

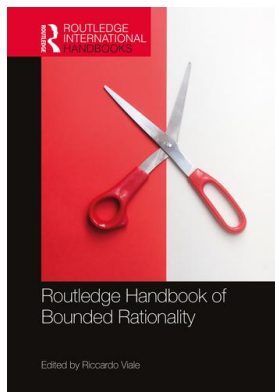
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AGAINST NUDGING

Simon-inspired behavioral law and economics
founded on ecological rationality*Nathan Berg***Introduction**

Paternalistic policy making in general—and Thaler and Sunstein's (2008) nudge program, in particular—assume that we have a reliable and relatively stable expert consensus regarding what we should eat, how much we should save for retirement, which types of securities should be held in our retirement portfolios, and how we ought to make sundry other decisions for which many lack conviction to take decisive action without a nudge (e.g., whether to become an organ donor). Critiques of the nudging program are many. Some of these critiques follow from: (1) debates over competing definitions of axiomatic rationality versus Simon-inspired bounded or ecological rationality (Gigerenzer and Selten, 2001; Berg, 2014a; Gigerenzer, 2016); (2) philosophical and methodological concerns over autonomy and the option to change one's mind raised by Sugden (2016, 2018) and Infante, Lecouteux, and Sugden (2016); (3) evidence regarding the stability of expert advice and social epistemologies on which appeals to authority rest discussed in Viale (2001, 2012, 2019, forthcoming); (4) and well-known incentive problems in the signaling literature that may impede the unbiased transmission of expert advice (Berg, 2018; Berg and Kim, 2019). A less frequently recognized implication of ecological rationality (in contrast to that of axiomatic rationality) is that *heterogeneity of beliefs and decision processes* is a beneficial social good responsible for numerous positive externalities (Berg and Watanabe, 2020). How nudging risks reducing these important yet difficult-to-observe indirect benefits of heterogeneous beliefs and behavior is the focus of this chapter.

Heterogeneous beliefs and decisions can, of course, be costly. Not all behavioral deviations from what experts say we should do are good. Putting aside the uniformly distributed trembling hand (because that is not the kind of unsystematic deviation one often finds), many of the compelling behavioral findings in the last three decades reflect highly non-uniform *deliberate* deviations from normative decision theory—or *purposively systematic* deviations when they are unconscious or autonomic (whether helpful or otherwise in the particular environment in which they are used, e.g., evolutionary mismatch). Although not yet mainstream (because it contradicts the Kahneman-inspired view among many behavioral economists that deviations from axiomatic rationality must somehow be costly and therefore pathological), there are, by now, abundant empirical evidence and numerous theoretical models demonstrating that some types of deviations, when well-matched to the environments in which they are used,

confer individual-level advantages or improved payoffs to deviators relative to non-deviators (Gigerenzer, Todd, and the ABC Research Group, 1999; Selten and Gigerenzer, 2001; Berg and Hoffrage, 2008; Berg, Biele, and Gigerenzer, 2016). My aim in this chapter is to focus instead on the less frequently considered *social* benefits of heterogeneity in beliefs and behavior. I argue that advocates of nudging policies—which risk jeopardizing both population- and individual-level benefits of behavioral diversity, in part, by inducing less resilient monocultures—would do well to incorporate these risks into their analysis.

Peter Kropotkin and Glen Shafer express the idea that heterogeneity among the decision processes that individuals employ—and heterogeneity among the metrics that individuals use to assess how well they perform—is broadly normative (Berg, 2003, 2018; Berg and Gigerenzer, 2010). In many real-world (and theoretical) decision-making environments, there is no one-size-fits-all “optimal” or “best” process that people would agree should be used to make decisions, form beliefs, or evaluate outcomes (Simon, 1957, 1979; Gigerenzer and Selten, 2001).¹ Social benefits from behavioral diversity include diversification of population-level risks, efficiencies from competition among differing views, ideas, and beliefs, and—less obviously—beneficial social coordination services achieved through voluntary choice in heterogeneous populations, which may be (inadvertently) blocked when paternalistic policies induce behavioral monocultures. For example, the social networks generated from voluntarily choosing to eat vegetarian or give money to charity may lose social significance once these behaviors become policy makers’ desired outcomes. Just as financial incentives may crowd out cooperative or prosocial behavior (e.g., Eckel, Grossman, and Johnston, 2005; Mellström and Johannesson, 2008; Brown and Knowles, 2019), so, too, policy prescriptions may crowd out voluntary choice by individuals of the policy maker’s preferred behavior. Policy prescriptions can be expected to alter coordination services, social meanings, and what can be inferred from voluntarily choosing behaviors that policy makers wish to induce with nudging. Another important aspect of social benefits of heterogeneity follow from the so-called triple-helix model in which nurturing distinct views and objectives that lead to complementary but distinct processes of innovation within a complex adaptive system raises special challenges for policy makers seeking to encourage innovation (Viale and Pozzali, 2010).

In addition to benefits, there are also costs of new complexities to consider when policy makers introduce framings and nudges. Nudges introduce strategic communication between experts and non-experts, which forces non-experts to filter information in new ways. Non-experts notice when experts shift from disseminating information *without paternalism* toward paternalism (even in the absence of coercion where the choice set is simply re-described but not materially altered, e.g., nudging).² Non-experts therefore cannot be sure of experts’ objectives when disseminating information, which may reduce information flows, trust and social welfare (Berg, 2018; Berg and Kim, 2010).

There are additional informational benefits that heterogeneity may confer that are not mentioned above, which include discovery of hidden benefits from minority behaviors (e.g., therapeutic uses of tobacco in irritable bowel syndrome and Parkinson’s and Alzheimer’s Disease), innovation and welfare gains from competition and trade based on opposing beliefs, and subjective benefits from the option value and exercise of individual freedom (e.g., Sugden, 2018). In this context in which public health is used to justify restrictions on consumer choice (i.e., paternalism that goes beyond nudging), Popper’s critiques of seemingly benign sympathy with totalitarian means to virtuous ends (among political philosophers’ interpretations of Plato) as developed in *The Open Society and Its Enemies* are relevant. Similarly relevant is Hayek’s discussion of world views about whether *order*,³ as a foundational public good, should be understood as *cosmos* (endogenous or spontaneous order that arises through purposeful action in

the face of “irremediable ignorance on everyone’s part of most of the particular facts which determine the actions of all the several members of human society” (Hayek, 1973, p. 12)) or as if it were designed by policy makers, or choice architects, or some other unitary entity, as *taxis* (exogenously given or “made order” (Hayek, 1973, p. 36)).

Benefits of decentralization—once a foundational insight of welfare economics based in part on the First Fundamental Welfare Theorem—risk being mislaid (Berg, 2018). The possibility of social costs attributable to market failures are also underscored by the stringency of the Welfare Theorem’s hypothesis, namely, the joint absence of market power, externalities, and information asymmetry. When failures of this hypothesis arise, as they often do, of course it is not automatic that intervention will satisfy the benefit–cost criterion and improve social welfare. And it would be naïve to fail to recognize numerous rent-seeking motives when political support for intervention forms.

As appealing and reasonable as it may sound to introduce nudges aimed at influencing individuals to make (what some experts claim would be) better choices as judged by themselves (about which many well-published experts would themselves disagree, e.g., fewer saturated fats; more cancer screenings; greater contributions to employer-sponsored retirement savings programs,⁴ etc.), there *are* real risks of inadvertently hurting people who respond to nudges precisely in the way that those policies are intended to work.⁵ If populations respond to nudges as they are designed to and bring the population’s profile of beliefs and behaviors into closer conformity, then multiple beneficial streams of belief and behavioral heterogeneity also risk being reduced. This latter risk involves more subtle and indirect social benefits of heterogeneity forgone, which motivates its special consideration in evaluating the benefits and costs of nudging and paternalistic policies more broadly.

Expert advice and political uses of scientific claims

There is substantial disagreement in the nutrition and medical research literatures regarding macronutrient percentages (e.g., fat, protein, carbohydrate) in the diet and, specifically, whether polyunsaturated or saturated fats reduce or increase risk of chronic disease.⁶ Policies concerning the screening of asymptomatic women and men for breast and prostate cancer, respectively, are another important area of contention among experts where proponents of nudging have nevertheless appeared and influenced governments.⁷ Encouraging savers to accept more exposure to financial risk (which often means equities and high-yield bond funds) to earn higher rates of return is yet another case where behavioral economists have argued that influencing people to shift their behavior is obvious (e.g., Benartzi and Thaler, 1995) even though we know that large equity draw-downs, money-market-fund defaults, and severe liquidity crises are far from unlikely events that savers will face over their lifetimes.

Despite the standard advice from financial advisers to max out employer-matches in 401ks and the compounding tax benefits of individual retirement accounts, it should at least be acknowledged that this advice, when acted on, raises new risks of having one’s wealth concentrated in brokerage accounts, Exchange Traded Funds, and asset classes with counterparty risk adverse liquidity events (e.g., New York money-market specialist, The Reserve, whose Primary Fund with exposure to Lehman-Brothers-issued commercial paper “broke the buck” on September 18, 2008). If a nudging program is “successful” by the narrow criterion of increasing savings rates and balances held in retirement accounts, the social-welfare consequences of homogenizing a population’s otherwise more heterogeneous retirement savings decisions remain far from obvious.

Viale (2001) argues that expert knowledge could be reconfigured to strengthen the necessary appeals to authority in evaluating scientific claims. See Viale (2001, 2012) for more discussion of social epistemologies and the *methodological cognitivism* advocated in this context, which bear special relevance for evaluating prescriptive claims upon which nudging policies rest. It must be acknowledged, of course, how challenging it is to consistently apply any political principle (e.g., ranging from *laissez-faire* to totalitarian health dictatorship by public health experts), or a fixed set of normative principles, to guide policy makers' responses to serious problems such as insufficient retirement savings (Harrison and Ross, 2018), even when there is agreement that it is indeed a problem. Observers can agree on the population-level outcome they would like to see without finding common ground on the role of centralized power in bringing that outcome about. The question of "Should there be more or less government?" applied to such problems depends crucially on the counterfactuals considered. Part of the challenge involves how to appropriately circumscribe the answers we regard as admissible evidence when we ask "Without intervention, which harms would have occurred if not for the intervention?" versus the much subtler question of "Which socially beneficial behavioral innovations and new private organizations to address this problem would have appeared without the intervention?"

Given the available evidence regarding regulatory capture, falsehoods propagated by governments based on lobbying rather than scientific evidence (e.g., the "food pyramid"), regulatory failures to protect the public from dangerous drugs, and regulatory failures (of a distinct kind) that block research and availability of un-patentable approaches to treating disease and improving health—one would hope that advocates for more intervention would acknowledge that our answers to the question of whether more government regulation based on scientific expertise would improve social welfare are often ambiguous. Well-informed empiricists can, and do, frequently disagree. And transparent access to that disagreement is beneficial for those who want to make up their own minds. Disagreement is, once again, socially beneficial when it leads to collection and dissemination of new evidence. False harmonization of discordant expert views, as well as disparaging those who question evidence regarding what a political "consensus" claims to be "settled science," can do real harm.

Ecological rationality

Inspired by Herbert Simon,⁸ the research program on *ecological rationality* (Gigerenzer and Selten, 2001; Smith, 2003; Berg and Gigerenzer, 2010; Berg, 2014a, 2015), focuses on a novel normative criterion that diverges from definitions of rationality used elsewhere in economics. Rather than rationality being an attribute solely of the decision maker—or the decision-making process a decision maker employs (as in axiomatic definitions of a preference ordering's rationality or the choice data it generates)—the definition of ecological rationality also depends on the external reward-generating environment in which the decision process is used.

Ecological rationality is a matching criterion. It requires that a decision process perform sufficiently well when measured by one or more performance metrics relevant to the environment in which it is used. There are virtually no decision processes that are universally ecologically rational. For any decision process (including constrained optimization), there exists some choice domains where it performs poorly according to one or more relevant performance metrics. Ecological rationality is therefore not an inherent attribute of a decision maker or a decision process. Decision processes can be ecologically rational in one set of environments (or decision domains) and ecologically *irrational* in others.

One theme in the ecological rationality research program is to clearly define domains of reward-generating environments and performance metrics with respect to which a given

decision process performs well. Another theme relevant to Simon-inspired behavioral law and economics is how law and regulation—interaction with the population profile of decision processes actually in use—*jointly* construct the reward-generating environment. A heterogeneous ecology of decision rules employed by many different individuals and constrained by the institutional particulars of whichever laws and regulations are in effect at a particular time and place can perform well, by an appropriately specified aggregation rule or social welfare function. Epstein (1995), for example, argues that legal codes based on six simple rules could resolve many seemingly intractable complexities in contemporary societies arising from both technological innovation and timeless or nearly universal human moral principles.

As a normative criterion for evaluating the rationality of a decision process, ecological rationality is not domain-general, whereas axiomatic rationality is. Ecological rationality situates normative evaluations of rationality in a circumscribed set of environments or domains. The important role of the reward-generating environment and environment-specific metrics of performance make ecological rationality amenable to formal modeling. They also make ecological rationality *falsifiable* and, thus, not tautological. Such models describe rules of belief formation and behavior that do not necessarily arise as the solution to a constrained optimization problem.

Like axiomatic definitions of rationality, the possibility of *failing* to achieve ecological rationality is critical to its value as a normative concept. The possibility of failure gives meaning to statements or boundary conditions that circumscribe the set of environments in which a decision process performs well enough to achieve ecological rationality (given a threshold of performance in a particular class of environments). Clear partitioning of this set into disjoint sets of environments—one in which a decision process performs badly, and another in which it performs well enough—provides valuable information to the study of institutions, in general, and law and regulation in particular.

Having established that ecological rationality is distinct from axiomatic rationality,⁹ it is also worthwhile to observe that both concepts of rationality support normative evaluations of a decision process that can be conceptually identified as characterizing *individual performance*. The criterion of ecological rationality requires *good-enough* performance in a particular environment. In contrast, axiomatic rationality requires that observed choice data conform to domain-general axioms (e.g., transitivity), which first came to prominence in economics as technical requirements for well-known utility representation theorems. These distinct concepts of rationality also map into distinct normative evaluations of public policies.

Public policy

Another relevant methodological observation when comparing the performance of public policies based on ecological versus axiomatic rationality is that they can lead to different rankings of policies based on policy makers' own objectives—apart from the social welfare effects they produce. For example, Berg and Gigerenzer (2007) show that a society of satisficers requires less paternalistic intervention from risk regulators than a society of risk-averse expected utility maximizers to achieve the policy makers' goal of limiting behavior they regard as dangerous.

In contrast, the nudging program assumes that *violations* of standard axiomatic definitions of rationality based on internal logical consistency (e.g., preference reversals, framing effects, transitivity violations, time inconsistency) are themselves pathological. The assumption that violations of logical invariance and axiomatic rationality must incur economically meaningful harms lacks much empirical evidence and is contradicted in many studies outside of Kahneman and Thaler's research program (only a small subset of which is cited in this chapter). Nevertheless, the de-biasing program proposes that violations of axiomatic rationality be "corrected" so that

allegedly “biased” decision processes undergo paternalistic interventions to “de-bias” (e.g., Jolls, Sunstein, and Thaler, 1998). Paternalistic policy advice based on behavioral economics (e.g., Sunstein, 2014, 2016a, 2016b; Sunstein and Reisch, 2014; Sunstein, Reich, and Rauber, 2017)—and Sunstein and Thaler’s nudge program, in particular—furthermore fail to explain why alleged biases that afflict people in general (not to mention rent-seeking motives) do not afflict paternalistic policy makers and choice architects.

Following Simon, March, Gigerenzer and others, one can point to compelling evidence that high-performing organisms, humans, and organizations (e.g., Alphabet, Amazon, or the New Zealand rugby team, the All Blacks) are not optimizers (e.g., Cyert and March, 1963; Gage, 2012). Instead, they perform to a high level (i.e., succeed in their respective endeavors) by using heuristics that are well-matched to the class of decisions and inference tasks in which they are used.¹⁰ Note (once again) that ecological rationality measures “success”—of procedures for making decisions or inferences *and* the social institutions that influence those decisions and inferences—by domain-specific performance metrics (e.g., wealth, health, happiness, objective accuracy, etc.).

Heterogeneity of beliefs and behavior as a public good

Although one should be cautious about attributing specific policy views to Simon, my reading of him suggests a Simon-inspired approach to the design of institutions in general—and legal and regulatory frameworks in particular—which rests on the principle that *behavioral heterogeneity* is itself a public good that confers many important social benefits which are often difficult to observe directly. Based on this insight, one may consider heterogeneity itself to be a public good and that efforts to defend against policies that risk encroaching upon heterogeneity are worthwhile to consider in social-welfare analyses of nudging and other paternalistic policies. In contrast, the nudging program and related work in behavioral law and economics prescribe public policies aiming to induce greater conformity with “expert” views of what constitutes optimal behavior (based on the biases and heuristics program). In so doing, it tends to view behavioral heterogeneity as a *problem* requiring heterogeneity-reducing policy solutions.

By aiming to induce conformity with expert recommendations (e.g., Sunstein and Vermeule, 2008; Thaler and Sunstein, 2008), which are relatively static compared to the speed at which the adaptive dynamics of decentralized systems generate value from individual experimentation with non-orthodox behavior and beliefs, the nudging program risks reducing individual payoffs, as well as population-level robustness. The nudging program also risks blocking revelation of valuable information generated by heterogeneous individual approaches to decision making. In blocking the revelation of new information generated by heterogeneity, beneficial social equilibria based on voluntary choice instead of paternalistic intervention—or worse, authoritarian prescription and proscription—are disrupted. These social costs are separate from any direct consideration of individual autonomy as a weighted term in the social welfare function. Including autonomy or liberty as weighted terms in the social welfare function would only compound losses from nudging.

Viale (forthcoming) argues that the hypothesized “System 1,” which uses fast, non-deliberative heuristic shortcuts, is one mechanism through which “choice architects” who advocate nudging policies such as defaults for organ donation believe that nudges affect decisions. Therefore, the claim that these nudges are “libertarian” is weakened because the vitally important preservation of a nudged decision maker’s choice set and his or her capacity to choose to not take up the nudge (i.e., Rebonato’s (2012) so-called “reversibility” criterion, required for the libertarian claim) is never engaged. (This is according to the choice architects’ own theory of why the

nudge will work.) The libertarian claim for nudging is therefore undermined and its coercive intent revealed. Nudges that are effective because of how System 1 reacts to choice architects' strategic framing stand in contrast to a second set of nudges (such as "cooling off" periods) that are designed to cue System 2 (i.e., more deliberation and analytic reflection of benefits and costs). Viale (2019) further analyses the implausibility of the dual theory of mind (i.e., Systems 1 and 2) upon which advocates of nudging rely.

Distinct normative interpretations of behavioral heterogeneity in Simon-inspired (as opposed to Kahneman–Thaler-inspired) schools of behavioral economics rest on opposing views about how stable the reward-generating environment is relative to the much slower speed at which institutions can change policies that seek to paternalistically influence people toward expert views of optimal behavior and belief. Is what we know about financial markets, human physiology and risk taking really stable enough to justify nudging individuals toward consensus views of optimal behavior in the current environment and given any currently available body of evidence, which nearly always include conflicting views and interpretations? Do institutions that provide expert advice and influence public policy (e.g., recommending that people invest more in the stock market, give more to charity, avoid sugar, and eat "healthy fats"—whichever those turn out to be) wind up processing new information fast enough, updating expert recommendations flexibly enough, and avoiding regulatory capture and the influence of lobbyists¹¹ reliably enough for us to have confidence that reducing heterogeneity by inducing conformity with expert recommendations is a good idea? These unsettled questions reveal how different assumptions regarding the stability of experts' partial knowledge about the reward-generating play an important and largely unrecognized role in driving these competing research programs within behavioral law and economics.

Heterogeneity forgone: costs and risks of nudging

In a world governed by a stable reward-generating environment that is simple enough to be described with a scalar-valued objective function, and exhaustively known (possibly vector-valued) constraint set which gives rise to a well-defined optimal choice (i.e., a "small world" (Savage, 1954; Shafer, 1986)), it is indisputable (within the confines of such a model) that deviations (i.e., suboptimal choices) are costly. Even in this case, however, where it *can* be calculated how much is lost by deviating from optimal choice (or, aggregating over individuals, lost social welfare), the *costs of nudging programs and paternalistic intervention* are not guaranteed to be fully offset by aggregate social welfare improvements achieved by nudging a non-optimizing population to optimize. Although gains are possible (as long as the payoff functions and contributions of heterogeneity to payoffs are correctly specified), new largely unforeseen risks emerge as a result of shifting the population profile of beliefs and actions toward greater homogeneity.

Advocates of nudging do not seem to take into account how changes in the *population* distribution of beliefs and behavior could adversely affect the social welfare function. Instead, they appear to rely on a *tacit* assumption of a Benthamite social welfare function under which payoff improvements at the individual level (predicated on their *explicitly* maintained assumption that individuals who respond to nudges will judge their own payoff to have improved as a result) cleanly aggregate into social welfare improvements.

Yet another problem when assessing possible payoff improvements achieved by paternalistic intervention—from the perspective of process-dependent (rather than consequentialist) preferences—concerns the loss of liberty and the subjective devaluation of payoffs associated with an outcome when that outcome is mandatory rather than voluntary (cf. Conly, 2014).

If the social welfare gains hypothesized by choice architects are the result of non-deliberative responses to nudges and fail the reversibility criterion emphasized by Rebonato (2012) and Viale (2019, forthcoming), then we should consider whether those subpopulations with process-dependent preferences that put positive weight on self-determination, autonomy, and liberty might evaluate the resulting population profiles of nudged beliefs and actions less favorably than if those same profiles were arrived at without nudging. Insofar as some members of society do put weight on self-determination, autonomy and liberty, even a utilitarian social welfare analysis should take these non-consequentialist aspects of preferences into account.

It is not difficult to imagine substantial violations of consequentialists' invariance-over-outcomes principle in subjective valuations attached to an outcome such as weight loss. The decision maker can lose weight by voluntarily paying to enter a "fat farm" where food choice is restricted. Or the decision maker could achieve an identical slimming outcome as the result of a legislative mandate, government control over the distribution of food, or active and successful nudging campaigns that change social norms and meanings associated with voluntarily preventing obesity. It does not seem far-fetched that many people would have strict preferences over an identical slimming outcome, ranking self-determined slimming ("I did it myself!") over market-assisted slimming ("I chose to go to the fat farm and achieved the desired result") over nudges ("I didn't notice that the desserts in the lunch room had been placed out of sight in the corner, and it seems they have caused me to lose weight") over coercive paternalism ("I stopped eating as much after sin taxes raised the prices of foods I like to eat"). A successful slimming nudge could reduce payoffs from the self-determined slimming outcome while achieving the same outcome by nudging. The social value associated with the slimming outcome for some likely depends on: (1) the population distribution of slimming outcomes, and (2) the process by which the outcome was brought about (e.g., slimming has greater subjective value when chosen autonomously rather than as the result of deception, coercion or command).

One could object to these points by recalling two justifications in Thaler and Sunstein (2008). First, proponents of "libertarian paternalism" argue that if all elements of the choice set remain available and a nudging policy only changes the default, or re-describes the choice set with a new framing, then "choice" is preserved. Although influenced by a centralized power, authority or government, Thaler and Sunstein claim that preservation of the availability of all elements in the choice set should make us regard nudging policies as libertarian. If the preserved items in the choice set are never considered or deliberated about (Rebonato, 2012; Viale, 2019, forthcoming), however, or if the social and individual values associated with those elements in the decision maker's choice set are materially altered (as I argue in this chapter), then the libertarian claim is unjustified.

A second justification put forward by Thaler and Sunstein, with which I agree, is that, in many cases, there is no neutral description of the choice set. For example, in arranging food items on a food buffet line, *some* item must be placed at the front. Similarly (their argument goes), regarding organ-donor status, the law must take a non-neutral stand on opt-in (as in Germany) versus opt-out (as in Austria). Granted that a non-neutral choice-influencing default must be selected, there is still a collision of conflicting principles. The libertarian principles of self-ownership and voluntarism clearly suggest that defaults should be set so that posthumous use of one's body reverts to the individual's estate in the absence of any directives "opting in" to organ-donor status. On the other hand, advocates of nudging claim that changing the default helps more individuals realize an otherwise unexpressed preference to be an organ donor. Social welfare analysis should at least acknowledge that there are conflicting normative principles and reasonable people can disagree about the appropriate weights to place on each principle and possible unintended consequences.

Another risk to consider more carefully before accepting the social welfare claims of those advocating for more nudging is that expert consensus is mistaken, or that no one-size-fits-all recommendation applies to everyone in the population. Expert recommendations are notorious for flip-flopping over time. Tragic episodes where regulators have recommended medicines that caused great harm (e.g., more than 10,000 disabled by thalidomide given to pregnant women for several years) are hardly unknown. When policy makers set out to influence individuals to make decisions with their money and health, risks of harm should be considered.

Honest errors and revision are to be expected as new medical, financial or behavioral research contravenes previous recommendations. Then there are more nefarious strategic distortions, such as the influence of lobbyists, rent seeking or deep capture. In my view, it makes little sense to exclude consideration of policy errors and unintended consequences from social welfare analysis of proposals to introduce nudges as public policy.

Beyond “as-if” to policy in a profoundly uncertain world

One of Gigerenzer’s key arguments against modeling choice and inference *as if* it were the solution to a well-defined constrained optimization problem (Berg and Gigerenzer, 2010) is the instability of the reward-generating environment. What basis of evidence about behavioral “errors” could be relied upon for policy recommendations about savings, dietary choice, and charitable giving in such environments? Even with a well-defined and stable reward distribution, if that distribution is sufficiently fat-tailed so that the theoretical mean and conditional means do not exist (e.g., the Cauchy distribution), forming beliefs and basing actions on averages and correlations from the past would not provide a stable and informative set of mental processes to learn about the reward environment and make accurate predictions—let alone make public policies that prescribe optimal behavior from on high (i.e., nudging people to conform to expert recommendation).

This is not to say that public policy is impossible in such environments. Rather, Epstein (1995) argues, in effect, that the Simon-inspired behavioral and law economics founded on ecological rationality in *un-learnably unstable* and *unknowably complex* environments must rest on principles of liberty and voluntary choice, while mitigating the most harmful negative externalities (e.g., murder and theft) based on long-established legal principles that otherwise allow for wide-ranging preference and belief heterogeneity in decision making about money, health, and information (e.g., Epstein, 2003, 2018).

If behavioral heterogeneity consisted of random deviations from expert recommendations, then perhaps the lost payoffs from suboptimal decision making could be used as justification for nudging. Because real-world deviations are, by and large, non-random and constituted by purposeful (although oftentimes inconsistent) action, nudging programs that seek to limit or restrict those deviations lack both *normative* and *moral* authority (Epstein, 1995, 2011, 2018). Epstein’s arguments in favor of long-established legal traditions and restraint against complexifying the legal environment with new policy objectives and their unintended consequences are largely compatible with Simon.¹²

Gigerenzer (2016, p. 364) argues for education, drawing motivation from Simon’s (1985) assertion that “people are generally quite rational; that is, they usually have reasons for what they do:”

the dismal picture of human nature painted by behavioral economists and libertarian paternalists is not justified by psychological research. Rather, it is largely the product of narrow logical norms of rationality and selective reporting of the psychological

literature. Most important for public policy, by comparing cognitive illusions with visual illusions, libertarian paternalists misleadingly suggest that attempts to liberate people from their biases through education are largely doomed to fail. However, as I will show, there is experimental evidence that even children can learn to deal with risk and uncertainty—if they are taught how. I will conclude that democratic governments should invest less in nudging and more in educating people to become risk savvy.

This basic normative question is raised too infrequently: Which normative principle is the basis for designing policies to “correct” alleged violations of rationality that are frequently often cited in the behavioral economics literature? Many arguments in favor of nudging begin by reciting extensive empirical evidence—which *is* indeed compelling and descriptively convincing that such empirical patterns exist. This evidence, by and large, reveals that axioms, which were originally used as technical criteria in representation theorems, are routinely violated. Observed violations of consistency axioms are not in doubt. Rather it is the *interpretation* of those important empirical findings that requires deeper investigation.

It may be the case that healthy and successful people do not typically have well-defined domain-general preferences (i.e., no single objective function explains the decisions they make). They may rather use a toolkit of simple action rules or heuristics. The use of a particular decision heuristic is thought to be applied when cued by context or situation. Without disputing the damning evidence against the descriptive realisms of stable and consistent preferences, the normative implications are, in contrast, far from straightforward.

Promoters of nudging argue that this evidence implies a need to roll out new policies to help people avoid “errors.” This conclusion, however, reflects an odd normative interpretation given to the observation that most people’s choice data do not conform to the strictures of perfect internal logical consistency. Their argument is that nudging policies that help restore behavioral consistency according to the neoclassical model of rationality will make people better off—or better off “as judged by themselves” as Sunstein writes.

The authoritarian turn

Economists undertaking normative analysis could, at this point, instead dispense with the assumption of stable internally consistent preferences which are required in both nudgers’ and neoclassical revealed preference theorists’ welfare claims based on the common premise of stable preferences represented by smooth utility functions that can be inferred or “recovered” based on observed choice data. They could circumscribe the universality of axiomatic definitions of rationality which, by their definitions, must hold across all choice domains. They could follow Simon and allow for contextually-cued piecewise-defined objective functions, which would mean applying distinct welfare criteria or multiple performance metrics depending on the choice domain.

For example, many of us behave as if we are free riders in some domains and, at the same time, inconsistently take the lead contributing to public goods in other domains (Kameda et al, 2011). Many of us are dogged own-payoff maximizers in some domains and generously pro-social in others. Sometimes we expend great effort to think analytically, and sometimes we use shortcuts, such as imitation, or follow intuition instead of cognitive analysis. Sometimes we exhibit such inconsistency with self-awareness and reflection. Yet sometimes our inconsistent behavior is autonomic or unconscious. Setting aside neoclassical definitions of rationality, an empiricist observing the regularity of inconsistent beliefs and behavior could more

easily interpret them as descriptive of normal, healthy and productive decision making than pathological irrationality.

Behavioral economists could become more committed empiricists by observing the richly heterogeneous human population and seeking to describe the multiple decision processes and normative evaluations that people use to achieve success, thrive, and live “a life well-lived.” Instead, the nudging program channels Orwellian visions of centralized control under guidance by experts. This unfortunate exclusion of the multiplicity of decision processes in use, and the multiplicity of relevant normative criteria, reveal an authoritarian turn in the intellectual history of behavioral economics. This authoritarian turn is based on inflexible and narrow norms.

Perhaps incidentally, the authoritarian turn also generates new demand for academics and “expert advice.” Cynics could be forgiven for not writing it off as coincidence when they observe increased reports of “irrationality” in behavioral economists’ academic findings and concurrent increases in public money and power over others allocated to them (as policy influencers, providers of research aimed at influencing policy, policy designers, choice architects, and program administrators).

Behavioral economists discovered that observed choice data fail to conform to axiomatic rationality. These axiomatic definitions of rationality require internal logical consistency above all else (even though the reward-generating process is dynamic and unstable). They were first used in utility representation theorems by Samuelson and von Neumann and Morgenstern, and later re-interpreted by Kahneman-inspired behavioral economists as a normative standard of rational or optimal behavior. There is little evidence that violations of axiomatic definitions of rationality in choice data lead to measurable economic harm, and some evidence that deviations from axiomatic rationality are positively associated with performance. Successful people (by many metrics of success) violate the axiomatic definitions of rationality as well as those less successful. Given that people’s choice data generally fail to conform to that axiomatic standard, what should policy makers do about it? It would be surprising if many non-economists regarded this brief synopsis of the stylized facts surrounding the Kahneman–Thaler program as strong motivation for paternalistic intervention rather than revising the shortcomings of the narrow norms used and expanding the way rational behavior is defined.

A Simon-inspired alternative

Following Simon’s notion of satisficing, ecological rationality requires that a behavioral rule or *heuristic*—a procedure for making a decision or inference—satisfies a threshold condition (i.e., is “good enough”) when evaluated by a metric of performance that makes sense in the particular context in which it is used. This threshold requirement in ecological rationality provides an objective standard that usually (but not always) allows for more behavioral heterogeneity than in Kahneman-inspired models of rationality with prescriptive logical invariance. Although optimization problems may also have a large number of solutions and allow for an arbitrarily large degree of behavioral heterogeneity among optimizers, economic models used by those who advocate nudging programs typically have narrower views on what constitutes successful behavior—in decisions about retirement savings, diet, organ donation, charitable giving, etc. This narrowness gives substance to the critique of nudging as reducing heterogeneity of beliefs and behavior.

The standard of ecological rationality allows for multiple ways of being objectively successful. For example, if there is a threshold level of wealth that is required to be financially viable, then it follows that there is a plurality of purposeful decision processes that can achieve that criterion. The problem of designing an effective reward environment (in both private organizations and

as public policy, e.g., legal institutions, restrictions on action in the legal code, fines, subsidies, and—perhaps—strategic framings used to induce law-abiding behavior) defines a naturally Simon-inspired approach to behavioral law and economics founded on the matching concept (between heuristics and reward environments) that underlies ecological rationality. Given the vast literature documenting legal institutions that fail to induce behavior consistent with policy makers' objectives (e.g., the War On Drugs aiming to reduce illicit drug use; Sarbanes-Oxley aiming to fix systematic risk caused by “too big to fail” financial institutions, which arguably led to increased market concentration in banking and finance since the Great Financial Crisis of 2008–2009; and immigration policies across most G30 countries that often bring results opposite to stated intentions), it would seem that more veridical study of decision processes—and the challenge of designing robust rules of the game that enable value generated by interaction among the heterogeneous decision processes that individuals actually use—should be a research priority. Positive externalities from behavioral heterogeneity are missing in most social-welfare analyses of nudging. When policy is based on academic experts' views of optimal retirement savings behavior, optimal dietary choice, or optimal medical decision making, a number of social costs are incurred that rarely enter into benefit-cost analyses of such programs.

Insofar as nudging succeeds in concentrating more of a population's decisions on an allegedly optimal decision, population-level behavioral heterogeneity is reduced. The population loses portfolio diversification that would otherwise have been afforded by more heterogeneous retirement savings decisions. Nudging workers of a certain age into similar retirement portfolios increases payoff variance in the event of a financial crisis. A generation of Japanese retirement savers would have been far worse off had they been nudged out of low-return “postal savings accounts” into professionally managed funds with greater exposure to equities in the NIKKEI Index during the 1980s—which peaked in December 1989 and traded 80 percent lower more than 20 years later and currently, after a long bull market, trades at more than 40 percent below its peak. Japan's aggregate retirement savings would have endured greater volatility and sharply lower levels had Save More Tomorrow (as advocated by Thaler and Sunstein's (2008) nudging program) been used as a template for the design of Japan's retirement savings schemes. Ignoring what Benartzi and Thaler (1995) propose provided an aggregate benefit of reduced volatility in the value of retirees' net wealth and protected against losses.

One may argue that the importance of the Save More Tomorrow nudge was to increase the level of savings rather than shift the composition of retirement savings accounts (i.e., how retirement funds were invested). If the level of savings in retirement accounts is the sole normative criterion used to evaluate the nudge, then we can regard it as successful. If we expand the normative criteria to include savers' subjective judgment of their own consumption-savings path, which includes the reduction in disposable income before retirement and related hardships that Zywicki (2018) reports—not to mention stress-testing its effects on wealth over time horizons that include a depression or 50 percent drawdown—then the question of whether the nudge is objectively beneficial to savers remains ambiguous. For more on species-, population- and individual-level benefits from heuristics that generate behavioral heterogeneity rather than uniformity (at an optimum at one particular time in one particular reward environment), see Bookstaber and Langsam (1985); Todd, Gigerenzer, and the ABC Research Group (2012); Hertwig, Hoffrage, and the ABC Research Group (2013); Mousavi and Kheirandish (2014).

As mentioned earlier, Zywicki (2018) reports evidence of individual-level harm inflicted by Save More Tomorrow nudging programs. Controlling for other differences, savers enrolled in Save More Tomorrow programs, on average, made larger contributions to their retirement savings accounts by direct debit each month but carried larger credit card balances and used other high-interest debt products such as payday lending at significantly higher rates

than un-nudged workers. Thus, the seemingly worthy goal of encouraging workers to save more for retirement had unintended costs in the form of greater expenditures on interest and financing fees—and possibly greater stress and reduced financial flexibility with less disposable income.

Expert nutritional advice is famously contradictory, and perhaps justifiably so, given that contradictory information is frequently revealed by new studies, which includes randomized control trials, longitudinal population studies, and small-sample findings that bring new information to light despite lacking statistical precision or external validity (also potentially valuable in revealing previous mistakes and new breakthroughs). Optimal macronutrient composition (fats, carbs, protein), for example, remains unknown and likely varies across people and within person over time. More difficult questions would include: Which fats?, Which carbs?, Which proteins?

Well-informed scientists frequently disagree, sometimes reaching opposite conclusions based on the same available evidence. This disagreement, in turn, provides socially valuable informational benefits for those who have access to open debate rather than facing top-down, centralized one-size-fits-all food choice environments and incentive systems with sin taxes, agricultural subsidies, regulation of food imports, etc., based on a static conceptualization of “expert consensus.” One thing that most nutrition researchers seem to agree on, however, is the inappropriateness and ineffectiveness of food pyramids promulgated by the U.S. and foreign governments. (e.g., the U.S. Department of Agriculture (USDA) introduced but then halted publication of its “Eating Right Pyramid” in 1991, which was followed by subsequent food pyramids, including “My Plate” (Rowland, 2016),¹³ each eliciting controversial responses from nutrition experts and industry groups.) Nudging programs designed to influence what food people choose risks inflicting harm by influencing choices toward food choices that will subsequently be modified or contra-indicated. They also risk wasting information about discovery of the best practices in food choice, which may not follow any simple algorithm at the population level and, instead, require substantially different approaches to eating for different people.

Against nudging

Sunstein (Chapter 38 in this volume) acknowledges that the welfare implications of nudging are, in general, ambiguous. He asserts that there are three cases to consider. In the first case, there are stable preferences and nudging is unambiguously helpful as judged by the individual’s own standard. The second case involves a self-control problem where it is argued there are multiple selves with different preferences. In this case, Sunstein claims that nudging is once again helpful by the individual’s own standard, so long as the individual has a clear meta-preference (e.g., ranking the cool and sober self, who patiently deliberates about future-versus-future intertemporal trade-offs, over the impulsive and emotionally “hot” self, who prefers an immediate small payoff over a later larger payoff). In Sunstein’s third case, preferences are endogenous to nudging, which therefore has ambiguous welfare implications. Sunstein claims that the first two cases comprise a “large” set of choice domains that gives ample justification (and enthusiasm) for nudging programs. In the third case with ambiguous welfare implications, he calls for case-by-case investigation into the welfare consequences, suggesting that they can be gleaned by “explor[ing] what informed, active choosers typically select.”

Sunstein’s list of three cases is incomplete, however. There are omitted cases that come up frequently: undefined preferences, undefined or dynamic discovery of new objectives, and multiple context-specific objectives across which there may be no one-size-fits-all

nudging program whose social-welfare improvements exceed its expected costs from new risks imposed. The claim that the welfare implications in cases 1 and 2 are unambiguously positive can also be challenged, for example, with the example of Save More Tomorrow and the observation that its application in other places and times would not have led to social welfare improvements using an expanded set of reasonable performance metrics, such as net wealth at time of retirement. If applied decades prior to a 50 percent draw-down in stock market indexes and major dislocations in bond markets, as has occurred in multiple countries including the U.S. and Japan over the last 100 years, that nudge could have materially damaged savers' aggregate wealth and well-being, although it succeeded in its narrow objective of increasing retirement savings rates during most working years. Given the instability introduced by unconventional monetary policy since the GFC, who is to say whether increased savings into 401k retirement plans will prove to be an enabler or detriment to savers' well-being?¹⁴ Serious risks of harming individual and aggregate well-being by introducing nudging programs as government policies should be considered with more attention to new costs and risks they introduce.

Controlling impulsiveness is widely acknowledged as a genuine behavioral challenge by people with a broad range of views on the advisability of nudging. It is instructive to recall here that, in addition to impulsive under-saving, Strotz (1955) also considered the problem of *excessive saving* among multiple time-inconsistent behavioral profiles in intertemporal choice domains. For many of us, introspection reveals important cases—perhaps just as many (as one wonders how these should be counted, weighted, or averaged)—in which excessive moderation, or too much emotional cool, can hurt us, too.¹⁵ We sometimes regret staying cool and deliberative and wish we had been more strongly moved by emotion. Proponents of nudging and “System 1 versus System 2” dualism contend that System 2 is generally helpful and the true seat of rationality. But there are times when we *should* have made noise and we erred by *not* acting on emotion—*not* asking for a raise, *not* negotiating a better deal, or *not* giving into impulsively and asking someone who would have been a great life partner for a phone number for a first date.

Generalized prescriptions on the basis of behavioral economics at this early date, while we still lack conclusive evidence of economic harms attributable to violations of consistency axioms, would seem to reflect hubris on the part of behavioral economists. No doubt, many advocates of nudging are genuine, and their concern for helping others avoid mistakes is sincere. Given the risks of paternalistic policies uncovered already and lack of investigation into the unintended consequences of nudging and new paternalism, however, it would seem that recalling some of the fundamental observations by classical economists would be wise: social-welfare benefits from decentralization; heterogeneous endowments, preferences and beliefs as fundamental underpinnings of socially beneficial exchange; and the corrupting influence of power. These fundamentals generally encourage *caution* about introducing new policies. To these should be added the link between population heterogeneity, on one hand, and creativity and innovation on the other. Simon's corpus of work alerts us to many mechanisms by which successful adaptation can occur in the face of unstable reward environments. Its implication is a behavioral law and economics that depends beneficially on high-dimension heterogeneity of beliefs and behavior (e.g., Bennis et al., 2012; Berg, 2003, 2006, 2010, 2014b, 2017; Berg, Abramczuk, and Hoffrage, 2013; Berg, El-Komi and Kim, 2016; Berg and Gabel, 2015, 2017; Berg and Hoffrage, 2008; Berg, Hoffrage and Abramczuk, 2010; Berg and Kim, 2014, 2015, 2016, 2018a, 2018b, 2019; Berg and Maital, 2007; Berg and Murdoch, 2008; Dold and Schubert, 2018; Kameda et al., 2011; Rizzo and Whitman, 2018).

Notes

1 According to Simon:

The first consequence of the principle of bounded rationality is that the intended rationality of an actor requires him to construct a simplified model of the real situation in order to deal with it. He behaves rationally with respect to this model, and such behavior is not even approximately optimal with respect to the real world.

1957, p. 198

Simon also states:

The first is to retain optimization, but to simplify sufficiently so that the optimum (in the simplified world!) is computable. The second is to construct satisficing models that provide good enough decisions with reasonable costs of computation. By giving up optimization, a richer set of properties of the real world can be retained in the models.

1979, p. 498

- 2 For example, we can expect some proportion of the population to formulate different beliefs and take different actions depending on whether expert advice is disseminated as “Consider this information and then you decide what is best” as opposed to “This decision has been structured to influence you to choose what experts believe is best for you.”
- 3 In *Law, Legislation and Liberty* (1973, p. 35), Hayek wrote: “Order is an indispensable concept for the discussion of all complex phenomena, in which it must largely play the role the concept of law plays in the analysis of simpler phenomena.”
- 4 Zywicki (2018) reports that participants in the private nudging policy in the Save More Tomorrow Program succeeded at contributing more to tax-advantaged 401k retirement accounts. On average, those successfully nudged savers also wound up cash-strapped with significantly higher revolving balances on credit cards and other high-interest-rate credit products such as payday lending. In his evaluation, the evidence is far from clear that this nudge—when it worked as intended by inducing greater contributions to 401s—improved the targeted population’s well-being. Of course, one can attribute the increased use of high-interest-rate financing as another behavioral mistake requiring further paternalistic regulation (and perhaps nudging) to discourage uptake. The observed pattern of one nudge leading to unintended secondary problems is unlikely to resolve disagreements about whether paternalism (or lack of more paternalism) is the root problem. The pattern does underscore, however, the conspicuous absence of serious consideration of unintended consequences from paternalistic interventions in the nudging literature that classical and neoclassical economists have identified.
- 5 These three allegedly “reasonable” behaviors are examples of decision domains where advocates of nudges have influenced real-world policy making despite remarkable disagreement among experts regarding what constitutes a reasonable inference based on available evidence and decisions.
- 6 Forouhi et al. (2018) report in the *British Medical Journal* that there is controversy rather than evidenced-based consensus regarding dietary recommendations on fat:

The medical literature is still full of articles arguing opposing positions. For example, in 2017, after a review of the evidence, the American Heart Association Presidential Advisory strongly endorsed that “lowering intake of saturated fat and replacing it with unsaturated fats, especially polyunsaturated fats, will lower the incidence of CVD”. Three months later, the 18-country observational Prospective Rural Urban Epidemiology (PURE) Study concluded much the opposite: “Total fat and types of fat were not associated with cardiovascular disease, myocardial infarction, or cardiovascular disease mortality”. ...

In the absence of long term randomised controlled trials, the best available evidence on which to establish public health guidelines on diet often comes from the combination of relatively short term randomised trials with intermediate risk factors (such as blood lipids, blood pressure, or body weight) as outcomes and large observational cohort studies using reported intake or biomarkers of intake to establish associations between diet and disease. Although a controversial practice, many, if not most, public health interventions and dietary guidelines have relied on a synthesis of such evidence ...

Although authorities still disagree, most consider that public health decisions should be made on the weight of the available evidence, acknowledging its limitations, and seeking to obtain further, better evidence when indicated. Equally important is to acknowledge when evidence is insufficient to formulate any guidance, in which case all the relevant options should be clearly outlined to enable informed choice.

- 7 In *JAMA*, Pace et al. (2014) report a newly updated (i.e., reversed) recommendation against default screening with mammography of asymptomatic women under 50, given the large numbers of false positives, biopsies with complications, anxiety, and overtreatment of cancers that would not have been lethal. Similarly, Tikkinen et al. (2018) report a revised recommendation against PSA screening of asymptomatic males for prostate cancer. In both cases, the revised guidelines suggest that the pros and cons should be presented to patients who should then make their own decisions based on personal weights applied to pros and cons of the test. Berg, Biele and Gigerenzer (2016) report on male economists' subjective beliefs about the PSA test.
- 8 According to Simon (1969, p. 53): "Human beings, viewed as behaving systems, are quite simple. The apparent complexity of our behavior over time is largely a reflection of the complexity of the environment in which we find ourselves." And Simon states (1990, p. 1): "Human rational behaviour is shaped by a scissors whose blades are the structure of task environments and the computational capabilities of the actor."
- 9 Behavioral economics often identifies rationality with the axioms of internal logical consistency used in neoclassical theory's utility representation theorems (e.g., Samuelson's use of transitivity; von Neumann and Morgenstern's use of the continuity and independence axioms; Kolmogorov axioms and Bayes rule as used in subjective probability theory). Identification of rationality with internal logical consistency underpins the *biases and heuristics research program* inspired largely by Kahneman, which focuses on deviations from neoclassical rationality axioms and its prescriptive program of inducing greater behavioral conformity with those consistency requirements (de-biasing as in Jolls, Sunstein, and Thaler (1998) or Thaler and Sunstein's (2008) *Nudge*; cf. Sheffrin, 2017).
- 10 See, for example, Gigerenzer and Selten (2001), Smith (2003), Berg and Gigerenzer (2010), Berg (2014a) and Mousavi and Kheirandish (2014) for definitions of *ecological rationality* and research programs based on Herbert Simon's seminal work on bounded rationality.
- 11 Hawkes (2018) reports allegations of influence from lobbyists representing pharmaceutical firms and complaints about removal of board members from Cochrane (a widely respected UK charity and Limited Liability Company). Many observers regard Cochrane as one of most influential and well-executed institutions designed to objectively evaluate drugs and medical procedures with evidence-based reasoning and sophisticated meta-analyses of the medical research literature. These allegations and recent controversy among former Board members of the Cochrane are just one example of how vulnerable attempts at evidenced-based medicine (and policy making) are to rent-seeking and non-transparent influence.
- 12 Of course, we cannot be sure that people's deviations are purposeful, given Hayek's "irremediable ignorance" about other people and the causal forces that structure various choice environments we encounter. Neither can advocates of nudging be sure that deviations are harmful or lack purpose and value.
- 13 The Chairman of Nutrition at the Harvard School of Public Health is quoted as saying: "Unfortunately, like the earlier U.S. Department of Agriculture pyramids, My Plate mixes science with the influence of powerful agricultural interests, which is not the recipe for healthy eating."
- 14 In financial crises, the correlation of most paper assets (e.g., bonds and stocks) approaches 1. In some instances, "safe" treasury bonds and "risky" stocks both decline, and the restricted universe of financial assets in many pension accounts may not provide an effective hedge against such risks. For those who assign greater probabilistic or subjective weight to wealth preservation in those states of the world, the nudge into greater exposure to the restricted asset classes offered in 401k accounts may hurt rather than help investors.
- 15 For example, Presidential Candidate Michael Dukakis' dispassionate response to journalist Bernard Shaw's question "about whether he would support the death penalty should his wife, Kitty, be raped and murdered" (Shepley, 2019) hurt Dukakis despite its logical consistency and valid evidence from his home State of Massachusetts about the death penalty's weak deterrent effect.

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