Gray et al., 2012). Mindless systemic forces like institutionalized racism, cultural misogyny, or capitalism may not spring to mind; instead, the person witnessing the violation is likely to blame the officer who pulled the trigger, the sexual harasser, or the stingy employer.

The individual lens is also apparent in the present-oriented and punitive nature of the actions that moral emotions compel, once the dyadic template is in place. The specific combination of an intentional agent causing substantial harm to a patient uniquely evokes moral outrage (Ginther, Hartsough, & Marois, 2022). In turn, the proximate function of moral outrage is to enforce moral standards: Moral outrage motivates people to punish the perpetrator (Ginther et al., 2022; Konishi, Oe, Shimizu, Tanaka, & Ohtsubo, 2017), thus satisfying an immediate and visceral pull. Even if our witness managed to identify the system as the perpetrator, their drive to punish would have nowhere to go: Although it is at least in theory possible to punish an individual police officer, sexual harasser, or employer, it is not so clear how one could punish structural institutions like racism, sexism, or capitalism. The long and arduous task of systemic reform often requires going beyond gratifying one's immediate and intuitively appealing urge to punish.

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This drive to punish likely leads people to further deemphasize situational and systemic causes for social ills. When seeking to punish an individual they have identified as a perpetrator, people will try to maximize that individual's moral responsibility. Whether this means downplaying additional causes for the violation or external constraints on the individual's actions (Clark et al., 2015; Cushman, Knobe, & Sinnott-Armstrong, 2008; Kominsky, Phillips, Gerstenberg, Lagnado, & Knobe, 2015; Young & Phillips, 2011), or elevating philosophical beliefs in free will (Clark et al., 2014), they adopt perceptions that justify punitive action. In other words, when people are most morally outraged and motivated to punish, they may push aside important systemic factors in the heat of the moment, so they can hold individual actors to account and mete out punishment without hesitation.

To summarize, representations of societal issues that center individual perpetrators tend to be inherently appealing because they align with our moral psychology and satisfy our immediate emotional needs. This tendency to individualize the causes of issues likely translates into preferences to correct (perhaps most often punish) individual behavior, rather than address the manifold structural imbalances at the root of the problem. As C&L suggest, this bias among the general public may affect policy decisions, both because policy-makers themselves are vulnerable to it, and because they are motivated to appeal to the majority. Advocates for system-oriented policies seeking to gain public support will need to confront not only the cognitive obstacles blocking their path, but also the moral ones too.

Financial support. This research received no specific grant from any funding agency, commercial, or not-for-profit sectors.

Competing interest. None.

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Wise interventions consider the person and the situation together

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doi:10.1017/S0140525X23001176, e179

Abstract

Chater & Loewenstein (C&L) ignore the long history by which social scientists have developed more nuanced and ultimately more helpful ways to understand the relationship between persons and situations. This tradition is reflected and advanced in a large literature on "wise" social–psychological or mindset interventions, which C&L do not discuss yet mischaracterize.

Chater & Loewenstein (C&L) argue that behavioral scientists have under-appreciated the role of the context in social change. On that we agree. But this is hardly an original point. When C&L say "the real problem lies not in human fallibility, but in institutions, laws and regulations" (target article, sect. 3, para. 4) they are reiterating 100 years of sociology (which they call the "future" of behavioral economics). They are also making a case for 80-year-old theoretical principles from Kurt Lewin, who founded the tradition they critique (yet do not cite). It is a problem that C&L do not wrestle with the intellectual histories that directly address the relationship between persons and situations in social change (e.g., Bronfenbrenner, 1992; Coleman, 1966, 1994; Lewin, 1951; Markus & Kitayama, 2010; Ross & Nisbett, 1991; Walton & Wilson, 2018) because much of their article critiques a belief that nobody holds. Here we discuss the Lewinian perspective, and why cross-disciplinary solutions coming from this tradition should be encouraged. To do so, we focus on the example of "wise" interventions (Walton & Wilson, 2018) that mitigate educational inequality.

C&L claim:

> Much of the research [on growth mindset or stereotype threat] has hinted, or even explicitly proposed, that these interventions can counteract the impact of low-quality education (target article, sect. 2.5.1, para. 2).

Really? In 2011, we wrote that wise interventions "are not silver bullets" (Yeager & Walton, 2011, p. 268), that these interventions "complement – and do not replace – traditional educational reforms," and that it would be "absurd" to think of the former as a replacement for the latter (p. 293). Instead, we argued, wise "interventions may make the effects of high-quality educational reforms such as improved instruction or curricula more apparent" (p. 293). Why? Because clearing psychological obstacles like feelings of non-belonging or beliefs about fixed intelligence

allows students to take advantage of the opportunities available to them.

This is not just our view. These claims were summarized well by Wilson's (2006) earlier conclusion that "the fact that small, theory-based interventions can have large effects should not be taken as a criticism of large-scale attempts at social change. As important as people's construals of the environment are, often the environment itself needs changing" (p. 1252).

This theorizing developed from a long tradition showing that neither i-frame nor s-frame solutions, in isolation, have the desired effects. Students won't learn what they aren't taught. But they also won't learn, at least not as well as they could, if they doubt they belong in class. Construals such as of non-belonging are what wise interventions address. These interventions help students contend with psychological vulnerabilities that get in their way. Importantly, these vulnerabilities come from contexts – a fact that contradicts the authors' false dichotomy. It is our fixed-mindset culture that provokes fixed-mindset thoughts. Praise for being "smart," paternalistic sympathy ("It's okay. Not everyone can be good at math"), and "Gifted and Talented" programs all prompt a student who struggles to wonder, "Am I dumb at this?" and then avoid challenges (Leslie, Cimpian, Meyer, & Freeland, 2015; Mueller & Dweck, 1998; Rattan, Good, & Dweck, 2012).

Nor do wise interventions work in a vacuum. These are not isolated "i-frame" solutions. C&L conflate a *methodological choice* (individual-level randomization) with a *theoretical problem* (locating problems in the person alone). Although individuals are treated, these treatments are fundamentally person × situation approaches. They address legacies of culture and depend for their effects on other "forces" in complex systems, in the tradition of Lewinian field theory (Walton & Wilson, 2018; Yeager & Walton, 2011).

The argument that we should reject an exclusively i-framed ideology is therefore a straw man. This caricature in turn leads to naïve recommendations to "change the situation." This approach has been tried, often without success, for decades, as we have known since the 1966 publication of sociologist James Coleman's famous report on educational inequality to inform Johnson's (s-framed) Great Society reforms. The failure of solitary s-framed treatments is because inequality is *both* a behavioral and structural problem. See Table 1.

We and other researchers have long been working to break down the false dichotomy between persons and situations. At least three key advances have emerged:

(1) *Anticipate heterogeneity, not main effects*: One should not expect strong main effects but variable effects in different contexts (for i-frame interventions) and among different individuals (for s-frame interventions) (Bryan, Tipton, & Yeager, 2021; Tipton et al., in press; Walton et al., 2023; Yeager et al., 2019). C&L ignore this, claiming that small average effects for nudges indict the field. Yet the question should be: How and under what circumstances can effects be optimized? See Table 2.

(2) *Study individual × context heterogeneity directly*: Heterogeneity is what we should study (Bryan et al., 2021; Tipton et al., in press), and this is a focus of contemporary research on wise interventions. See Table 2. Large-scale trials show the importance of "sustaining environments" (Bailey, Duncan, Cunha,

Table 1 (Walton and Yeager). Conclusions from the Coleman report

The Coleman report
Coleman's (1966) conclusion was clear: Despite massive s-frame investments in the decade after *Brown v. Board*, resources allocated to majority–minority schools serving poor families had no association with the magnitude of that disparity. Coleman, a sociologist who was inclined to prefer s-frame solutions, nevertheless concluded that the problem was with schools' *use* of those resources – the behaviors of teachers and students in schools. i-Frame problems gummed up s-frame investments. After decades observing this pattern, Coleman (1994) concluded that the context and individual behavior are inextricably linked, not isolated or in a zero-sum competition. The policy context influences behavior, which creates collective outcomes and therefore becomes the context.

Table 2 (Walton and Yeager). Advances that arise from considering the roles of persons and situations together

Advance no. 1: Anticipate heterogeneity, not main effects	Advance no. 2: Study individual × context heterogeneity directly	Advance no. 3: Create team-science infrastructure to integrate i- and s-frame solutions
C&L (endnote 4) use a small average effect of nudge experiments to discredit the approach. However, as Tipton et al. (in press) wrote, "The point of social science meta-analysis is therefore to understand to what extent effects vary and, furthermore, to what extent this variation in effects can be explained and understood using moderators rooted in the theory of the intervention (as well as other things)." Further, in a comment (Szaszi et al., 2022), we pointed out that the initial meta-analysis of "nudge" effects by Mertens, Herberz, Hahnel, and Brosch (2022) found that 95% of effects ranged from −0.92 to +1.08 – a tremendous amount of heterogeneity. Thus, the unexplained heterogeneity, not the average, was the heart of the story. This precludes all-or-nothing conclusions like those drawn by C&L.	The National Study of Learning Mindset, a trial with 12,486 students in 65 US public high schools, finds that growth-mindset interventions may not raise grades if the ninth-grade peer culture would make it uncool to act on a growth mindset (Yeager et al., 2019), or if a teacher delegitimates a growth mindset, by rejecting it (Yeager et al., 2022). The College Transition Collaborative's Social-Belonging Trial, with 26,911 students in 22 colleges and universities further divided into 374 "local-identity groups," finds that social-belonging interventions may not enhance progress in college when opportunities to belong for a given identity group are inadequate (Walton et al., 2023).	Wise interventions may include efforts to foster a growth-mindset culture in classrooms (Trzesniewski et al., 2021); to address teachers' mindsets about students when they misbehave, which can reduce suspension and even incarceration rates (Okonofua, Paunesku, & Walton, 2016, 2022; Walton et al., 2021); and to cultivate classroom norms that support more inclusive treatment, which can increase belonging, raise grades, and narrow inequality (Murrar, Campbell, & Brauer, 2020).

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

Foorman, & Yeager, 2020). This is because wise interventions seed ways of thinking. But the soil has to be fertile for that seed to take root. That is, people must find the proffered way of thinking legitimate and useful in their context to sustain it and use it to guide their interpretations of and response to ongoing experience (Walton & Yeager, 2020).

(3) *Create team-science infrastructure to integrate i- and s-frame solutions*: It is false that the i-frame "blinds" behavioral scientists to s-frame solutions. The Lewinian tradition has *always* considered both the individual and the context. What, then, explains the relative abundance of i-frame experiments? We think it is partially because randomizing contexts (e.g., classrooms, schools) are far more difficult (costly, slow) than individuals. So, let's take a page from *Nudge*: Make it cheap and easy. Rather than pointing fingers, let's build public, shared infrastructure to support teams to systematically explore the roles of contexts and individuals navigating these contexts. Already, wise interventions have helped show what aspects of context to shift. See Table 2. We look forward to future work that integrates persons and situations to promote positive, sustainable social change.

Financial support. The first author was supported by a fellowship from the Center for the Advanced Study of Behavioral Sciences in writing of this commentary.

Competing interest. None.

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i-Frame interventions enhance s-frame interventions

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doi:10.1017/S0140525X23000900, e180

Abstract

We argue that i-frame interventions can and do increase support for systemic reforms, and s-frame interventions should be pursued in parallel to address key societal issues. Without accompanying i-frame interventions, s-frame interventions can fail. We offer an operant conditioning framework to generate positive spillover effects. Behavioral scientists should develop i-frame interventions that enhance, rather than compete with, s-frame interventions.

Chater & Loewenstein (C&L) make the provocative claim that "The impact of…i-frame interventions has been disappointing and can reduce support for much-needed systemic reforms"

(target article, short abstract). However, there is no solid evidence for the claim that i-frame and s-frame interventions generally compete with each other. A recent Bayesian meta-analysis (Geiger, Brick, Nalborczyk, Bosshard, & Jostmann, 2021) concludes that there is no consistent overall spillover effect across behaviors or intentions for proenvironmental behaviors. In fact, countering the evidence for negative spillovers between proenvironmental behaviors selectively cited by the authors, positive spillover effects do also occur (e.g., Henn, Otto, & Kaiser, 2020; Kumar, Caggiano, Cuite, Felder, & Shwom, 2023; Sparkman, Attari, & Weber, 2021; Xu, Zhang, & Ling, 2018).

In this commentary, we offer two rebuttals: (1) i-Frame interventions can and do increase support for systemic reforms (Sunstein, 2022); and (2) i-frame and s-frame interventions should be pursued in parallel to address key societal issues. Without accompanying i-frame interventions, many s-frame interventions are likely to fail because of low compliance, lack of enforcement, or reactance (Antinyan & Asatryan, 2019; Carlsson, Gravert, Johansson-Stenman, & Kurz, 2021; Nwafor et al., 2021; Proudfoot & Kay, 2014).

i-Frame interventions can enhance s-frame interventions in at least two ways. First, i-frame interventions can be productively employed to instigate s-frame changes. For example, reflecting on how one's proenvironmental behaviors are connected to one's values or identity increased support for a carbon tax policy (Sparkman et al., 2021). Drawing attention to rising global temperature increased support for climate policy for liberal individuals (Luo & Zhao, 2019). i-Frame interventions can also trigger positive policy spillovers. For example, a small fee discouraged the use of single-use plastic bags and also increased public support for other environmental policies in the United Kingdom, such as adding changes for plastic bottles, excessive packaging, and fuel consumption (Thomas, Sautkina, Poortinga, Wolstenholme, & Whitmarsh, 2019). Three recent meta-analyses suggest that positive spillovers tend to occur more often than negative spillovers (Kumar et al., 2023), that positive spillovers tend to occur when i-frame interventions target intrinsic motivation or when the behaviors are similar to each other (Maki et al., 2019), or when i-frame interventions support personal autonomy, involve an explicit rationale explaining why the behavior is important, and address normative goals (environmental protection) or personal gain goals (financial savings; Geiger et al., 2021).

Second, i-frame interventions are uniquely well-suited to complement s-frame changes and may sometimes be necessary to ensure the success of systemic reforms. Many existing policies are ineffective because individuals fail to comply, or adequate enforcement is not feasible. Nudges and other i-frame interventions have been shown to increase policy efficacy in numerous domains, including tax compliance (Holz, List, Zentner, Cardoza, & Zentner, 2020), public health (Krawiec, Piaskowska, Piesiewicz, & Białaszek, 2021), and environmental policy (Carlsson et al., 2021). i-Frame interventions have been particularly effective in solving the so-called "last-mile" problem in public policy to overcome the intention–action gap, improve compliance, and reduce reactance to achieve policy targets (Soman, 2015). For example, the City of Vancouver passed a bylaw in 2015 to ban food waste in garbage bins and provided residents with compost bins, but a significant amount of food waste still remains in garbage bins years later (Metro Vancouver, 2020). To address this last-mile problem, i-frame interventions such as making composting easier by moving the bins closer to people's doors (DiGiacomo et al., 2018) or making the signage easier to read (Wu et al., 2018) can substantially increase composting rates. i-Frame interventions such as personalized information, messaging, and reminders have increased participation rates of low-income individuals in social policy programs, helping these policies realize their intended benefits (Despard, Roll, Grinstein-Weiss, Hardy, & Oliphant, 2022; Hotard, Lawrence, Laitin, & Hainmueller, 2019; Manoli & Turner, 2016; Page, Castleman, & Meyer, 2020; Umaña, Olaniyan, Magnelia, & Coca, 2022). i-Frame interventions can even mitigate reactance from people who are reluctant to comply with s-frame changes, using ideologically consistent frames (Bain, Hornsey, Bongiorno, & Jeffries, 2012) or messaging from in-group authority figures (Goldberg, Gustafson, Rosenthal, & Leiserowitz, 2021).

C&L raise potential pitfalls of i-framed interventions but neglect the broader picture of how i-frame and s-frame interventions work together. The field of behavioral science needs a better framework to outline the conditions under which negative and positive spillovers are likely to occur, as a recipe to design effective, complementary, and mutually reinforcing i-frame and s-frame interventions. As a start, we have proposed a unifying framework to account for positive and negative spillovers from an operant conditioning perspective (Zhao, Radke, Chen, Sachdeva, & Luo, 2023). Specifically, we argue that positive spillovers occur because the previous behavior has been positively reinforced and generalized (e.g., by social or symbolic rewards, or identity reinforcers like warm glow), and negative spillovers occur because the previous behavior has not been positively reinforced. Negative spillover is especially likely if the previous behavior involves personal sacrifice (e.g., costs, efforts), which functions as a form of punishment that can lead to the extinction of the behavior and other similar behaviors. When the i-frame intervention leads to a behavior that feels rewarding (e.g., enhancing identity or values), it will likely lead to positive spillovers. When the i-frame intervention leads to a behavior that feels punishing (e.g., paying more for renewable energy) without positive reinforcement, it will lead to negative spillovers (e.g., less support for a carbon tax policy). This framework bridges a critical gap in the literature by highlighting the importance of reinforcement in generating spillovers. Indeed, some of the most promising i-frame interventions (e.g., social recognition) reinforce desirable behaviors via operant learning principles (Schneider & Sanguinetti, 2021). Effective i-frame interventions to create positive spillovers should introduce positive reinforcement to sustain a given behavior and to trigger other similar behaviors that are likely to be reinforced.

We urge behavioral scientists to continue developing and refining i-frame interventions that enhance, rather than compete with, s-frame interventions. Focusing solely on negative spillovers is counterproductive. We also encourage behavioral scientists to be more thoughtful in developing i-frame interventions by capturing spillover effects and unintended consequences. Only then can we gather a more comprehensive picture of human behavior change.

Financial support. Jiaying Zhao is supported by the Canada Research Chair program.

Competing interest. None.

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Authors' Response

Where next for behavioral public policy?

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doi:10.1017/S0140525X23002091, e181

Abstract

Our target article distinguishes between policy approaches that seek to address societal problems through intervention at the level of the individual (adopting the "i-frame") and those that seek to change the system within which those individuals live (adopting the "s-frame"). We stress also that a long-standing tactic of corporations opposing systemic change is to promote the i-frame perspective, presumably hoping that i-frame interventions will be largely ineffective and more importantly will be seen by the public and some policy makers as a genuine alternative to systemic change. We worry that the i-frame focus of much of behavioral science has inadvertently reinforced this unhelpful focus on the individual. In this response to commentators, we identify common themes, build on the many constructive suggestions to extend our approach, and reply to concerns. We argue, along with several commentators, that a key role of behavioral public policy is to clarify how to build support for systemic reforms for which there is a broad consensus in the policy community, but which are opposed by powerful special interests.

> Time spent arguing is, oddly enough, almost never wasted.
> — Christopher Hitchens, Letters to a Young Contrarian

R1. Introduction

Academic papers are rarely born out of personal struggles. Our target article was. For two decades or so, the two of us have been trying to apply what we know about the science of human nature to real-world policy challenges. Our natural focus was on the individual – for example, on how to encourage people to lose weight, exercise more, take medications, save more, cut back on high-interest credit cards and pay-day loans, escape problem gambling, and to lead more environmentally sustainable lives. We began with great optimism, but found ourselves increasingly disillusioned, at the point where our presumed fund of behavioral insights made contact with policy-making reality. In some cases, our interventions simply didn't work; in others, they worked, but their effects seemed like proverbial drops in the bucket when compared to the problems they were intended to mitigate.

We wanted to understand why. Was it just our choice or execution of projects, or was there a larger problem with the direction

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

of the field? And, if so, how might behavioral public policy most effectively move forward, to help change the world for the better? So we wrote this paper, deliberately targeting *behavioral and brain sciences* (BBS) for its interdisciplinary open-peer commentary, hoping both to clarify our thinking and to see how far our diagnosis and proposals resonate, or clash, with others in behavioral public policy and neighboring fields. We hoped to open a productive debate about the best role for the behavioral and social sciences in public policy. The breadth and quality of the commentaries convinces us that we have accomplished this goal.

Our commentators represent diverse viewpoints, some aligning with, and others unconvinced by, our analysis. But our overwhelming impression is one of common purpose and willingness constructively to debate how our field can move forward. Openness to diverse viewpoints has been crucial to the development of the behavioral sciences, whether in integrating economic theory, experimental psychology, and neuroscience, or in harnessing the power of large-scale field studies, big data, and machine learning. We need the same openness when it comes to public policy. We thank our insightful commentators for joining this debate. We have learned a lot in thinking through their arguments; and their insights will, we hope, be valuable for the behavioral public policy community at large.

Our target article reflects our concern that our own policy-related thinking, along with much of our field, has gone off track, and that, collectively, we need a rethink and a reset (see **Lamberton** for a valuable historical context). The two of us have become convinced that many of the growing number of problems faced by the United States, Britain, and other countries – including financial insecurity in retirement, climate change, obesity, gun violence, inequality, and many others – stem not from the limitations of individuals, but from misguided policies. We have also become concerned that "nudging" has become *synonymous* in the public eye, and even among some academics, with behavioral public policy. We made this point in an earlier paper (Loewenstein & Chater, 2017) and pursue it in our target article. In this response, we highlight the broader role that we believe behavioral science can and should play in public policy.

Some of our commentators take exception to our central arguments. They argue that our concerns are misplaced or overplayed (**Hallsworth**; **Sunstein**; **Thaler**), or agree with our diagnosis but argue that behavioral public policy faces more fundamental challenges (e.g., **Edelman**; **Hertwig**; **Osman**). We were gratified and even somewhat surprised by the much larger number of commentaries that expressed support for our central idea, albeit accompanied by constructive criticisms and insights (for example, **Thomas, Kay & Laurin** persuasively argue that an i-frame bias may be built into human moral psychology, which primarily focuses on praise and blame for individuals). Before taking up broader themes, some specific points are worth noting:

(1) **Walton & Yeager** rightly point out that our concern regarding the overemphasis on the individual has a long and distinguished history in social psychology and sociology, disciplines that have long recognized the primacy of the s-frame. Indeed, i-frame interventions in behavioral economics can seem radical and exciting precisely because they break away from such conventional (although, we believe, in retrospect, largely correct) wisdom.

(2) Several commentators point to inequality and discrimination as vitally important topics to which our analysis applies, but which we barely discuss. For example, **He & Kang** argue that "Inequality is not an individual-level issue, but rather a systemic problem that requires systemic solutions. Absent any other supporting systemic intervention, changing individual behaviors is unlikely to close inequality gaps; the systems in which individuals are nested must be fundamentally altered." We couldn't have said it better! He & Kang point out that equity, diversity, and inclusion (EDI) has been dominated by the i-frame perspective (including, they note, a $8 billion/year diversity training industry), distracting, they argue, from addressing deep systemic challenges for organizations and government.[1] Relatedly, at a recent conference on gender inequality, a leading researcher on this topic, Lise Vesterlund, memorably said: "We don't need to fix the woman, we need to fix the system." We agree wholeheartedly. And, referring specifically to economic inequality, **Ruggeri, Tutuska, Ladini, Al-Zahli, Alexander, Andersen, Bibilouri, Chen, Doubravová, Dugué, Durrani, Dutra, Farrokhnia, Folke, Ge, Gomes, Gracheva, Grilc, Gürol, Heidenry, Hu, Krasner, Levin, Li, Messenger, Nilsson, Oberschulte, Obi, Pan, Park, Pelica, Pyrkowski, Rabanal, Ranc, Recek, Pascu, Symeonidou, Vdovic, Yuan, Garcia-Garzon, & Ashcroft-Jones (Ruggeri et al.)** note that, given extreme existing levels of inequality in income and wealth, expecting most people to save for their own retirement is unrealistic. We agree, and discuss financial provision for retirement in detail below.[2]

(3) Although embracing **Hertwig**'s critique of behavioral public policy's focus on human weakness as the cause of societal problems, we remain unconvinced that "boosts" – his proposed policy solution – are likely to have much impact on the problems we discuss. Boosts are the type of targeted education interventions that **Kristal & Davidai**, in their commentary, argue almost never change behavior. Although doubtful of the efficacy of educational interventions to change targeted behaviors, we see education in general as of huge importance: An educated polity is, almost certainly, one more likely to support, and vote for, wise policies.

(4) We also question **Hertwig**'s claim that the widespread "rhetoric of irrationality" necessarily reinforces the presumption that people are primarily the authors of their own problems (as opposed to the systems within which they operate). This focus on irrationality does not, on its own, explain the focus on the i-frame. Indeed, one might equally well conclude that human irrationality argues for more rigid regulation, an argument used, largely uncontroversially, to justify limits on children's choices about whether to be educated, drink alcohol, smoke cigarettes, and so on.

(5) We agree with those commentators (e.g., **Bingley, Haslam, Haslam, Hornsey, & Mols [Bingley et al.]**; **Caggiano, Constantino, Lees, Majumdar, & Weber [Caggiano et al.]**; **Mermelstein & Preston**) who endorse our call for system-level change, but stress the importance of understanding the forces, including bottom-up community mobilization, that often drive such change. We agree that behavioral public policy should not be seen as a purely a top-down technocratic exercise of advising current policy makers, but also as informing the social movements and public debates providing the bottom-up impetus for real change.

(6) Further commentaries focus on how behavioral science can, and already has, helped understand systemic problems (**Bowles**; **Ockenfels**). We strongly endorse the emphasis by Ockenfels and Bowles on the crucial importance of *behavioral*

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

mechanism design: Setting the "rules of the game" likely to produce the best outcomes must be based not on assuming that people can be treated as ideally rational individuals but on a realistic picture of human nature (Bolton & Ockenfels, 2012). Bowles outlines a helpful "mini-manifesto" for a behavioral science of s-frame reform. We believe that ideas of this kind are vital for preserving open debate and democratic institutions (cf., Bak-Coleman et al., 2021; Lessig, 2019; Stewart et al., 2019).

(7) A number of commentators (e.g., **Brown**; **Heath**; **Johnson & Dana**) are sympathetic to our central argument, but, aligning with arguments put forward by Oliver (2023) and Sugden (2017) have ethical qualms about our enthusiasm for s-frame reform, particularly regarding behaviors that primarily impact the individual (e.g., regarding health) rather than imposing social costs (e.g., regarding pollution). We agree that caution is required, but make two points in response. First, it is highly dangerous if behavioral science is deployed only by one side of a market transaction. Currently people are making decisions in environments (e.g., engineered processed foods; slot machines) that are deliberately and carefully designed to steer their "free choice" to ends that are good for companies and bad for individuals. To quote Tariq Fancy, the former Chief Investment Officer for sustainable investing at Blackrock, from an article describing Environmental, Social, and Governance (ESG) Investing as a "deadly distraction" (Fancy, 2021): "No 'free market' truly exists. A market economy is, at its core, a collection of rules. No rules mean no market. Nor is there one set of standard rules. Every rule, including corporate tax rates, patent protection and fines against pollution, is a deliberate decision that has an impact on the system. If a government changes the rules, we get different results – all of which can be defined as market outcomes. Changing rules is no more an 'intervention on the free market' than creating them in the first place."

Second, we are not proposing that consumer protection should be imposed by fiat by a technocratic regulator. How we, as a society, are regulated, should be determined by the normal processes of democratic debate. There is a balance between consumer protection and individual freedom – and that balance should be set, we believe, by democratic consensus (uninfluenced, as far as possible, by corporate lobbying).

In the remainder of our response, we turn to broader questions raised in the diverse and insightful range of perspectives we received on our paper. We organize the points below on a number of discrete themes, discussing each in turn.

R2. Why do deep societal problems persist? Two competing perspectives

In our paper, we talk about individual- and system-oriented policies, drawing upon the widely used metaphor according to which social, economic, and political life is viewed as a *game* (or rather a complex system of interlocking games). The players of each game – citizens, politicians, corporations, think tanks, university researchers, governments, corporations, and many others – interact with one another, seeking to further their objectives, which might take any form, from complete selfishness, to the promotion of the interests of the group, to universal altruism (see **Bowles**, for an insightful discussion of why a single concept of utility may be insufficient to capture the diversity of such objectives). The outcome of any game depends both on the rules of the game itself (the focus of the s-frame), and how – and how well – the players can play according to those rules (the focus of the i-frame).[3]

Persistent societal problems arise when particularly crucial games "go wrong," leading to outcomes such as climate change, inadequate financial provision for retirement, the obesity "epidemic," plastic pollution, and the spiraling costs of health care. Substantial societal problems typically develop over decades and continue to grow despite widespread alarm, active programs of research, and highly motivated and informed groups campaigning for change.

Why do such problems persist? One possibility is that, although the players all genuinely want to fix the problem, they can't figure out, or agree on, what to do. More research, perhaps, is required. On this reading, the various players, despite their diverse concerns, would be willing to help to reduce carbon emissions, plastic pollution, inequality, or spiraling healthcare costs, if only they knew how. We believe that this "good faith" perspective is often implicit in policy thinking, including behavioral public policy.

But there is a second, very different explanation, which assumes that societal problems persist because of *conflicts of interests* between the players. What may seem to be deeply pathological outcomes of social and economic games may in fact be highly beneficial to some participants in the game. If solving a societal problem damages powerful and concentrated interests, these interests will work to block reform.

According to this conflictual perspective, the key obstacle to solving many of society's problems lies not with helping well-intentioned actors find better policies. Indeed, we suggest that the well-intentioned often know very well what to do, at least in general terms. What is lacking is the political influence and popular support to drive through reform, in the teeth of powerful and well-funded opposition. Smoking provides a relatively uncontroversial case. After early and compelling evidence about the harms of tobacco, it was clear that smoking needed to be reduced; and also relatively uncontroversial what measures (s-frame taxes and bans, combined with large and consistent public information campaigns) would be effective. But these measures (as well as the underlying science) were relentlessly contested by "big tobacco," with their considerable financial and lobbying power. Indeed, tobacco companies continue to aggressively promote smoking in many countries around the world, even as profitable Western markets decline. Thus, more than 20% of the global population now smokes, and, according to the World Health Organization (WHO),[4] half of these people will die of smoking-related diseases. As the case of smoking illustrates, where conflicts of interest are creating or maintaining major societal problems, the solution will typically require campaigning and building political coalitions to change the "rules of the game" so that the wishes of concentrated special interests do not prevail.

Johnson & Dana strongly endorse such a conflictual perspective, and review a substantial body of research corroborating our point that existing, concentrated, interests are often behind legislation and regulations that support their interests. They provide, however, a useful caution to our call for s-frame reform (see also **Heath**): "C&L are surely right that traditional regulations, whether through bans or incentives, will change behavior more than nudging. Yet a public choice analysis suggests that this is a reason for more, not less, caution in proposing regulation: Poor nudging can waste resources; poor regulation can lay waste to us all." We agree, but stress that the poorest regulations of all are those that, as is so often the case, have been crafted by powerful interests opposed to change – the phenomenon of

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

"regulatory capture" (e.g., Laffont & Tirole, 1991). It is therefore especially important to apply behavioral science to design, and build support for, better s-frame policies.

Some commentators take the conflictual perspective for granted, and stress the need for reforms in different areas, and at different scales, to address them (e.g., **Bright, Parry, & Thoma [Bright et al.]**; **Edelman**; **Strohminger & Táíwò**). Other commentators, rather to our surprise, downplay the conflictual origins of social problems. Indeed **Sunstein**, fresh from an earlier commentary accusing us of being "reactionaries" (Sunstein, 2022; for our response, Chater & Loewenstein, 2022) now makes the rather mystifying claim that our conflictual analysis can be dismissed as a "conspiracy theory." Sunstein's charge would, if valid, apply to almost all academic studies of the political and policy-making process, where the conflictual analysis is taken for granted across the ideological spectrum, from Karl Marx (2004/1867) to Chicago School Economics (e.g., Becker, 1983; Stigler, 1971). Indeed, the conflictual perspective is entirely standard in fields such as political science, political economy, public health, climate policy, the sociology of science, and many more (Bartels, 2016; Brownell & Warner, 2009; Mann, 2021; Oreskes & Conway, 2011).[5]

The difference between the good faith versus conflictual perspective is crucial in understanding political debate concerning persistent social challenges – and the role of i- and s-frame interventions. The good faith perspective takes the superficial content of this debate at face value, accepting as genuine tobacco companies' expressed doubts that smoking kills, fossil-fuel companies' dismissal of the idea that greenhouse gases cause rising global temperatures, the gun lobby's questioning that the availability of assault weapons impacts the scale of mass shootings, and the insurance industry's view that the US model of private health insurance provides good value health care for the average citizen. The conflictual perspective suggests, instead, that for these and many other apparent debates about "the facts" are phony. The facts are widely and long agreed upon by any serious individual who doesn't have an economic stake in disbelieving them. Uncertainty and confusion arises less from genuine uncertainty than from deliberate obfuscation and disinformation from powerful interests that would be disadvantaged by s-frame reform.

It doesn't require a conspiratorial mindset to appreciate that many current policy debates regarding persistent social problems are similarly phony. Powerful interests benefitting from the status quo will, of course, continually attempt to raise doubts about the "quality of the evidence," or will agitate endlessly for "more research" before action is taken (while often blocking the ability to carry out that research). But, according to the conflictual perspective, these are moves in an economic and political game – aimed at delaying s-frame reform.[6] If persistent social problems typically arise from political log-jams caused by competing interests, better insights into how to change individuals' behaviors are likely to have only marginal impacts. From this perspective, behavioral science will contribute to better policy primarily by helping to overcome the special interests that block s-frame reform.

R3. The definitions of i-frame and s-frame

Some commentators (e.g., **Hallsworth**; **Madva, Brownstein, & Kelly [Madva et al.]**) question the clarity of our i-frame/s-frame distinction. For example, Hallsworth worries that "the distinction does not offer much clarity and holds up poorly under scrutiny." By contrast, we suggest that the core distinction is simple, clear, and is indeed already deeply woven into the social sciences. S-frame interventions involve changing the rules of the game; i-frame interventions attempt to modify the actions of the players, within the existing rules. Distinguishing rules and actions is basic to seeing the social and economic world in terms of games at all: A game is, after all, simply an interaction between agents (players) governed by some set of rules.

Interestingly, libertarian paternalism (Sunstein & Thaler, 2003; see also Camerer, Issacharoff, Loewenstein, O'Donoghue, & Rabin, 2003, and **Heath** for insightful discussion) relies on the same distinction, but with a different slant. Here, changing the rules of the game (s-frame change) is viewed as infringing individual autonomy; "nudging," or providing information, advice, or education (i-frame change), is viewed as preserving individual autonomy. Where we differ from libertarian paternalism is not on the i-frame/s-frame distinction, but on which approach should be prioritized when dealing with major social challenges.

The natural viewpoint of policy makers (and we suspect the general public) is that when games go wrong, we need to change the rules of the game or "system" (e.g., introducing regulations, subsidies, and taxes to decarbonize the economy). The libertarian paternalist perspective offers a superficially attractive "light-touch" alternative (e.g., for climate change, defaulting people into green electricity tariffs; or helping people compare their energy consumption with that of their neighbors). Our contention is that light-touch liberty-preserving alternatives are rarely a meaningful alternative to, and can distract from, much-needed rule changes. But more to the point here: The very concept of libertarian paternalism requires distinguishing between interventions that change the rules of the game (thus impacting individual autonomy); and "nudges" that don't change the rules but encourage players to respond differently.

Now any such discussion (whether from a libertarian perspective, or from our own) is relative to which game, and which players, we are focusing on. Banning displays of cigarettes in shops is an i-frame nudge if we focus on consumer choice (consumers can still buy cigarettes, but it is now harder); it is an s-frame nudge if we focus on the interaction between retailers and the legal system (the retailers aren't merely discouraged from displaying cigarettes – they are legally required not to do so). But whichever game is the focus, changing the rules of the game, rather than nudging the players, is likely to be more effective. Focusing on consumers, bans and taxes will be more impactful than nudges that make cigarettes less salient in shops. Focusing on retailers, banning cigarette displays outright will be more impactful than nudging them to make displays less salient. If any game is going persistently wrong, the policy maker's, and the public's, first thought should be how to change the rules. This typically means facing up to a trade-off between welfare and liberty, to be resolved by the normal political processes. For most persistent social problems, to follow the libertarian paternalist in hoping this trade-off can be dodged, by helping players play better within the existing rules, is to pursue a mirage.

Some commentators propose introducing a third, intermediate level of analysis (a group-frame, **Bingley et al.** or community-frame, **Caggiano et al.**). We are very sympathetic to this emphasis on groups of many kinds, including popular movements (**Mermelstein & Preston**; see also Cole, 2016). Regarding theory and terminology, though, we believe it is simpler to stick to the basic distinction (changing the rules of the game vs. the actions of the players), while allowing that the players in the game (i.e.,

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

system) under study can be groups (or other aggregate entities) rather than individuals (just as we might model a wage negotiation game between labor unions and businesses, rather than individual workers and managers). Similarly, there may be interesting i-frame/s-frame issues within groups or organizations (e.g., concerning struggles for control within a social movement).

R4. Crowd-out, crowd-in, and the impetus for s-frame reform

Several commentators doubt our assertion in the target article and in prior work (Hagmann, Ho, & Loewenstein, 2019) that nudges may "crowd out" support for more substantive policies. We will turn later to an obvious, material, crowd-out effect: That armies of researchers testing nudge interventions are not engaged in other policy-related research. Here, we focus on the narrower question of whether exposure to i-frame interventions, whether in the news or in practice, diminishes support for structural changes.

Sunstein, who has extensive experience in public policy, claims to have never seen such crowd-out. This conflicts with other top-level policy makers we have interacted with who, reading our paper or hearing us present it, have reported on situations in which the (false) promise of nudges diminished support for more substantive reforms. Sunstein dismisses the systematic pattern we identify of corporate support for the i-frame as no more than "arresting stories," but seems to have complete confidence in his own personal observations from his time in the White House.

Sunstein seems to misunderstand our worry that behavioral scientists' focus on i-frame interventions can weaken support for systemic reform. He claims "If we were making a list of 100 reasons why system reform has not happened in some important area (such as climate change), the fact that some behavioral scientists have been enthusiastic about i-frame interventions could not possibly make the list." We are certainly not claiming that crowd-out is one of the most important causes of lack of progress on climate change (or any other issue). This would be to radically overestimate the power of behavioral insights, or indeed any other source of policy recommendations, when compared with the vast political and commercial forces battling for control of the climate agenda. We are not expecting behavioral public policy to single-handedly change the world; we are hoping that more reflection on our focus as a discipline may increase the degree to which we can collectively contribute in a positive direction as far as possible.

We are surprised that **Sunstein** expresses such confidence that i-frame research findings will not reduce the perceived need for s-frame change. To requote a passage we highlighted, he recently wrote (Sunstein, 2021, p. 548):

> It has long been thought that to reduce environmental harm, the best approach is an economic incentive, perhaps a corrective tax. In recent years, however, increasing attention has been given to non-monetary interventions including "nudges," such as information disclosure, warnings, uses of social norms, and default rules. A potentially promising intervention would automatically enrol people in green energy, subject to opt-out.

This very description pitches i-frame interventions as an *alternative* to what was "long thought" to be the best approach: A carbon tax. **Sunstein** seems to imply that the best approach may not be a carbon tax, or similar s-frame reform, but that i-frame nudges may provide an alternative. Behavioral scientists need to be very cautious about conveying such an impression, whether intentionally or not.

Sunstein also dismisses our research as "unreliable non-evidence, including surveys finding that if you tell people about an i-frame intervention, you can reduce support for an s-frame intervention." We assume Sunstein cannot be suggesting that survey evidence is always unreliable – indeed, he has a long track-record of using, and drawing strong conclusions from, survey methods. But if that is not the implication of his statement, then why are the diverse empirical studies we review – all showing large and highly statistically significant crowd-out effects – viewed as "unreliable non-evidence?"[7]

Zhao & Chen address the empirical question more substantively, and point to a recent meta-analysis concluding that there is no systematic negative spillover between different environmental behaviors (although also showing weak or non-existent positive spillovers). They cite Thomas, Sautkina, Poortinga, Wolstenholme, and Whitmarsh's (2019) study, which found that the English plastic-bag charge changed behavior and increased support for other charges to reduce plastic waste. Of course, as a plastic-bag charge is a paradigm s-frame policy, this demonstrates a positive spillover from s-frame reform to i-frame reform, rather than the opposite.[8] Zhao & Chen note that positive spillovers might be more likely when i-frame interventions target intrinsic motivation. **Koppel, Robertson, Doell, Javeed, Rasmussen, Rathje, Vlasceanu, & Van Bavel (Koppel et al.)** acknowledge the lack of empirical support for positive spillover, but claim that positive, crowd-in, effects could be obtained if nudges played on social identity, paralleling **Walton & Yeager**'s claim that nudges could have large effects if more accurately targeted.[9]

We acknowledge that there are situations in which positive spillovers could, and very likely do, occur – in which being nudged to engage in a certain behavior *increases* public support for more substantive measures. **Newell, Vigouroux, & Greenwell (Newell et al.)** provide a persuasive example: Although there is little if any evidence that carbon-footprint calculators reduce personal emissions, they suggest that "knowledge about how our personal actions can collectively make a difference in tackling environmental problems can be a powerful motivator for supporting proenvironmental action."

In closing this subsection, we note that Hagmann et al. (2019) did not intend the conclusion of their paper, "Nudging out support for a carbon tax," to be that nudges *always* crowd out more substantive policies, but as a response to claims that such effects do not occur (e.g., **Sunstein**; **Thaler**). Indeed, as we note in our target article, Hagmann et al.'s final study showed that these effects disappear when participants are informed of the likely small impact of the nudge (green-energy defaults).[10] We continue to believe, along with many commentators (e.g., **Bright et al.**; **Hertwig**; **He & Kang**) and, apparently, many companies and their public relations agencies, that the i-frame can provide a potent distraction from s-frame change, unless we are very clear about the modest impacts that i-frame interventions are likely to have.[11]

R5. i-Frame and s-frame interventions: Complements or substitutes?

A number of commentators (e.g., **Cherry & Kallbekken**; **Collier, Harris, Jecks, & Bendtsen**; **Hagger & Hamilton**; **Koppel et al.**; **Madva et al.**; **Newell et al.**; **Ruggeri et al.**; **Sunstein**; **Zhao &**

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

Chen) note that i-frame and s-frame policies should be viewed as complements, not substitutes: That is, that surely both are required. We agree, and regret if we failed to convey this clearly. We did go some distance in that direction in the target article, stating for example, that:

> uncontroversially, s-frame policies should be as "ergonomic" as possible, and they frequently fail badly in this regard… A valuable lesson from the behavioral insights movement has been that ergonomics matters just as much for government policies as for the personal computer (PC) or smart phone. Designing policy around the consumer can frequently make the difference between success and failure, and policy design should be guided primarily by behavioral insights.

Among the illustrations we provide is the case of a carbon tax (or, nearly equivalently, a cap-and-trade scheme), widely recognized as an essential part of any successful response to climate change. Designing and implementing a carbon tax that is both effective and acceptable to the public will, as we discuss in our paper, require key decisions (some involving i-level issues) that can usefully be informed by behavioral research.

Although i-level and s-level interventions can and should be synergistic, a very real danger arises when i-frame interventions (typically with modest scope and effect sizes) are framed as *alternatives* to s-frame change. The problem is not primarily that nudges, information provision (for example, calorie labels, labels for recycling, kite-marks for sustainability), boosts (**Hertwig**), financial education, computational tools for assisting decision making (**Johnson & Mrkva**) and the like are being oversold by their inventors. The danger is rather that they are being *overbought* by policy makers hoping that difficult s-frame policy challenges can be avoided by supposed i-frame alternatives.

Indeed, our central theme is that powerful interests opposed to s-frame reform exploit the prospect of i-frame change as a substitute for s-frame change. Thus, as we document, fossil-fuel companies have promoted individual carbon footprints; pension companies frame long-term retirement provision as a matter of personal prudence; food companies focus on individual choice, and especially levels of exercise, as the root cause of the obesity epidemic; companies generating vast quantities of plastic waste sponsor advertising campaigns focusing on individual responsibility for littering; the gun lobby promotes the slogan that "guns don't kill people, people kill people," and so on. Viewed through the lens of the conflictual analysis of persistent social problems, this is to be expected, as a tactic to reduce pressure for s-frame solutions and to focus instead on i-frame interventions, which are likely to have only marginal (although often worthwhile and positive) impacts.

In the debate over the substitutability versus complementarity of i-frame and s-frame policies, an obvious point gets lost: Researchers have limited time and resources. As **Roberto** writes, "Resources spent developing, pursuing, and touting relatively ineffective i-frame interventions draw resources away from the development and implementation of more effective s-frame solutions." "Attentional and physical resources are limited. A researcher spending time investigating or promoting an i-frame solution is not spending that time investigating or promoting an s-frame solution. Funding dollars spent on i-frame research is not spent on s-frame work." Roberto concludes that "Behavioral scientists who want to develop solutions to the world's biggest problems should focus their efforts on s-frame solutions." We agree. Similarly, **Newell et al.** also point to the "scarcity of academic or bureaucratic resources" as reasons for why i-frame and s-frame interventions can act as substitutes rather than complements.

R6. Are i-frame interventions really so ineffective?

Surprisingly few commentators (e.g., **Johnson & Mrkva**) challenge our conclusions about the (in)effectiveness of nudges.[12] We stress that in some policy contexts, i-frame ergonomics, and in particular choice architecture, can be important (e.g., Johnson, 2022). But often better s-frame design is more crucial. Thus, no amount of nudging to help people to save can compensate for a fundamentally flawed pension system (see below). We completely agree with Johnson & Mrkva that policy makers need to be alert to, and regulate against, profitable but welfare-destroying "dark nudges."

Beyond the studies we cite (e.g., by DellaVigna & Linos), it is useful to consider a more recent analysis (Saccardo et al., 2022) of two randomized controlled trials (RCTs) of nudges to increase coronavirus disease-2019 (COVID-19) vaccinations (N = 187,134) and 111 nudge RCTs ranging across policy areas involving 22 million people. The paper concludes that "nudges' estimated efficacy is higher when outcomes are more narrowly (vs. broadly) defined and measured over a shorter (vs. longer) horizon, which can partially explain why nudges evaluated by academics show substantially larger effect sizes than nudges evaluated at scale by a government agency."[13]

Relatedly, and consistent with this theme, **Thaler** notes that: "the range of interventions studied by behavioral scientists is truncated by what I call permission bias: you can only test what you can get the approval to try. It is wrong to infer from this fact of life that behavioral scientists are using the wrong 'frame.' Rather, they face constraints! It also makes it problematic to judge the potential impact of possible behavioral policy interventions based on the set of randomized controlled experiments behavioral scientists have been allowed to run." It is indeed possible that nudges might be more effective if unconstrained by policy-making realities. But these same constraints inevitably bind not only on what RCTs are possible, but also what policies can be implemented. Moreover, if Saccardo et al.'s (2022) findings hold more broadly, we might anticipate that large-scale and longer-term trials, if and when they could be run, would produce disappointingly modest effects. More generally, our argument, echoing others (e.g., Deaton, 2020; Deaton & Cartwright, 2018a, 2018b), is that the focus on RCTs itself is extremely restrictive, and largely excludes s-frame reform. Systemic changes typically affect everyone, and usually cannot be randomly allocated to some people and not others. We discuss this point further in section R8, dealing with research methods.

Walton & Yeager suggest that nudges might be more effective if more accurately targeted. They cite two meta-analyses finding that a specific type of nudge, mindset interventions (which they acknowledge that we don't discuss but, somewhat mysteriously, claim that we nevertheless mischaracterize) has modest overall effects. But they argue that: "One should not expect strong main effects but variable effects in different contexts (for i-frame interventions) … C&L ignore this, claiming that small average effects for nudges indict the field. Yet the question should be: how and under what circumstances can effects be optimized?" Perhaps, but the proof will be in the pudding.

Newell et al. propose that discouragement about small nudge effect sizes arises from excessive expectations. We agree that

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

"behavioural scientists should not overhype the potential impact of i-frame interventions beyond what is justified by their typically modest results." Indeed, as shown in Hagmann et al. (2019), this is crucial for encouraging complementarity rather than rivalry between s- and i-frame approaches – because it is critical for policy makers, opinion formers, and the general public to appreciate that, in most policy domains, i-frame interventions are too weak to substitute for s-frame change.

R7. Have behavioral scientists been engaging with the s-frame all along?

Some commentators (**Hallsworth**; **Sunstein**; **Thaler**) stress that behavioral insights have *already* often been applied to inform systemic change.[14] According to this critique, where behavioral insights researchers are in, or are close to, government, they have frequently focused on systemic policy (e.g., laws, taxes, mechanism design). Where this occurs, it is to be applauded and extended.

Perhaps differences in perspective partly reflect a disagreement on what counts as substantive s-frame reform. Focusing on the crucial case of what he terms "saving for retirement" **Thaler** writes "In four decades of behavioral economic research on this topic, the focus has always been on making the system work better for humans. Isn't that the s-frame?" Not necessarily. Indeed, the very framing of retirement provision as a problem of "saving" reflects an individualist perspective. Retirement is, in most countries with successful pension systems, not a matter of individuals saving (and making investment decisions) for their own retirement; it is often a process that is primarily organized by the state.[15]

Substantial s-frame reform for pension provision in the United States needs to be far more radical than the innovations presented by auto-enrolment and auto-escalation. The entire defined-contribution retirement system, with its unrealistic assumptions about individual saving, highly regressive tax breaks, requirement that individuals make their own (uninformed) investment choices, ease in permitting withdrawals and borrowing against retirement savings, and ignorance of the realities of life at low or even median income-levels in the United States, is fundamentally flawed.

The benefits of defined-benefit schemes (and other collective schemes) are clear: They pool risks across many workers. By contrast, defined-contribution schemes place the risk regarding life-expectancy and investment performance firmly with the individual. Most people attempting to provide for their retirement under such schemes have little idea what level of savings will be sufficient, or how to draw down the money once they are retired. As it happens, across the population, defined-contribution pensions are also seriously underfunded: Many people with such schemes face severe financial hardship in retirement.[16]

Thaler claims: "Private sector defined-benefit plans, like typewriters and dial telephones, are obsolete technologies few people pine for." But the transition has not occurred because of public enthusiasm for defined-contribution schemes; but because they are cheaper for employers and more profitable for pension providers (Hassel, Naczyk, & Wiß, 2019). The outcome has been disastrous. The median 401(k) balance in the United States in 2019 for people *who have a 401(k)* in the age range 55–64 was an utterly inadequate $144,000.[17] Worse, 48% of that age group have no 401(k) at all. If defined-benefit schemes were the typewriters of their day, it seems we must now make do with a broken pencil.[18,19]

The challenge of s-frame pension reform is substantial, but is dwarfed by the technological and social transformations required to tackle problems such as climate change or healthcare reform. This "inconvenient truth" is rarely confronted in behavioral public policy (**Roberto**, see also **Lamberton**). For example, **Jackson** notes how little social science policy research (including behavioral science) has focused on addressing the growing problem of inequality in the United States, United Kingdom, and many other countries. Of course, where there are small-scale "quick wins," we should embrace them.[20] But we must not lose sight of the scale of reforms required to bring about really substantive change; nor of the inevitability that such reforms will be vigorously opposed by those benefitting from the status quo.

There is doubtless room for further debate on how usefully and distinctively behavioral science can shape government policy. But this issue is largely independent of our argument that: (1) that a large fraction of the behavioral science community has focused on i-frame interventions to the detriment of exploring routes to sorely needed systemic reform; and (ii) the biggest stumbling block to reform is not lack of insight (behavioral or otherwise) about what to do, but achieving the political momentum to overcome the powerful interests opposing system change. A major role of behavioral science should, therefore, be to help identify how to mobilize popular support to overcome powerful vested interests.

R8. Why is there so little s-frame behavioral public policy research?

A theme that we touch upon, but do not discuss in detail, in our target article is the tendency for the most widely used social science methods to bias policy toward the i-frame. **Jackson** concurs, arguing that "the social sciences are increasingly ill-equipped to design system-level reforms. Long-standing trends in social science – in particular, increasing specialization, emphasis on causal inference, and the replication crisis – are barriers to system-level policy development." **Strohminger & Táíwò** likewise argue that "structural factors bias and perpetuate behavioral science toward the i-frame"; we agree, though we are skeptical of some of their specific proposals (e.g., choosing which research projects to fund by lottery). **Gal & Rucker** have elsewhere noted that "applied behavioural science tends to overvalue interventions that can be readily tested using experiments," and argued that such constraints on research "drives the popularity of light interventions and nudges and unnecessarily limits the scope and ambition of the field" (Gal & Rucker, 2022). **Thaler** also points out the biasing effect of constraints on research: "An important point to stress is that behavioral scientists, whether they are in academia or nudge units, do not have the authority to experiment with most of the rules and regulations in a given domain. No nudge unit has the ability to say, hey, let's try a carbon tax in half the country and strict emission rules in the other and see how it goes. In practice they are often limited to messaging campaigns, which are less impactful."

Note, though, that the limits on s-frame research go beyond what **Thaler** refers to as "*permission bias*" – that researchers need political permission to test their ideas. Commercial funding for science is very substantial, and, given severe limits on government funding of research, inevitably influences the types of research that gets done. Worse, commercial interests can suppress science. Koerth (2023) notes that there is little evidence on effective gun controls in the United States because laws banning the use of gun-tracing information for research purposes was enacted by gun-lobby-influenced legislators.[21] In consequence, Koerth notes, a recent major Rand report (Smart et al., 2023) that adopts strict criteria to evaluate studies on gun control finds just three studies between 1995 and 2020 meet

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

these criteria. But these are, in any case, the *wrong standards* for s-frame policies, where experimental studies are generally impractical (and well-controlled "natural" experiments are rare); instead, historical and cross-national (and sub-national) comparisons, while imperfect, are hugely informative.

More broadly, s-frame policy innovation is inevitably, as **Cherry & Kallbekken** observe in their insightful commentary, a process involving intuition and exploration, as is true for systemic changes ranging from restructuring a business, changing a law, to widening the franchise, expanding civil rights, or setting up entirely new institutions. Any experimentation in system-level reform typically occurs in a fairly ad hoc manner, as the new systemic change is trialed and continually adapted to deal with the inevitable stream of hitches and unintended consequences (Hausmann & Rodrik, 2003; Mulgan, 2021; Sanger & Levin, 1992).

A cautious approach to policy innovation relying on experimental, or similar, evidence as a precondition would have ruled out most of the major transformational developments in human history. Consider the transitions toward democracy, revolutions in agriculture, manufacturing, and the invention of information technology (IT) (and their economic and organizational consequences), the modern financial system, the creation of the welfare state, or the international institutions of the United Nations (UN), and many more. All these huge s-frame innovations would have been hopelessly hamstrung if each move forward had to be grounded in a solid basis in RCTs.

Research and its influence on policy can be skewed in other ways, too. Scientists, ourselves included, are naturally driven by curiosity. But what is most interesting is not always what is most important. **Roberto** writes:

> typically, scientists ask questions they are curious about and that other scientists find interesting. This approach works well if you want to learn something about human psychology or offer self-help ideas or treatments for people. But if your goal is to contribute population-level solutions (which are required for most big challenges), a scientist must begin the research process by asking: (1) What is known about the problem drivers, (2) what has been tried, and (3) what solutions are most promising?

Without abandoning curiosity as an important and legitimate criterion for the selection of research projects, a "nudge" for researchers in the direction of policy impact might be beneficial.

R9. Final thoughts: Behavioral science and the struggle against special interests

We agree that behavioral insights are key to enacting and implementing successful policy reform (e.g., **Hallsworth**; **Sunstein**; **Thaler**). A key, but under-appreciated role that the behavioral sciences can play is in winning the "political battle" against special interests (which are not seriously attempting to engage with the truth or find policy solutions to maximize human welfare). Radical systemic change often comes from the bottom-up, as well as from top-down. Understanding which policies gather popular support (Fitzgerald, Lamberton, & Walsh, 2016) and how to design policies (e.g., carbon taxes, health care, or pension reform) to maximize that support are key challenges.

Major societal problems require, we believe, major systemic change. Early social and economic theorists as varied as Thomas Hobbes, Jean-Jacques Rousseau, Adam Smith, David Ricardo, Auguste Compte, and Karl Marx, focused at least as much on changing the social world as on understanding it (Mulgan, 2021). But major s-level change, even where it is widely agreed to promote human welfare overall, will typically be bitterly opposed by those benefitting from the status quo. The challenge in formulating, and building support for, reforms that address the fundamental challenges that face our societies is formidable, but more than worth confronting. All available tools must be deployed, and where i-frame solutions can contribute, behavioral scientists should pursue these enthusiastically. But to really make a difference, behavioral public policy needs to refocus its insights and energy on s-frame reforms: Almost always, deep policy problems require us not just to nudge the players, but to *change the game*.

Acknowledgments. N. C. gratefully acknowledges the support from the Economic and Social Research Council (ESRC), via the Rebuilding Macroeconomics Network (Grant Ref: ES/R00787X/1); and through the ESRC Network for Integrated Behavioural Science (grant number ES/P008976/1). The authors thank Jason Dana, Linda Dezső, Cait Lamberton, Phil Newall, and Christina Roberto for helpful feedback on this essay.

Notes

1. For a recent example, Colin Prescod, the outgoing chair of the UK's Institute of Race Relations has "decried the widespread use of 'nonsense' unconscious bias training, claiming it is an obvious sidestepping of tackling racial injustice." https://www.theguardian.com/world/2023/feb/18/unconscious-bias-training-is-nonsense-says-outgoing-race-relations-chair
2. We remain to be convinced, though, of how far **Ruggeri et al.**'s study of "positive deviants" will help design policies to support economic mobility.
3. As well, of course, as background factors that influence the course of the game, which we might term the state of "Nature," e.g., the facts of climate science, human physiology, life expectancies, the chemistry and economics of plastic recycling, and much more.
4. https://www.who.int/news-room/fact-sheets/detail/tobacco
5. In Sunstein's own work (e.g., Sunstein & Vermeule, 2009) he defines conspiracy theories as beliefs that "powerful people *have worked together* in order to withhold the truth" (our emphasis). The present case is very different. There need to be no "powerful people" working together, presumably in secret. Rather, corporations are independently pursuing PR and lobbying tactics that will, as conventional economic logic would dictate, promote their interests. Indeed, we agree with Sunstein and Vermeule's observation that incorrect beliefs about the harm of cigarettes and climate change "are… both false and dangerous, but… need not depend on, or posit, any kind of conspiracy theory" (p. 206). Real conspiracy theories are very different. For one thing, they tend to be overly complicated (Chater & Loewenstein, 2016). For example, the popular conspiracy theory that the US government was behind the 9/11 tragedy envisions the government secretly hiring the hijackers, booby-trapping the buildings (according to the dominant "theory," the airplanes alone would be insufficient to cause their collapse). Our observation that corporations consistently and publicly advance the i-frame does not fit this pattern.
6. From a conflictual perspective, attempts to develop and implement policy alongside industries that stand to be commercially disadvantaged by effective action needs to be viewed with skepticism. So, for example, the UK gambling industry has agreed to put odds-of-winning on slot machines, but ensure that these are difficult for gamblers to find, read, or understand (Newall, Walasek, Ludvig, & Rockloff, 2022).
7. Hagmann, Liao, Chater, and Loewenstein (2023) present two new studies showing that when people are exposed to i-level, as opposed to s-level, solutions to policy problems (involving climate change, financial provision for retirement, and obesity) they are subsequently more likely to (1) spontaneously propose i-level interventions as being the best solutions to the problem, (2) indicate that individuals rather than governments are responsible for creating, and solving, the problem, and (3) support charities oriented at the individual level (e.g., providing education programs) as opposed to the systemic level (e.g., lobbying for policy reform).
8. Cherry, Kallbekken, Kroll, and McEvoy (2021) find that survey respondents provided with information about solar geoengineering – an even more radical (albeit temporary) solution to climate change than a carbon tax – are

https://doi.org/10.1017/S0140525X22002023 Published online by Cambridge University Press

significantly more likely to support a carbon tax, again indicative of crowd-in from a more heavy-handed solution to a more light-touch one rather than the reverse.

9. Identity is, obviously, a two-edged sword, and, to date, has probably been used far more for ill than for good (Mukand & Rodrick, 2018).

10. **Lamberton** provides a helpful taxonomy to predict when crowd-out will and will not occur.

11. A particularly striking illustration of the general pattern is the motor industry's promotional efforts from the early 1920s to blame road deaths on individuals, and especially pedestrians, and to argue for better education for road users (Standage, 2021). But dramatic road-safety improvements have been generated by s-frame reforms, as exemplified by Sweden's vision zero approach to automobile fatality prevention, which they frame as a "paradigm shift, where the ultimate responsibility for road safety is shifted from the individual road-user to those who design the transport system." https://www.roadsafetysweden.com/about-the-conference/vision-zero---no-fatalities-or-serious-injuries-through-road-accidents/

12. Johnson and Mrkva note that the same nudge techniques (e.g., defaults) used in public policy are employed to an even greater extent by corporations, causing harms to consumers, and disproportionately to the poor. They call for "regulation and s-frame mandates" to combat these effects, and we entirely agree.

13. Beyond issues of effectiveness, Tor and Klick (2022) challenge prior estimates of the *costs* of nudges, and question the claim in prior research (Benartzi et al., 2017) that nudges are "low hanging fruit" because they are so cheap. They argue that reanalysis of Bernatzi et al.'s data "reveals that they variously exclude and include key cost elements to the benefit of behavioral instruments over traditional ones and overstate the utility of cost-effectiveness analysis for policy selection. Once these methodological shortcomings are corrected, a reassessment of key policies evaluated by the authors reveals that nudges do not consistently outperform traditional interventions."

14. Indeed, although the UK's Behavioural Insights Team became colloquially known as the "Nudge Unit," this was always an inappropriately narrow label. This unhelpful shorthand has stuck and extended to similar teams across the world.

15. One critic has, in personal communications, provided many examples of perceived s-frame interventions, some apparently spearheaded those in the nudge movement. These include the agreement by finance industry leaders such as Vanguard to facilitate transferring defined-contribution savings when changing employer. Such change is welcome, although it may require no "deep" behavioral justification.

16. Thaler notes disadvantages of traditional defined-contribution schemes regarding portability and possible fund bankruptcy. Clearly, these problems are solvable with suitable s-frame reform. In many countries such schemes are easily portable; and the risk of bankruptcy is solved by reinsurance and, ultimately, government backing.

17. Data from Boston College, Center for Retirement Research: https://crr.bc.edu/wp-content/uploads/2021/03/401kIRA-Balances_2019-SCF.pdf

18. Indeed, across the world workers have persistently and vigorously attempted to defend their defined-benefit schemes, often with industrial action (a fight that is on-going in the UK higher education sector at the time of writing: https://www.unison.org.uk/news/article/2022/02/unison-vows-to-fight-against-sustained-attack-on-he-pensions/).

19. Thaler points to the UK's NEST pension scheme as a successful alternative to the Australian plan. Whatever its strengths and weakness, note that, as we do in our target article, that NEST is almost entirely a conventional s-frame policy, with only a marginal behavioral element (e.g., the ability to opt-out, which is rarely exercised, and almost always financially damaging when it is, because the employer's matching contribution is lost).

20. A rather different point is that one can reasonably question quite how much specifically *behavioral* insights actually contributed to policy debate. We do not question the value of some of the policy analysis produced by teams of behavioral insights specialists (including ourselves). For example, the recent and excellent report by the Behavioural Insights Team on moving toward a net-zero society does not claim to rest on strong behavioral science foundations, and most of its recommendations are advocated in conventional policy circles. We see this is a major strength. But it is important to note that informed and high-quality policy analysis looks quite similar whether primarily behaviorally informed or not – and hence the "added value" of the behavioral science perspective may be relatively modest (https://www.bi.team/wp-content/uploads/2023/01/How-to-build-a-Net-Zero-society_Jan-2023.pdf).

21. This is part of the 2003 Tiarht Amendment: https://en.wikipedia.org/wiki/Tiahrt_Amendment

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