

2018

Boost: Improving Mindfulness, Thinking, and Diversity

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Citation Information

Peter H. Huang, *Boost: Improving Mindfulness, Thinking, and Diversity*, 10 WM. & MARY BUS. L. REV. 139 (2018), available at <https://scholar.law.colorado.edu/articles/1221>.

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BOOST: IMPROVING MINDFULNESS, THINKING, AND DIVERSITY

PETER H. HUANG*

ABSTRACT

Many important decisions can be difficult; require focused, cognitive attention; produce delayed, noisy feedback; benefit from careful and clear thinking; and quite often trigger anxiety, stress, and other strong, negative emotions. Much empirical, experimental, and field research finds that we often make decisions leading to outcomes we judge as suboptimal. These studies have contributed to the popularity of the idea of nudging people to achieve better outcomes by changing how choices and information are framed and presented (also known as choice architecture and information architecture). Although choice architecture and information architecture can nudge people into better outcomes, choice architecture and information architecture also assume implicitly or explicitly that people's decision-making competencies are immutable or too costly to improve and, therefore, choice architecture and information architecture fail to improve people's decision-making competencies.

This Article advocates boosts to improve mindfulness, thinking, and diversity. Boosts differ from nudges in that boosts aim to improve decision-making competencies, instead of just decision-making outcomes. Mindfulness involves paying attention to life in an intentional way as it unfolds moment to moment. Mindfulness improves decision-making through many pathways, including by reducing stress and negative emotions. Recent economic research demonstrates that many cognitive biases exemplify lack

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of mindfulness about particular aspects of life. Thinking boosts include thinking technologies and diversity. Thinking technologies involve computer or digital technologies to assist people in their thinking. Examples of novel, fun thinking technologies include a financial entertainment computer video game where a player is a vampire managing a blood bar and planning for retirement, and video adventure games designed to teach players to recognize and mitigate their cognitive biases. Diversity creates bonuses for organizations by improving decision-making, creativity, innovation, prediction, problem-solving, and productivity.

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INTRODUCTION

In a notable scene from the well-known movie *Indiana Jones and the Last Crusade*,¹ a Nazi soldier chooses poorly resulting in his death, while Indiana Jones chooses wisely by practicing mindfulness and careful thinking resulting in saving Indiana Jones' father's life. Mindlessness and careless thinking often cause people to choose poorly in life and fiction, resulting in tragedy.² All of us often face choices that are complex, stressful, and require careful thinking.³

Examples of such choices include choices about health, healthcare, love, spending, investing, and retirement savings and planning.⁴ Many empirical, experimental, and field studies in behavioral economics find that choice contexts often unconsciously influence people's choices.⁵ This research underlies the currently popular idea of nudging people's choices,⁶ through choice architecture, which designs choice contexts to influence people's choices, and information architecture, which designs information presentation to influence people's choices.⁷ Behavioral economics also finds that people often choose poorly due to unconscious cognitive biases.⁸ Nudges incorporate or take advantage of people's cognitive biases to nudge people's choices to different outcomes.⁹ The 2017 award of the Sveriges Riksbank Prize in economic sciences

¹ YouTube Duck Channel 120, *Indiana Jones 3 Holy Grail Scene*, YOUTUBE (May 20, 2016), <https://www.youtube.com/watch?v=A0TalLrtZ24> [<http://perma.cc/J33W-FSVC>] (displaying video-clip from *INDIANA JONES AND THE LAST CRUSADE* (Paramount Pictures 1989)).

² See Creagan Dow, *Horror Movie: It's What You Do—GEICO Commercial*, YOUTUBE (Jan. 30, 2015), <https://www.youtube.com/watch?v=uQ-hlcux66s> [<http://perma.cc/4G96-SUXV>] (depicting horror movie characters choosing poorly).

³ See RICHARD H. THALER & CASS R. SUNSTEIN, *NUDGE: IMPROVING DECISIONS ABOUT HEALTH, WEALTH, AND HAPPINESS* 74 (1st ed. 2008).

⁴ See, e.g., THALER & SUNSTEIN, *supra* note 3.

⁵ See DANIEL KAHNEMAN, *THINKING, FAST AND SLOW* 109–265 (1st ed. 2011) (surveying this research).

⁶ THALER & SUNSTEIN, *supra* note 3, at 4 (introducing nudges); Pierre Schlag, *Nudge, Choice Architecture, and Libertarian Paternalism*, 108 MICH. L. REV. 913, 913 (2010) (reviewing and critiquing the book *NUDGE*).

⁷ THALER & SUNSTEIN, *supra* note 3, at 3; Schlag, *supra* note 6, at 916.

⁸ See THALER & SUNSTEIN, *supra* note 3, at 30.

⁹ *Id.* at 26.

in memory of Alfred Nobel to behavioral economist Richard Thaler has focused more public attention on, and popular press coverage of, nudges.¹⁰

This Article analyzes and advocates *boosts* that aim to enhance people's decision-making competencies,¹¹ such as risk or statistical literacy education,¹² identifying and teaching people a limited core of domain-specific factual and procedural knowledge,¹³ and designing and disseminating simple cognitive heuristic strategies that support better decision-making.¹⁴ This Article advocates policies to foster people adopting growth mindsets,¹⁵ as opposed to fixed mindsets, about their decision-making skills to create a learning society¹⁶ and a learning economy,¹⁷ which are both inherently linked to democracy.¹⁸ Being optimistic about one's ability to change and learn facilitates learning.¹⁹ Conversely, being pessimistic about one's ability to change and learn impedes learning.²⁰

¹⁰ Richard H. Thaler, Award Recipient, Prize Lecture: From Cashews to Nudges: The Evolution of Behavioral Economics at Stockholm University (Dec. 8, 2017), https://www.nobelprize.org/nobel_prizes/economic-sciences/laureates/2017/thaler-lecture.html [<http://perma.cc/AN5D-K2ZW>].

¹¹ Till Grüne-Yanoff & Ralph Hertwig, *Nudge Versus Boost: How Coherent are Policy and Theory?* 26 *MINDS & MACHINES* 149, 156 (2016) [hereinafter Grüne-Yanoff & Hertwig, *Nudge Versus Boost*]; Ralph Hertwig, *When to Consider Boosting: Some Rules for Policy-Makers*, 1 *BEHAV. PUB. POL'Y* 143, 144, 146 (2017); Ralph Hertwig & Till Grüne-Yanoff, *Nudging and Boosting: Steering or Empowering Good Decisions*, 12 *PERSP. PSYCHOL. SCI.* 973, 974 (2017) [hereinafter Hertwig & Grüne-Yanoff, *Nudging and Boosting*].

¹² Grüne-Yanoff & Hertwig, *Nudge Versus Boost*, *supra* note 11, at 158–59, 166; Hertwig & Grüne-Yanoff, *Nudging and Boosting*, *supra* note 11, at 977, 979.

¹³ Grüne-Yanoff & Hertwig, *Nudge Versus Boost*, *supra* note 11, at 159–60.

¹⁴ Grüne-Yanoff & Hertwig, *Nudge Versus Boost*, *supra* note 11, at 162; Hertwig & Grüne-Yanoff, *Nudging and Boosting*, *supra* note 11, at 979.

¹⁵ CAROL DWECK, *MINDSET: THE NEW PSYCHOLOGY OF SUCCESS* ix (1st ed. 2007).

¹⁶ See generally JOSEPH E. STIGLITZ & BRUCE C. GREENWALD, *CREATING A LEARNING SOCIETY: A NEW APPROACH TO GROWTH, DEVELOPMENT, AND SOCIAL PROGRESS* 457–72 (2014) (explaining that learning is a way to change mindsets which leads to a society's growth and development).

¹⁷ See generally *id.* at 47–87 (exploring how to create an economy that supports learning).

¹⁸ *Id.* at 466.

¹⁹ RICHARD E. NISBETT, *INTELLIGENCE AND HOW TO GET IT: WHY SCHOOLS AND CULTURES COUNT* 143 (2d ed. 2010).

²⁰ Miles Kimball, *There's one key difference between kids who excel at math and those who don't*, *QUARTZ* (Oct. 27, 2013), <http://qz.com/139453/theres-one>

One reason that people choose poorly is a lack of thinking carefully and clearly, which in turn makes people vulnerable to impulsiveness, short-sightedness, neglect of probabilities, and many other cognitive biases.²¹ This Article advocates a human developmental approach to law and economics that draws upon biological, cognitive, neurological, psychological, and social theories of human development.²² Humans can develop abilities, competencies, and virtues²³ to realize their full potentials.²⁴

There are many reasons why American society should boost people's decision-making competencies.²⁵ First, an effective and well-functioning democracy requires educating individuals about how to make good civic and governance decisions.²⁶ Second, educating people to make better economic and political decisions reduces economic inequalities and political inequities.²⁷ Third, when choosing poorly leads to individually undesirable outcomes, there are negative consequences for those people and their families and even for societies if societal resources must be allocated to deal with the individually undesirable outcomes of those choices.²⁸ Such negative externalities provide a well-known justification for government intervention.²⁹ Fourth, effective decision-making skills are public goods with positive externalities (such as better citizenship, voting, marriages, parenting, physical health, mental health,

-key-difference-between-kids-who-excel-at-math-and-those-who-dont/ [http://perma.cc/B7Q7-SUXD].

²¹ Jonathan Baron & Rex V. Brown, *Why Americans Can't Think Straight*, in *TEACHING DECISION-MAKING TO ADOLESCENTS* 1, 2–3 (Jonathan Baron & Rex V. Brown eds., 1st ed. 1991).

²² John F. Tomer, *Smart Persons and Human Development: The Missing Ingredient in Behavioral Economics*, in *HANDBOOK OF BEHAVIOURAL ECONOMICS AND SMART DECISION-MAKING: RATIONAL DECISION-MAKING WITHIN THE BOUNDS OF REASON* 137, 138 (Morris Altman ed., 1st ed. 2017).

²³ *Id.* at 149–51.

²⁴ *Id.* at 152.

²⁵ See THALER & SUNSTEIN, *supra* note 3.

²⁶ See Martha Minow, *Education and Democracy*, HARV. L. REV. BLOG (Oct. 17, 2017), <https://blog.harvardlawreview.org/education-and-democracy/> [http://perma.cc/NN8K-AQCF].

²⁷ *See id.*

²⁸ See Colin Camerer et al., *Regulation for Conservatives: Behavioral Economics and the Case for "Asymmetric Paternalism"*, 151 U. PA. L. REV. 1211, 1212 (2003).

²⁹ Grüne-Yanoff & Hertwig, *Nudge Versus Boost*, *supra* note 11, at 149.

and well-being) and correspondingly ineffective decision-making skills are public bads with negative externalities (for example, when governments have to use tax dollars to deal with the individual and societal consequences of ineffective individual decision-making).³⁰ Fifth, the private sector may not have enough incentive to improve people's decision-making skills because often businesses can profit more from exploiting people's cognitive biases³¹ than mitigating them, and/or businesses cannot capture all of the benefits from improving people's decision-making competencies because some of those benefits are uncertain, delayed, and spillover into many other wide-ranging domains.³² Sixth, even if businesses can profit from improving people's decision-making competencies, there are issues of access, affordability, equity, and fairness about whether empowering people to make better decisions should be left to just (not necessarily competitive) market forces.³³ Seventh, public and private boosts can coexist as they do with many other subjects.³⁴ Eighth, because people will form decision-making habits and maintain decision-making routines, boosts can and should begin as early as possible with children.³⁵

The difference between a nudge and a boost is concretely illustrated in the context of eating.³⁶ In his 2017 economics Nobel Prize lecture,³⁷ Thaler tells the well-known story about how everybody thanked him when he was a graduate student at a party when he took a bowl of cashews into the kitchen after about half the nuts had been eaten.³⁸ His moving the nuts is an example of

³⁰ See JESSICA LAHEY, *THE GIFT OF FAILURE: HOW THE BEST PARENTS LEARN TO LET GO SO THEIR CHILDREN CAN SUCCEED* xxvii (1st ed. 2015); THALER & SUNSTEIN, *supra* note 3, at 74; Grüne-Yanoff & Hertwig, *Nudge Versus Boost*, *supra* note 11, at 149, 175; Minow, *supra* note 26.

³¹ GEORGE AKERLOF & ROBERT SHILLER, *PHISHING FOR PHOOLS: THE ECONOMICS OF MANIPULATION AND DECEPTION* 1–2 (1st ed. 2015).

³² See *generally id.* (explaining how competition leads to the benefits of consumer decisions being spread out throughout the free market).

³³ See *generally id.* (explaining how the free market can both help and hurt consumers, but how consumer impact will reach equilibrium naturally through the market).

³⁴ THALER & SUNSTEIN, *supra* note 3, at 71.

³⁵ See Hertwig & Grüne-Yanoff, *Nudging and Boosting*, *supra* note 11, at 978–79.

³⁶ Thaler, *supra* note 10.

³⁷ *Id.*

³⁸ *Id.*

a nudge because it changed people's choice environment in a way that was easy for people to reverse.³⁹

Those nuts were now in the kitchen.⁴⁰ People could still eat them if they just went to the kitchen.⁴¹ The reason Thaler moved them is because he correctly believed most people would not walk to the kitchen to eat the nuts.⁴² When the nuts were in front of people, many people ate those nuts mindlessly.⁴³

A boost alternative to mindless eating is to teach people to manage their lifestyle differently, make changes in food choices, increase aerobic activity, and reduce stress through mindfulness meditation, yoga, guided imagery, breathing, and relaxation exercises.⁴⁴ This boost changes people's decision-making competencies.⁴⁵ It also has benefits that spill over into other domains besides eating.⁴⁶ This boost can help people to focus on what is important, develop self-belief, self-efficacy, self-confidence, and self-compassion.⁴⁷ The nudge of removing tempting food is a short-term intervention that changes people's decision-making environment.⁴⁸ The mindful eating boost is a long-term intervention that changes people's decision-making competencies.⁴⁹ The mindful eating boost has higher costs (in terms of effort, time, and money) and higher benefits (in terms of spillovers, self-confidence, and self-efficacy) than the moving tempting food nudge.⁵⁰ The costs and benefits of boosts and nudges can vary across people

³⁹ *Id.*

⁴⁰ *Id.*

⁴¹ *Id.*

⁴² *Id.*

⁴³ *Id.*

⁴⁴ *Learn to be Lean Program*, MASS. GEN. HOSP. CORRIGAN MINEHAN HEART CTR., http://www.massgeneral.org/heartcenter/cardiac_metabolicsyndrome_program.aspx?display=learn-to-be-lean [<http://perma.cc/6T44-2NU9>].

⁴⁵ *See id.*

⁴⁶ Terry Byrne, *Prevention Priority: Emphasis on Wellness Grows*, MASS. GEN. HOSP. MAG., <https://giving.massgeneral.org/disease-prevention-as-priority/> [<http://perma.cc/8T9D-VJ35>].

⁴⁷ *Id.* (reporting that participants learn to eat mindfully, focus on "making healthy lifestyle choices" and "shift their mindset toward healthy behavior over the long term. It's ... an approach to healthy eating.").

⁴⁸ *See* Thaler, *supra* note 10.

⁴⁹ Hertwig, *supra* note 11, at 155.

⁵⁰ *See id.* at 157; Byrne, *supra* note 46.

and time. Nudges and boosts are not mutually exclusive.⁵¹ Nudges and boosts can be complements or substitutes.⁵² Boosts respect and foster people's abilities to develop and learn decision-making competencies.⁵³ Nudges assume that people's abilities to develop and learn decision-making competencies are lacking or not worth engaging.⁵⁴

This Article advocates that societies can and should promulgate boosts. This Article focuses on these boosts: (1) practicing mindfulness and (2) thinking boosts, including thinking technologies and diversity. There are three audiences to which this Article is addressed. First, this Article offers a guide to law students, law professors, lawyers, judges, regulators, and indeed anyone interested in how to improve their decision-making competencies in order to make better decisions. Second, this Article is directed at federal and state policymakers to engage with and complement an existing literature about nudging. Third, this Article is aimed at policymakers and the public in advocating that societies empower people through boosts that improve decision-making competencies.

The rest of this Article is organized as follows. Part I analyzes how to improve decision-making. Part II analyzes how mindfulness can improve people's processes of making decisions in any situation by more consciously, deliberatively, and thoughtfully responding instead of automatically, reflexively, and unconsciously reacting. Part II extends a recent novel application of real-options theory⁵⁵ analyzing how improving mindfulness fosters legal ethics and professionalism.⁵⁶ Part II also analyzes other ways in which mindfulness can improve people's decision-making. Part III analyzes two kinds of thinking boosts: thinking technologies that build on behavioral research about how people think and

⁵¹ See Hertwig & Grüne-Yanoff, *Nudging and Boosting*, *supra* note 11, at 979.

⁵² *Id.*

⁵³ Grüne-Yanoff & Hertwig, *Nudge Versus Boost*, *supra* note 11, at 156.

⁵⁴ *Id.* at 153.

⁵⁵ Peter H. Huang, *A New Options Theory for Risk Multipliers of Attorney's Fees in Federal Civil Rights Litigation*, 73 N.Y.U. L. REV. 1943, 1946–47 (1998) (discussing examples of real options).

⁵⁶ Peter H. Huang, *How Improving Decision-Making and Mindfulness Can Improve Legal Ethics and Professionalism*, 21 J.L. BUS. & ETHICS 35, 68–71 (2015).

behave on digital screens,⁵⁷ and diversity that builds on complex systems research about how groups make decisions.⁵⁸

I. HOW TO IMPROVE DECISION-MAKING

The quality of people's choices can be assessed according to multiple criteria.⁵⁹ Two established criteria are⁶⁰: (1) whether people's decisions are coherent with normative standards of internal consistency, such as transitivity of preferences or Bayes' theorem, and (2) whether people's decisions correspond with reality. A third criterion asks if people's decisions attain their goals.⁶¹ A final possible criterion asks if people's choices are socially desirable.⁶² This Article focuses on the personal goal attainment and social desirability criteria of assessing people's choices.

Utilizing the criteria of subjective goal attainment and social desirability, choosing poorly is costly.⁶³ Increases in information (and noise), time pressure constraints, simultaneous decision-making, globalization, and information-based economies all imply that choosing poorly will become costlier for "individuals, families, businesses, governments, and societies. ... After all, errors induced by biases in judgment lead decision makers to undersave for retirement, engage in needless conflict, marry the wrong partners, accept the wrong jobs, and wrongly invade countries."⁶⁴ In

⁵⁷ See, e.g., SHLOMO BENARTZI WITH JONAH LEHRER, *THE SMARTER SCREEN: SURPRISING WAYS TO INFLUENCE AND IMPROVE ONLINE BEHAVIOR* (1st ed. 2015).

⁵⁸ See, e.g., SCOTT E. PAGE, *THE DIFFERENCE: HOW THE POWER OF DIVERSITY CREATES BETTER GROUPS, FIRMS, SCHOOLS, AND SOCIETIES* 24–25, 50 (rev. ed. 2008).

⁵⁹ See Philip T. Dunwoody, *Theories of Truth as Assessment Criteria in Judgment and Decision-making*, 4 *JUDGMENT & DECISION-MAKING* 116, 123 (2009); Grüne-Yanoff & Hertwig, *Nudge Versus Boost*, *supra* note 11, at 162. See generally KENNETH R. HAMMOND, *HUMAN JUDGMENT AND SOCIAL POLICY: IRREDUCIBLE UNCERTAINTY, INEVITABLE ERROR, UNAVOIDABLE INJUSTICE* 95–106 (2000) (defining and providing examples of the criteria of coherence and correspondence).

⁶⁰ See HAMMOND, *supra* note 59, at 95–106 (defining and providing examples of the criteria of coherence and correspondence).

⁶¹ Dunwoody, *supra* note 59, at 123.

⁶² Grüne-Yanoff & Hertwig, *Nudge Versus Boost*, *supra* note 11, at 162.

⁶³ See Dunwoody, *supra* note 59, at 123; Grüne-Yanoff & Hertwig, *Nudge Versus Boost*, *supra* note 11, at 162.

⁶⁴ Katherine L. Milkman et al., *How Can Decision-making Be Improved?*, 4 *PERSP. PSYCHOL. SCI.* 379, 379 (2009).

addition to monetary costs of choosing poorly, there are psychological and emotional costs to choosing poorly.⁶⁵

Given that people often consider themselves as choosing suboptimally, societies face a fundamental question: how can and should societies respond to people's choosing suboptimally? The answer depends on to what extent "self-reflection, experience, learning, feedback, routines, assistance, supervision, oversight, and a full array of punishment and rewards" can overcome the presence and extent of cognitive errors.⁶⁶ Making decisions can be difficult and stressful, even with help from others.⁶⁷ There is a decision-making information marketplace consisting of advice, books, courses, online services, planning, and software among other products.⁶⁸ Law can and should help decision makers who are not experts, which is all of us in some area(s) or domain(s).⁶⁹ The question is how to do this. This Article analyzes three policies. The first is a laissez-faire policy of doing nothing based on a belief that people can learn from their experience to improve decision-making.⁷⁰ The second is the by now well-known intervention of nudges designed to improve the outcomes of people's decision-making by changing their decision-making environments.⁷¹ The third is the more recent innovation of boosts that aim to improve people's decision-making competencies.⁷²

A. Problems with Improving Decision-Making from Experience

A possible response to people making suboptimal choices is for governments to do nothing based upon a belief that over time and with repeated experience people will improve their decision-making.⁷³ One problem with this reaction is that many decisions (such as marriage and retirement) are infrequent, entail large

⁶⁵ See THALER & SUNSTEIN, *supra* note 3, at 33–34.

⁶⁶ Richard A. Epstein, *Behavioral Economics: Human Errors and Market Corrections*, 73 J. U. CHI. L. REV. 111, 111 (2006).

⁶⁷ See *id.*

⁶⁸ See THALER & SUNSTEIN, *supra* note 3, at 255–62 (giving examples of a variety of sources to further understand decision-making).

⁶⁹ See *id.* at 3.

⁷⁰ *Id.* at 83.

⁷¹ Hertwig & Grüne-Yanoff, *Nudging and Boosting*, *supra* note 11, at 973.

⁷² *Id.* at 974.

⁷³ THALER & SUNSTEIN, *supra* note 3, at 6.

personal and social costs if incorrectly decided, and provide delayed, limited, and noisy feedback.⁷⁴ An analogous philosophy in the realm of parenting, called autonomy-supportive parenting,⁷⁵ advocates parents let their kids fail so their kids can learn from such experiences.⁷⁶

One reason that philosopher Mark White is critical of nudges is that nudging shields people from opportunities to make mistakes, learn from them, and in so doing, develop such character virtues as temperance and tenacity.⁷⁷ Legal scholars Jonathan Klick and Gregory Mitchell analyze how paternalistic interventions may create cognitive hazards, which “interfere with information searches, educational investments, and feedback that would occur in the absence of paternalistic interventions and that are important to the individual’s development of effective decision-making skills and strategies.”⁷⁸ They are concerned that paternalistic policies may restrict learning opportunities and introduce noise into, or mute feedback signals in, learning environments.⁷⁹ They are also concerned that paternalistic policies can become self-fulfilling for both laypeople and regulators, leading to further demand for additional future paternalism.⁸⁰ They base their analysis upon developmental psychological research indicating “that individuals improve their decision-making skills over time through a ‘learning by doing’ process”⁸¹ and psychologist James Byrnes’ self-regulation model of decision-making.⁸² Klick and Mitchell are justified to be concerned that paternalistic interventions and

⁷⁴ *Id.* at 73–76.

⁷⁵ LAHEY, *supra* note 30, at xxi–xxii; Greg Toppo with Jessica Lahey, *New Book Suggests Parents Learn to Let Kids Fail*, USA TODAY (Aug. 12, 2015), <http://usat.ly/1Tsg9wn> [<http://perma.cc/9N89-FE8U>].

⁷⁶ See MARK D. WHITE, *THE MANIPULATION OF CHOICE: ETHICS AND LIBERTARIAN PATERNALISM* 119–23 (2013).

⁷⁷ See *id.* at 119.

⁷⁸ Jonathan Klick & Gregory Mitchell, *Government Regulation of Irrationality: Moral and Cognitive Hazards*, 90 MINN. L. REV. 1620, 1626 (2006).

⁷⁹ See *id.* at 1633.

⁸⁰ See *id.* at 1638–41; WHITE, *supra* note 76, at 122.

⁸¹ Klick & Mitchell, *supra* note 78, at 1626.

⁸² See JAMES P. BYRNES, *THE NATURE AND DEVELOPMENT OF DECISION-MAKING: A SELF-REGULATION MODEL* 109–10 (1998); James P. Byrnes et al., *Learning to Make Good Decisions: A Self-Regulation Perspective*, 70 CHILD DEV. 1121, 1124 (1999).

nudges may hinder people from having opportunities to learn from experience about how to make better decisions.⁸³ In fact, even in the absence of paternalistic interventions, learning how to make better decisions is difficult.⁸⁴

More recently, Byrnes examines motivational reasons for why people do not apply the effort and time required to engage in critical-analytic thinking.⁸⁵

Although the idea that people can and should learn from their experiences of choosing poorly is intuitively plausible and seems quite reasonable, there are many difficulties with people learning from their experiences of choosing poorly.⁸⁶ Some of these difficulties are intrinsic to experience and some are intrinsic to people.⁸⁷ Learning from experiences is difficult for humans in part because of the cognitive biases and heuristics that are part of human behavior.⁸⁸ Learning from experiences is also difficult because of several intrinsic aspects of the nature of experiences, including: complexity of causality in experience, endogenous nature of experience, multiplicity of interpretations about experience, and noisiness of experience.⁸⁹ Decision-making researcher James March concluded that the bottom line about learning from experience is: “[e]xperience may possibly be the best teacher, but it is not a particularly good teacher.”⁹⁰ Because most of what people learn is from other people, the issue of how to determine whom to trust is also critical to effective learning.⁹¹ In addition to difficulties in learning from direct experiences, there are many other difficulties in learning from others’ experiences.⁹²

⁸³ See Klick & Mitchell, *supra* note 78, at 1625–26.

⁸⁴ *Id.* at 1626.

⁸⁵ See James P. Byrnes & Kevin N. Dunbar, *The Nature and Development of Critical-Analytical Thinking*, 26 EDUC. PSYCHOL. REV. 477, 477 (2014).

⁸⁶ See *id.* at 489.

⁸⁷ See *id.* at 483, 486.

⁸⁸ See KAHNEMAN, *supra* note 5, at 109–265 (surveying this research).

⁸⁹ See JAMES MARCH, THE AMBIGUITIES OF EXPERIENCE 100–01 (2010) (examining problems inherent with the process of learning from experience).

⁹⁰ *Id.* at 115.

⁹¹ See PAUL L. HARRIS, TRUSTING WHAT YOU’RE TOLD: HOW CHILDREN LEARN FROM OTHERS 60 (2012) (examining the importance of how children and also adults learn primarily from others instead of first-hand experience).

⁹² See Jerker Denrell, *Vicarious Learning, Undersampling of Failure, and the Myths of Management*, 14 ORG. SCI. 227, 227 (2003).

We learn indirectly from memories of experiences as opposed to directly from ephemeral experiences.⁹³ Experiences are fleeting and momentary by their very nature.⁹⁴ Learning from experience is problematic due to the incomplete and selective nature of people's memories of their experiences.⁹⁵ Psychological research has found that ex post memories coincide with ex ante predictions instead of interim experiences.⁹⁶ The convergence between memories and expectations means that instead of learning from experience, people learn from selectively reconstructed memories of experiences.⁹⁷ People often make similar mistakes repeatedly due to imperfect learning and not seeing reality clearly for what it is.⁹⁸ As musician and pop star Taylor Swift states,⁹⁹ "But you'll come back each time you leave, [c]ause darling I'm a nightmare dressed like a daydream."

Even if people manage to learn from experience, there is the question of whether people can transfer whatever is learned across domains.¹⁰⁰ Empirical research has also found that many people, including MBA students, have difficulties with transferring lessons

⁹³ See HARRIS, *supra* note 91, at 105.

⁹⁴ See Norbert Schwarz & Jing Xu, *Why Don't We Learn From Poor Choices? The Consistency of Expectation, Choice, and Memory Clouds the Lessons of Experience*, 21 J. CONSUMER PSYCHOL. 142, 143 (2011) (proposing this explanation and providing supporting empirical data in the context of luxury cars).

⁹⁵ See Peter H. Huang, *Torn Between Two Selves: Should Law Care More About Experiencing Selves or Remembering Selves?*, 17 S.M.U. SCI. & TECH. L. REV. 263 (2014).

⁹⁶ See Schwarz & Xu, *supra* note 94, at 144.

⁹⁷ See Huang, *supra* note 95, at 295.

⁹⁸ *Id.* at 308.

⁹⁹ TAYLOR SWIFT, BLANK SPACE (Kobalt Music Publishing Ltd., Sony/ATV Music Publishing LLC) (2014); see Taylor Swift, Blank Space, TaylorSwiftVEVO, *Taylor Swift—Blank Space (Official Video)*, YOUTUBE (Nov. 10, 2014), <https://www.youtube.com/watch?v=e-ORhEE9VVg>.

¹⁰⁰ See Dedre Gentner et al., *Reviving Inert Knowledge: Analogical Abstraction Supports Relational Retrieval of Past Events*, 33 COGNITIVE SCI. 1343, 1355 (2009); Diane F. Halpern, *Teaching Critical Thinking for Transfer Across Domains: Dispositions, Skills, Structure Training, and Metacognitive Monitoring*, 53 AM. PSYCH. 449, 451 (1998); Jeffrey Loewenstein et al., *Analogical Encoding Facilitates Knowledge Transfer in Negotiation*, 6 PSYCHONOMIC BULL. & REV. 586, 592 (1999); Leigh Thompson et al., *Avoiding Missed Opportunities in Managerial Life: Analogical Training More Powerful Than Individual Case Training*, 82 ORG. BEHAV. & HUM. DECISION PROCESSES 60, 61 (2000).

that they have learned in one context to analogous yet novel contexts.¹⁰¹ Some law students have similar difficulties with reasoning by analogy to case precedents in the common law.¹⁰²

The above discussion presents the case that people will have difficulties with improving their decision-making utilizing a particular form of learning, namely learning from experiences of choosing poorly.¹⁰³ This Article therefore advocates other forms of learning to improve people's decision-making, namely learning about mindfulness, thinking architecture, and thinking technologies.¹⁰⁴

B. Nudging or Steering People's Decision Outcomes

A nudge is “any aspect of the choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives.”¹⁰⁵ As this definition makes clear, the target of nudges is behavior.¹⁰⁶ More recently, Sunstein distinguishes between educative and non-educative nudges based on whether a nudge provides information.¹⁰⁷ The most famous examples of non-educative nudges are defaults.¹⁰⁸

Examples of educative nudges include disclosure requirements, nutrition labels, warning labels, and reminders.¹⁰⁹ Both educative and non-educative nudges steer people's behavior by utilizing cognitive biases or taking advantage of motivational deficiencies.¹¹⁰ Even though an educative nudge is educative in the sense of providing information, an educative nudge does not

¹⁰¹ See Gentner et al., *supra* note 100, at 1373–74.

¹⁰² See Peter H. Huang, *Tiger Cub Strikes Back: Memoirs of an Ex-Child Prodigy About Legal Education and Parenting*, 1 BRIT. J. AM. LEGAL STUD. 297, 309 (2012) (discussing anecdotes that are related to the dangers of drawing the wrong lessons from case-based reasoning).

¹⁰³ *Id.* at 346.

¹⁰⁴ *Id.*

¹⁰⁵ THALER & SUNSTEIN, *supra* note 3, at 6.

¹⁰⁶ See CASS R. SUNSTEIN, *THE ETHICS OF INFLUENCE: GOVERNMENT IN THE AGE OF BEHAVIORAL SCIENCE* (2016).

¹⁰⁷ See *id.* at 6.

¹⁰⁸ *Id.* at 26–27, 34–37.

¹⁰⁹ *Id.* at 26.

¹¹⁰ *Id.* at 42.

educate in the sense of improving people's cognitive or motivational competencies.¹¹¹

The philosophy underlying nudging is “that the same factors that lead us to make a mindless suboptimal or unhealthy choice can often be reversed to help us make a mindless better choice.”¹¹² Marketing professor Brian Wansink and his co-authors have demonstrated in many studies that people often eat more than they think because they eat mindlessly.¹¹³ An obvious response to mindless eating is to practice mindful eating.¹¹⁴ Wansink believes that “[f]or 90 [percent] of us, the solution to mindless eating is not mindful eating—our lives are just too crazy and our willpower's too wimpy.”¹¹⁵ Instead, Wansink advocates nudges or self-nudges to modify food environments.¹¹⁶

Wansink's ideas are related to psychology professor Angela Duckworth's proposal that people proactively choose or change the situations they will face to reduce the power of undesirable impulses or increase the power of more desirable impulses.¹¹⁷ For such matter over mind strategies to succeed, people must be mindful at the earlier point in time when they choose or modify the matter of their situations, so that they can be mindless later and rely on their established habitual ways of behaving.¹¹⁸ As Gretchen Rubin observes, “[h]abits are freeing and energizing because they eliminate decision and self-control.”¹¹⁹

¹¹¹ *Id.* at 32.

¹¹² Eric J. Johnson et al., *Beyond Nudges: Tools of Choice Architecture*, 23 *MARKETING LETTERS* 487, 500 (2012).

¹¹³ See, e.g., BRIAN WANSINK, *MINDLESS EATING: WHY WE EAT MORE THAN WE THINK* (2007); see also *MINDLESS EATING*, <http://mindlesseating.org/> [<https://perma.cc/2R93-6KF6>].

¹¹⁴ See, e.g., THICH NHAT HANH, *SAVOR: MINDFUL EATING, MINDFUL LIFE* (2011); see also *THE CENTER FOR MINDFUL EATING*, <http://www.thecenterformindfuleating.org> [<https://perma.cc/MGU6-DXT7>].

¹¹⁵ BRIAN WANSINK, *SLIM BY DESIGN: MINDLESS EATING SOLUTIONS FOR EVERYDAY LIFE* 7 (2014).

¹¹⁶ See *SLIM BY DESIGN*, <http://www.slimbydesign.org/> [<https://perma.cc/6LVG-ABS7>].

¹¹⁷ Angela Duckworth et al., *Situational Strategies for Self-Control*, 11 *PERSP. PSYCH. SCI.* 35, 35 (2016).

¹¹⁸ See *id.* at 40.

¹¹⁹ Interview by Cassie Mogilner with Gretchen Rubin (July 17, 2015) <http://knowledge.wharton.upenn.edu/article/how-good-habits-can-make-you-happier>

Recently, there has been a backlash against nudges.¹²⁰ Professor Lauren Willis provides evidence that outside the automatic enrollment retirement context, defaults may fail to stick and those opting out of defaults would have benefited the most from the defaults.¹²¹ Nudges defaulting employees into retirement plans have been demonstrated to lead to regret,¹²² “may encourage irresponsible spending or early withdrawals of retirement money (with penalties) to cover debts,”¹²³ and can lead to learning less about financial matters and sharing less financial information with friends and families.¹²⁴ Experimental research finds that email reminders to donate to charities can backfire by annoying recipients to unsubscribe from such email lists.¹²⁵

An explicit or implicit assumption of choice architecture and information architecture is that people have fixed skills in making choices or educating people to improve their decision-making is futile or too costly to be worthwhile.¹²⁶ Choice architecture and information architecture are often contrasted with

?utm_source=kw_newsletter&utm_medium=email&utm_campaign=2015-07-22; see also CHARLES DUHIGG, *THE POWER OF HABIT: WHY WE DO WHAT WE DO IN LIFE AND BUSINESS* 20 (2012); GRETCHEN RUBIN, *BETTER THAN BEFORE: MASTERING THE HABITS OF OUR EVERYDAY LIVES* 4–5 (2015).

¹²⁰ See Bruce Bower, *Nudge Backlash*, 191 *SCI. NEWS* 18, 19 (2017) (discussing some downsides of nudging).

¹²¹ See Lauren E. Willis, *When Nudges Fail: Slippery Defaults*, 80 *U. CHI. L. REV.* 1155, 1155 (2013).

¹²² See *id.* at 19–20; Jeffrey R. Brown et al., *Decision-Making Approaches and the Propensity to Default: Evidence and Implications*, 121 *J. FIN. ECON.* 477, 489 (2016) (finding employees nudged into default retirement plans had the most regret over their past pension choices).

¹²³ Bower, *supra* note 120, at 20.

¹²⁴ See *id.* at 20–21; Bruce Ian Carlin et al., *Libertarian Paternalism, Information Production, and Financial Decision-making*, 26 *REV. FIN. STUD.* 2204, 2220–21 (2013) (proving in an economic model that those nudged into retirement defaults may acquire less financial information and share less financial information with their friends and families).

¹²⁵ See Bower, *supra* note 120, at 19, 22; see also Mette Trier Damgaard & Christina Gravert, *The Hidden Cost of Nudging: Experimental Evidence on Reminders and Unsubscriptions*, 157 *J. PUB. ECON.* 15, 15–16 (2018) (documenting in two field experiments the hidden costs of charitable donation email reminder nudges in terms of annoyance and unsubscribing).

¹²⁶ See Shlomo Benartzi et al., *Should Government Invest More in Nudging?*, 28 *PSYCHOL. SCI.* 1051, 1057 (2017).

and touted as being cheaper than and requiring less effort of laypeople and policymakers than educating people or traditional economic policies.¹²⁷ For example, psychologists Elke Weber and Eric Johnson state: “standard economic analysis suggests rather expensive government interventions (such as tax incentives) or effortful (for both provider and recipient) public education.”¹²⁸ Although choice architecture and information architecture are low-cost or low-effort interventions,¹²⁹ they also are low-benefit or low-reward interventions in the sense of not producing learning benefits and rewards that can potentially spill over to many other choice situations.¹³⁰

In a helpful user’s guide to debiasing,¹³¹ professors Jack B. Soll, Katherine L. Milkman, and John W. Payne divide paths to improving decisions into two general categories: “(1) modifying the person through either education or the provision of strategies and tools, and (2) modifying the environment a decision maker faces to facilitate wiser choices.”¹³² The first approach equips “people with some combination of knowledge and tools to help them overcome their limitations and dispositions ... [this approach] draws upon classic debiasing research on the benefits of education as well as thinking strategies, rules of thumb, and more formal decision aids that people can be taught to use.”¹³³ Educating people about practicing mindfulness and utilizing thinking tools illustrates the first approach.¹³⁴

The second approach changes the choice setting “in a way that either encourages better strategies or is a better match for the decision strategies that people naturally apply. This approach

¹²⁷ *Id.*

¹²⁸ Elke U. Weber & Eric J. Johnson, *Mindful Judgment and Decision-making*, 60 ANN. REV. PSYCHOL. 53, 75 (2009).

¹²⁹ See Benartzi et al., *supra* note 126, at 1051.

¹³⁰ *Id.* at 1042.

¹³¹ Jack B. Soll et al., *A User’s Guide to Debiasing*, in I THE WILEY BLACKWELL HANDBOOK OF JUDGEMENT AND DECISION-MAKING 924, 924 (Gideon Keren & George Wu eds., 2016).

¹³² *Id.* at 943.

¹³³ *Id.* at 925–26.

¹³⁴ See Peter H. Huang, *Achieving American Retirement Prosperity by Changing Americans’ Thinking About Retirement*, 22 STAN. J.L., BUS. & FIN. 189, 243–55 (2017).

accepts there is a bias and strives to create situations in which that bias is irrelevant or more commonly useful.”¹³⁵ Professor Shlomo Benartzi recently proposed the idea of “digital nudging, which seeks to identify online designs that help people make smarter choices.”¹³⁶

Choice architecture and information architecture exemplify the second approach and often harness or take advantage of a cognitive bias to mitigate another cognitive bias.¹³⁷

Modifying decision makers involves more optimism about people’s abilities and motivations to learn decision-making skills than modifying decision environments.¹³⁸ Finally, some interventions are classifiable as modifying decision makers and/or modifying decision environments.¹³⁹ For example, Soll, Milkman, and Payne describe checklists as examples of both modifying decision makers and modifying decision environments through nudges to induce reflection.¹⁴⁰

C. Boosting People’s Decision-Making Competencies

Boosts can enhance, establish, or foster many competencies.¹⁴¹ Risk literacy boosts improve understanding statistical information in such areas as climate, health, personal finance, politics, and safety. Examples of risk literacy boosts are: (1) training of math skills in general, such as math story time with parents,¹⁴² (2) brief training in converting opaque risk representations, such as single-event probabilities, into transparent risk representations, such as frequency-based representations,¹⁴³ (3)

¹³⁵ *Id.* at 925.

¹³⁶ Shlomo Benartzi, *How Digital Tools and Behavioral Economics Will Save Retirement*, HARV. BUS. REV. (2017) <https://hbr.org/2017/12/how-digital-tools-and-behavioral-economics-will-save-retirement> [<https://perma.cc/64PN-KZFF>].

¹³⁷ *See id.* at 2.

¹³⁸ *See* Michael Bond, *Risk School*, 461 NATURE 1189, 1189–92 (2009) (reporting about educating people versus nudging them).

¹³⁹ *Id.* at 1191.

¹⁴⁰ *See* Soll et al., *supra* note 131, at 924, 934.

¹⁴¹ Hertwig & Grüne-Yanoff, *Nudging and Boosting*, *supra* note 11, at 979.

¹⁴² *See* Talia Berkowitz et al., *Math at home adds up to achievement in school*, 350 SCI. MAG. 196, 198 (2015).

¹⁴³ *See generally* Peter Sedlmeier & Gerd Gigerenzer, *Teaching Bayesian Reasoning in Less Than Two Hours*, 130 J. EXPERIMENTAL PSYCHOL. 380, 380 (2001).

graphical risk representations,¹⁴⁴ (4) experienced-based instead of purely description-based representations of risk,¹⁴⁵ and (5) representations of risk, such as absolute instead of relative frequencies, that avoid biasing framing effects.¹⁴⁶ Uncertainty management boosts are procedural rules to make assessments, decisions, and predictions in the face of uncertainty when risk information is not available.¹⁴⁷ Examples of uncertainty management boosts are: (1) fast and frugal decision trees, procedural routines, and simple heuristics,¹⁴⁸ (2) simple actuarial inference methods,¹⁴⁹ and (3) simple rules of collective intelligence.¹⁵⁰ Motivational boosts

¹⁴⁴ See Annamaria Lusardi et al., *Visual Tools and Narratives: New Ways to Improve Financial Literacy*, 16 J. PENSION ECON. & FIN. 297, 301 (2017); David Spiegelhalter et al., *Visualizing Uncertainty About the Future*, 333 SCI. 1393, 1394 (2011); Elisabeth M. Stephens et al., *Communicating Probabilistic Information from Climate Model Ensembles: Lessons from Numerical Weather Prediction*, 3 WILEY INTERDISCIPLINARY REV.: CLIMATE CHANGE 409, 418 (2012).

¹⁴⁵ See Robin M. Hogarth & Emre Soyer, *Providing Information for Decision-making: Contrasting Description and Simulation*, 4 J. APPLIED RES. MEMORY & COGNITION 221, 223 (2015); see also Robin M. Hogarth & Emre Soyer, *Communicating Forecasts: The Simplicity of Simulated Experience*, 68 J. BUS. RES. 1800, 1802 (2015); Christine Kaufmann et al., *The Role of Experience Sampling and Graphical Displays on One's Investment Appetite*, 59 MGMT. SCI. 323, 325 (2013).

¹⁴⁶ See Gerd Gigerenzer et al., *Helping Doctors and Patients to Make Sense of Health Statistics*, 8 PSYCHOL. SCI. PUB. INT. 53, 63 (2007); David Spiegelhalter, *Risk and Uncertainty Communication*, 4 ANN. REV. STAT. APPLICATION 31, 53 (2017); Spiegelhalter et al., *supra* note 144, at 1394.

¹⁴⁷ Grüne-Yanoff & Hertwig, *Nudge Versus Boost*, *supra* note 11, at 152, 156.

¹⁴⁸ HEURISTICS: THE FOUNDATIONS OF ADAPTIVE BEHAVIOR chs. 29, 31, 32, 34, 36, 39 (Gerd Gigerenzer et al. eds., 2011); see Alejandro Drexler et al., *Keeping it Simple: Financial Literacy and Rules of Thumb*, 6 AM. ECON. REV.: APPLIED ECON. 1, 2 (2014); Ralph Hertwig & Stefan M. Herzog, *Fast and Frugal Heuristics: Tools of Social Rationality*, 27 SOC. COGNITION 661, 661–62 (2009). See generally Mirjam A. Jenny et al., *Simple Rules for Detecting Depression*, 2 J. APPLIED RES. MEMORY & COGNITION 150 (2013).

¹⁴⁹ See Robyn M. Dawes et al., *Clinical Versus Actuarial Judgment*, 243 SCI. 1668, 1673 (1989); see also John A. Swets et al., *Psychological Science Can Improve Diagnostic Decisions*, 1 PSYCHOL. SCI. PUB. INT. 1, 5 (2000).

¹⁵⁰ See Stefan M. Herzog & Ralph Hertwig, *Harnessing the Wisdom of the Inner Crowd*, 18 TRENDS COGNITIVE SCI. 504, 505 (2014); Ralf H. J. M. Kurvers et al., *Detection Accuracy of Collective Intelligence Assessments for Skin Cancer Diagnosis*, 151 J. AM. MED. ASS'N DERMATOLOGY 1346 (2015); see also Ralf H. J. M. Kurvers et al., *Boosting Medical Diagnostics by Pooling Independent Judgments*, 113 PROC. NAT'L ACAD. SCI. 8777, 8777 (2016); Max Wolf et al.,

enhance the competence of autonomously adjusting cognitive control, motivation, and self-control.¹⁵¹ Examples of motivational boosts are: (1) attention training and attention state training,¹⁵² (2) psychological connectedness training,¹⁵³ (3) expressive writing,¹⁵⁴ (4) growth mindset or sense-of-purpose exercises,¹⁵⁵ (5) reward-bundling exercises,¹⁵⁶ (6) training in pre-commitment strategies,¹⁵⁷ (7) training in self-control strategies,¹⁵⁸ and (8) harnessing simple implementation intentions.¹⁵⁹

Boosts are related to the simple heuristics (SH) research program,¹⁶⁰ which “has aimed to explore the cognitive mechanisms

Collective Intelligence Meets Medical Decision-Making: The Collective Outperforms the Best Radiologist, 10(8) PLOS ONE (e0134269), 1–3 (2015).

¹⁵¹ See Yi-Yuan Tang & Michael I. Posner, *Attention Training and Attention State Training*, 13 TRENDS COGNITIVE SCI. 222, 224 (2009) (explaining the effectiveness of mindfulness training).

¹⁵² Terrie E. Moffitt et al., *A Gradient of Childhood Self-Control Predicts Health, Wealth, and Public Safety*, 108 PROC. NAT'L ACAD. SCI. 2693, 2693 (2011); *id.* at 222; Yi-Yuan Tang et al., *Brief Meditation Training Induces Smoking Reduction*, 110 PROC. NAT'L ACAD. SCI. 13971, 13972 (2013).

¹⁵³ Hal E. Hershfield et al., *Increasing Saving Behavior Through Age-Progressed Renderings of the Future Self*, 48 MARKETING RES. S23, S24 (2011); Lisa Zaval et al., *How Will I Be Remembered? Conserving the Environment for the Sake of One's Legacy*, 26 PSYCHOL. SCI. 231, 231 (2015).

¹⁵⁴ Sian L. Beilock & Erin A. Maloney, *Math Anxiety: A Factor in Math Achievement Not to Be Ignored*, 2 POL'Y INSIGHTS BEHAV. & BRAIN SCI. 4, 8–9 (2015).

¹⁵⁵ David Paunesku et al., *Mind-Set Interventions Are A Scalable Treatment for Academic Underachievement*, 26 PSYCHOL. SCI. 784, 785 (2015); Aneeta Rattan et al., *Leveraging Mindsets to Promote Academic Achievement: Policy Recommendations*, 10 PERSPECTIVES PSYCHOL. SCI. 721, 722 (2015).

¹⁵⁶ GEORGE AINSLIE, PICOECONOMICS: THE STRATEGIC INTERACTION OF SUCCESSIVE MOTIVATIONAL STATES WITHIN THE PERSON 10 (1992); George Ainslie, *Specious Reward: A Behavioral Theory of Impulsiveness and Impulse Control*, 82 PSYCHOL. BULL. 463, 487 (1975).

¹⁵⁷ Thomas C. Schelling, *Self-Command in Practice, in Policy, and in a Theory of Rational Choice*, 74 AM. ECON. REV. 1, 5 (1984).

¹⁵⁸ Ayelet Fishbach & Luxi Shen, *The Explicit and Implicit Ways of Overcoming Temptation*, in DUAL PROCESS THEORIES IN THE SOCIAL MIND, 454, 459 tbl. 30.1 (Jeffrey W. Sherman et al. eds., 2014).

¹⁵⁹ Peter M. Gollwitzer, *Implementation Intentions: Strong Effects of Simple Plans*, 54 AM. PSYCHOLOGIST 493, 495 (1999).

¹⁶⁰ See, e.g., GERD GIGERENZER ET AL., SIMPLE HEURISTICS THAT MAKE US SMART 22 (1999); Norbert Donner-Banzhoff et al., *How Can Better Evidence Be Delivered?*, in BETTER DOCTORS, BETTER PATIENTS, BETTER DECISIONS:

that a boundedly rational decision maker—one operating under conditions of limited computational capacity, limited information, and uncertainty—employs to make satisficing, that is, *good enough* decisions.”¹⁶¹ The SH program is grounded in ecological rationality theory,¹⁶² which posits “that simple heuristics are adaptive and that heuristics cause problems mainly when underlying cognitive strategies are mismatched to situations. Consequently, people need to learn to calibrate their strategies to the environment to avoid bad decisions.”¹⁶³

The SH research program differs from the well-known heuristics and biases (H&B) research program, whose researchers have “catalogued a long list of what are widely considered systematic cognitive biases and flawed (e.g., temporally inconsistent) motivations which, they argue, lead to poor choices.”¹⁶⁴ Psychologist Gary Klein, cogently stated about the H&B paradigm that it:

has done a valuable service by identifying some important heuristics that people employ for thinking about complex issues. The classical paradigm—the demonstration that people use heuristics even if they result in errors—is useful and often intuitive. Unfortunately, the paradigm is often misinterpreted as implying that heuristics are always biasing and that everyday thinking is irrational. These extensions are unwarranted, misleading, and counter-productive. They reflect a sort of hyper-rationality bias.¹⁶⁵

While the SH research program “does not deny that people sometimes make poor decisions.”¹⁶⁶ Unlike the H&B program,

ENVISIONING HEALTH CARE 2020, 215, 231 (Gerd Gigerenzer & J.A. Muir Gray eds., 2011).

¹⁶¹ Grüne-Yanoff & Hertwig, *Nudge Versus Boost*, *supra* note 11, at 151.

¹⁶² Peter M. Todd & Gerd Gigerenzer, *Environments That Make Us Smart: Ecological Rationality*, 16 CURRENT DIRECTIONS PSYCHOL. SCI. 167, 167–68 (2007); Peter M. Todd, *How Much Information Do We Need?*, 177 EUR. J. ORG. RES. 1317, 1317 (2006).

¹⁶³ John M. Flach et al., *Approaches to Cognitive Bias in Serious Games for Critical Thinking*, 56 PROC. HUM. FACTORS & ECON. SOC. ANN. MEETING 272, 274 (2012).

¹⁶⁴ Grüne-Yanoff & Hertwig, *Nudge Versus Boost*, *supra* note 11, at 150.

¹⁶⁵ Flach et al., Professor, Wright State University, Proceedings of the Human Factors and Ergonomics Society 56th Annual Meeting: Approaches to Cognitive Bias in Serious Games for Critical Thinking (2012).

¹⁶⁶ Grüne-Yanoff & Hertwig, *Nudge Versus Boost*, *supra* note 11, at 151.

however, it does not attribute these behaviors to profoundly flawed mental software.¹⁶⁷ Instead, it presents a vision of bounded rationality according to which human reasoning and decision-making can be modeled in terms of SH¹⁶⁸ In particular, the SH research program acknowledges that “choices detrimental to individual and collective welfare can arise for various reasons, including the use of heuristics in environments that have changed—as a result of which the cognitive strategy no longer interlocks properly with the environmental structures ...—or the provision of information that is ... profoundly confusing.”¹⁶⁹

Under the H&B research program, “the goal is to design policies, that by co-opting systematic biases, nudge individual behavior toward a different, more beneficial outcome.”¹⁷⁰ In contrast, under the SH research program, “policies should aim to extend the decision-making competencies of laypeople and professionals alike.¹⁷¹ To this end, interventions can target the individual’s skills and knowledge, the available set of decision tools, or the environment in which decisions are made.”¹⁷² Nudging assumes that “people tend to be somewhat mindless, passive decision makers.”¹⁷³ In contrast, boosting “assumes a decision maker whose competencies can be improved by enriching his or her repertoire of skills and decision tools and/or by restructuring the environment such that existing skills and tools can be more effectively applied.”¹⁷⁴ Therefore although many boosts aim to modify decision makers,¹⁷⁵ some boosts aim to modify decision environments.¹⁷⁶

The SH research program does “not deny that people are not perfect thinkers and, at times, make bad decisions (for a variety of reasons).¹⁷⁷ However, the difference to the H&B program

¹⁶⁷ *Id.*

¹⁶⁸ *Id.*

¹⁶⁹ *Id.*

¹⁷⁰ *Id.* at 152.

¹⁷¹ *Id.*

¹⁷² *Id.*

¹⁷³ THALER & SUNSTEIN, *supra* note 3, at 37.

¹⁷⁴ Grüne-Yanoff & Hertwig, *Nudge Versus Boost*, *supra* note 11, at 152.

¹⁷⁵ Soll et al., *supra* note 131, at 926.

¹⁷⁶ *Id.*

¹⁷⁷ Grüne-Yanoff & Hertwig, *Nudge Versus Boost*, *supra* note 11, at 163.

is that these difficulties are not assumed to be so impervious to change that they have to be exploited rather than overcome.”¹⁷⁸ The approach of boosting assumes that “these difficulties can be addressed by training, information, education, better decision strategies, and better representations. The nudge approach, in contrast, presupposes that these cognitive deficiencies are difficult or costly to overcome, and therefore recommends their skillful manipulation to facilitate better choices”¹⁷⁹ or more precisely better outcomes being nudged on existing imperfect decision-making processes rather than improving decision-making processes themselves. Boosts and nudges can sometimes overlap in their policy recommendations, such as in the case of judiciously setting defaults.¹⁸⁰ Even when boosts and nudges overlap, the causal mechanisms underlying the rationales for those policies differ.¹⁸¹ In the case of defaults, proponents of nudges explain how effective defaults are by “inertia, status-quo bias, or the ‘yeah, whatever heuristic’”¹⁸² and in so doing are “revealing the policy to be *re*biasing.”¹⁸³ On the other hand, proponents of boosts explain how effective defaults are by “the implicit recommendation or endorsement effect ... describing the behavioral change in response to the default as consisting in a learning effect, and hence revealing the policy to be *de*biasing.”¹⁸⁴

More generally, boosts and nudges differ in their underlying assumptions about what cognitive errors they intend to counteract, their policy goals, characteristics of people they intend to help, and characteristics of policymakers.¹⁸⁵ Nudging does not assume that people have awareness or controllability of cognitive errors, while boosting assumes that people can detect and mitigate cognitive errors.¹⁸⁶ Nudging assumes that policymakers have information about people’s goals or the distribution of people’s goals

¹⁷⁸ *Id.*

¹⁷⁹ *Id.*

¹⁸⁰ *Id.*

¹⁸¹ *Id.*

¹⁸² THALER & SUNSTEIN, *supra* note 3, at 83.

¹⁸³ Grüne-Yanoff & Hertwig, *Nudge Versus Boost*, *supra* note 11, at 163.

¹⁸⁴ *Id.*

¹⁸⁵ *Id.* at 164, tbl. 1.

¹⁸⁶ *Id.* at 164–65.

in the presence of goal heterogeneity, while boosting does not require such strong informational assumptions.¹⁸⁷ Nudging assumes that policymakers are less cognitively error prone than laypeople and are benevolent, while boosting does not make such assumptions about policymakers' cognition or motivation.¹⁸⁸ Finally, boosting assumes that people are able to acquire trained skills and motivated to utilize trained skills, while nudging does not make such assumptions about people's abilities and motivations.¹⁸⁹

Philosopher Till Grüne-Yanoff and psychologist Ralph Hertwig compare to what degree the H&B and SH research programs about bounded rationality support the above necessary underlying policy assumptions of nudges and boosts respectively.¹⁹⁰ Grüne-Yanoff and Hertwig conclude that while the H&B research program does not imply all of the policy assumptions underlying nudging and the SH research program does not imply all of the policy assumptions underlying boosting, there is a greater partial disconnect between nudging and the H&B research program compared to boosting and the SH research program.¹⁹¹ They also conclude that "criticism that nudge[s] policies infringe on human autonomy and dignity do not apply (or applies less) to boost policies."¹⁹²

Nudges and boosts differ in their assumptions about people's cognitive architecture, which is the infrastructure of how people process information.¹⁹³ Cognitive architecture includes such mental hardware as memory structures for storing knowledge, beliefs, and goals.¹⁹⁴ Cognitive architecture also includes such functional processes that operate on mental hardware as cognitive algorithms, reasoning processes, and heuristics.¹⁹⁵ Nudges assume that people have a dual system cognitive architecture of system 1 versus 2,¹⁹⁶ while boosts do not assume that people

¹⁸⁷ *Id.* at 165–66.

¹⁸⁸ *Id.* at 166–67.

¹⁸⁹ *Id.* at 167–68.

¹⁹⁰ *Id.* at 168–74.

¹⁹¹ *Id.* at 174–75.

¹⁹² *Id.* at 176.

¹⁹³ Hertwig & Grüne-Yanoff, *Nudging and Boosting*, *supra* note 11, at 979.

¹⁹⁴ *Id.*

¹⁹⁵ *Id.*

¹⁹⁶ *Id.* at 980.

have a particular cognitive architecture.¹⁹⁷ Boosts assume that whatever people's cognitive architecture is, that cognitive architecture is "malleable and worth developing."¹⁹⁸ In particular, boosts assume people's current mental tools can be enhanced or that people can learn to utilize new procedural rules.¹⁹⁹ Boosts focus on fostering people's competencies, including redesigning people's external environments or teaching people how to redesign their external environments.²⁰⁰

An empirical and pragmatic difference between boosts and nudges is their permanence or reversibility.²⁰¹ Because boosts aim to enhance people's existing cognitive and motivational competencies or establish new cognitive and motivational competencies, those competencies should persist, meaning their consequences on behavior should also be stable and permanent over time after the boost stops.²⁰² Because nudges change the choice architecture and do not alter people's existing cognitive and motivational competencies, those competencies do not improve, meaning that behavior will revert back if a nudge is eliminated.²⁰³ A nudge can transform into a boost if that nudge unintentionally improves cognitive and motivational competencies.²⁰⁴

Hertwig proposes these six rules to help guide policymakers in determining to employ boosts or nudges.²⁰⁵ First, when people do not have the cognitive capacities or motivation to develop new competencies or skills, nudge instead of boost.²⁰⁶ Second, when policymakers are unsure about people's goals, when there is a lot of diversity over society in goals, or when a person has conflicting goals, boosts are less prone to errors than nudges.²⁰⁷ Third, when nudging requires nontransparency or invisibility to those who are nudged, nudging is paternalistic because it fails

¹⁹⁷ *Id.* at 975–76, 980.

¹⁹⁸ *Id.* at 980.

¹⁹⁹ *Id.*

²⁰⁰ *Id.*

²⁰¹ *Id.* at 980–81.

²⁰² *Id.*

²⁰³ *Id.* at 981.

²⁰⁴ *Id.*

²⁰⁵ Grüne-Yanoff & Hertwig, *Nudge Versus Boost*, *supra* note 11, at 149.

²⁰⁶ *Id.*

²⁰⁷ *Id.* at 151.

the easy reversibility criterion.²⁰⁸ Fourth, when governments are not always benevolent, or when governments allow private actors to create toxic choice architectures, boosts protect people better than nudges.²⁰⁹ Fifth, when policymakers endeavor to foster permanent behavioral changes and generalizable across many choice architectures, boost instead of nudge.²¹⁰ Sixth, when there are significant risks of unanticipated or unpredictable consequences of a boost or nudge, consider its respective alternative.²¹¹

To Hertwig's helpful rules, this Article adds these additional rules. Seventh, when people face the same or similar decisions in one context repeatedly, boost instead of nudge because an effective boost is one-time as opposed to nudges that have to be repeated.²¹² Eighth, when people face similar decisions across different settings, boost instead of nudge because an effective boost is a one-time intervention as opposed to having to make multiple nudges across settings.²¹³ Ninth, when people face decisions that are likely to change over time, boost instead of nudge because an effective one-time boost will enable people to adapt internally to changes as opposed to nudges that have to be changed externally over time.²¹⁴ Tenth, when people face decisions that are personal or private, boost instead of nudge because a boost is more likely to lead to reflection and introspection.²¹⁵ Eleventh, when people face decisions that are irreversible or costly to reverse, boost instead of nudge because a boost is more likely to engage in people taking care and paying attention. Twelfth, utilize a boost when that boost involves play and fun because that boost is likely to become self-motivating and self-sustaining through adrenaline, dopamine, engagement, excitement, harnessing competitive instincts, positive emotions, and stimulating brain reward centers.²¹⁶

²⁰⁸ *Id.* at 152.

²⁰⁹ *Id.* at 154.

²¹⁰ *Id.* at 155.

²¹¹ *Id.* at 149.

²¹² *Id.* at 155.

²¹³ *Id.*

²¹⁴ *Id.*

²¹⁵ Hertwig & Grüne-Yanoff, *Nudging and Boosting*, *supra* note 11, at 982.

²¹⁶ Hersh Shefrin, BORN TO SPEND? HOW NATURE AND NURTURE IMPACT SPENDING AND BORROWING HABITS 20, 22 (Chase Blueprint Apr. 2013) https://dlshowonline.com/wp-content/uploads/2014/12/Born_to_Spend_Hersh_On_money_personality.pdf [<https://perma.cc/3H4T-X4DL>].

This Article advocates boosting people's decision-making competencies by practicing mindfulness and utilizing thinking tools. Mindfulness and thinking tools are boosts in the sense of "empowering people by expanding (boosting) their competencies and thus helping them to reach their objectives (without making undue assumptions about what those objectives are)."²¹⁷ All the boosts that this Article advocates aim to transform people into better decision makers by expanding their portfolios of decision-making abilities, decision-making information, and decision-making tools.²¹⁸ While Grüne-Yanoff and Hertwig advocate teaching financial literacy,²¹⁹ in light of the empirical research demonstrating that "[f]inancial education as studied to date has serious limitations that have been masked by the apparently larger effects in correlational studies,"²²⁰ this Article advocates novel ways of motivating people to acquire and utilize financial skills, such as utilizing financial entertainment computer video games to help people learn basic financial skills²²¹ and utilizing serious games to help people learn about cognitive biases and improve their decision-making.²²² The play aspect of both of these types of games may also make it more likely that people are both able to acquire trained skills and motivated to utilize trained skills.²²³ Finally, there is already much empirical and experimental experience demonstrating that diverse audiences can and are motivated to acquire and utilize the skills of practicing various forms of mindfulness.²²⁴

This Article advocates boosts that enable people to improve decision-making competencies by thinking more mindfully, systematically, and effectively.

²¹⁷ Grüne-Yanoff & Hertwig, *Nudge Versus Boost*, *supra* note 11, at 156.

²¹⁸ Hertwig, *supra* note 11, at 143.

²¹⁹ Grüne-Yanoff & Hertwig, *Nudge Versus Boost*, *supra* note 11, at 162.

²²⁰ Daniel Fernandes et al., *Financial Literacy, Financial Education and Downstream Financial Behaviors*, 60 *MGMT. SCI.* 1861, 1861 (2014).

²²¹ Huang, *supra* note 134, at 245.

²²² *Id.*

²²³ STUART BROWN & CHRISTOPHER VAUGHN, *PLAY: HOW IT SHAPES THE BRAIN, OPENS THE IMAGINATION, AND INVIGORATES THE SOUL* 34 (2009).

²²⁴ Peter H. Huang, *Can Practicing Mindfulness Improve Lawyer Decision-Making, Ethics, and Leadership?*, 55 *HOUS. L. REV.* 66, 125–26 (2017).

D. Soft Paternalism versus Positive Parentonomics

Lengthened retirement periods and changing U.S. demographics resulting from aging heighten the importance of improving decision-making because older Americans are particularly vulnerable to financial decision errors.²²⁵ Defaulting people into 401(k) retirement plans exemplifies the idea of what is known as soft paternalism,²²⁶ which includes libertarian paternalism that preserves freedom of choice, while influencing choices to make people better off;²²⁷ asymmetric paternalism that produces large benefits for those prone to decision-making errors, while imposing small costs on those not so prone;²²⁸ cautious paternalism that requires policymakers to determine precise conditions under which benefits outweigh costs;²²⁹ and light paternalism that enhances individual choice without restricting it.²³⁰

All the above types of soft paternalism share the common feature of modifying the decision-making contexts that people face

²²⁵ Sumit Agarwal et al., *The Age of Reason: Financial Decisions over the Life Cycle with Implications for Regulation*, in BROOKINGS PAPERS ON ECONOMIC ACTIVITY, Fall 2009, 51, 55–78 (providing medical, psychological, and financial evidence of older Americans' vulnerability to financial decision errors); *id.* at 80–90 (discussing nine possible regulatory responses); Tibor Besedeš et al., *Age Effects and Heuristics in Decision-making*, 94 REV. ECON. & STAT. 580, 581 (2012) (finding in controlled experiments mimicking selecting a retirement savings plan that probabilities of making the optimal choice declined more for older subjects and older subjects relied more on suboptimal decision rules); Tibor Besedeš et al., *Decision-making Strategies and Performance Among Seniors*, 81 J. ECON. BEHAV. & ORG. 524, 524 (2012) (finding in paper and pencil experiments at senior centers that performance significantly declined with age due to reduced reliance on common heuristics and increased decision-making randomness among the oldest subjects).

²²⁶ Jim Holt, *The New, Soft Paternalism*, N.Y. TIMES, Dec. 3, 2006, at E15.

²²⁷ Cass R. Sunstein & Richard H. Thaler, *Libertarian Paternalism Is Not an Oxymoron*, 70 U. CHI. L. REV. 1159, 1162 (2003); Richard H. Thaler & Cass R. Sunstein, *Libertarian Paternalism*, 93 AM. ECON. REV. 175, 175 (2003).

²²⁸ Colin Camerer et al., *Regulation for Conservatives: Behavioral Economics and the Case for "Asymmetric Paternalism"*, 151 U. PA. L. REV. 1211, 1212 (2003).

²²⁹ Ted O'Donoghue & Mathew Rabin, *Procrastination in Preparing for Retirement*, in BEHAVIORAL DIMENSIONS OF RETIREMENT ECONOMICS 125, 129, 150 (Henry J. Aaron ed., 1999).

²³⁰ George Loewenstein & Emily Celia Harris, *The Economist as Therapist: Methodological Ramifications of "Light" Paternalism*, in THE FOUNDATIONS OF POSITIVE AND NORMATIVE ECONOMICS: A HANDBOOK 210 (Andrew Caplin & Andrew Schotter eds., 2008).

in order to improve the outcomes resulting from people's unmodified, existing decision-making.²³¹ None of these forms of soft paternalism attempts to improve the actual process of people's decision-making. Each of these versions of soft paternalism is thus open to legal scholar and philosopher Jeremy Waldron's criticism:

Choice architects nudge almost everything I choose and do, and this is complemented by the independent activity of marketers and salesmen, who nudge ... furiously for their own benefit. I'm not sure I want to live in a nudge-world, though—as a notoriously poor chooser—I appreciate the good-hearted and intelligent efforts of choice architects such as Sunstein to make my autonomous life a little better. I wish, though, that I could be made a better chooser rather than having someone on high take advantage (even for my own benefit) of my current thoughtlessness and my shabby intuitions.²³²

A new type of soft paternalism, known as autonomy-enhancing paternalism (AEP), aims to “support individuals’ ability to make autonomous decisions,”²³³ defining autonomy²³⁴ as “the capacity of a person ... to reflect upon, and then attempt to accept or change his or her preferences, desires, values, and ideals.”²³⁵ AEP “acknowledges that behavioral interventions can—and typically will—change the strength of decision-making anomalies over time, and favors those interventions that improve, rather than reduce, individuals’ ability to make critically reflected, unbiased, autonomous decisions.”²³⁶ AEP advocates “using behavioral insights to modify the choice architecture in a way that promotes critical reflection”²³⁷ and focuses on “helping individuals to become better decision makers; it aims to improve well-being through improving the *processes* of decision-making. This is in contrast to other forms

²³¹ See Holt, *supra* note 226, at E16.

²³² Jeremy Waldron, *It's All for Your Own Good*, N.Y. REV. BOOKS (Oct. 9, 2014), <http://www.nybooks.com/articles/archives/2014/oct/09/cass-sunstein-its-all-your-own-good/> [<http://perma.cc/4QD7-QDJF>] (reviewing CASS R. SUNSTEIN, *WHY NUDGE? THE POLITICS OF LIBERTARIAN PATERNALISM* (2014)).

²³³ Martin Binder & Leonhard K. Lades, *Autonomy-Enhancing Paternalism*, 68 KYKLOS 3, 4 (2015).

²³⁴ RONALD DWORKIN, *THE THEORY AND PRACTICE OF AUTONOMY* 48 (Sydney Shoemaker et al. eds., 1988).

²³⁵ Binder & Lades, *supra* note 233, at 5 (quoting DWORKIN, *supra* note 234, at 48).

²³⁶ *Id.* at 4.

²³⁷ *Id.* at 6.

of soft paternalism that aim to improve the *outcomes* of decision-making processes without concerning themselves with how the decisions come about.”²³⁸ AEP entails “interventions that change the choice architecture to help individuals to become good decision-makers, who are able to ... make critically reflected decisions.”²³⁹ AEP realizes that “interventions can influence individuals’ abilities to learn about both their cognitive biases and their preferences²⁴⁰ ... [and] prefers cognitive learning over non-cognitive learning because the latter often happens without the individual being aware of it and is thus more open to manipulation and the influence of other[s] ...”²⁴¹ AEP “encourages those behavioral interventions that help individuals to become better decision-makers and thus make better informed, less biased, and more autonomous choices over time that may better reflect their true preferences.”²⁴² AEP transforms choice contexts with a goal of improving people’s decision-making processes.²⁴³

This Article focuses on additional ways to improve decision-making competencies by democratizing practicing mindfulness and thinking tools.²⁴⁴ This Article advances the notion of *positive parentonomics*,²⁴⁵ extending *positive parentalism*,²⁴⁶ an original regulatory proposal advocating that policymakers “develop[] institutions ... [to] help enable [people,] ... communities[, and societies] to flourish and thrive.”²⁴⁷ Instead of negative and gendered connotations that come with paternalism and the idea of “father knows best,” positive parentalism entails positive and gender-neutral notions of parenting in fostering people to choose

²³⁸ *Id.*

²³⁹ *Id.*

²⁴⁰ *Id.*

²⁴¹ *Id.* at 5 (quoting DWORKIN, *supra* note 234, at 48).

²⁴² *Id.*

²⁴³ *Id.*

²⁴⁴ Richard P. Larrick, *Debiasing*, in BLACKWELL HANDBOOK OF JUDGMENT AND DECISION-MAKING 316, 317, 323–31 (Derek J. Koehler & Nigel Harvey eds., 2004).

²⁴⁵ See generally Peter H. Huang et al., *Positive Institutions: Organizations, Laws, and Policies*, in OXFORD HANDBOOK OF POSITIVE PSYCHOLOGY (C.R. Snyder, Shane J. Lopez, Lisa M. Edwards, and Susana C. Marques eds., forthcoming) (providing additional details about positive parentonomics).

²⁴⁶ Jeremy A. Blumenthal & Peter H. Huang, *Positive Parentalism*, NAT’L L.J. (Jan. 26, 2009), <https://www.law.com/nationallawjournal/almID/1202427700551/positive-parentalism/> [<http://perma.cc/XD23-8UZH>].

²⁴⁷ *Id.*

wisely across many different choice settings.²⁴⁸ Positive parentonomics is based on an optimistic view of humanity because it believes that people can improve their decision-making skills and focuses on helping people do so in order to lead happier and more meaningful lives.²⁴⁹ Positive parentonomics advocates that societies can and should empower people to flourish and thrive by facilitating people learning to make better decisions by fostering people practicing mindfulness and employing thinking boosts, including thinking technologies and diversity.²⁵⁰

E. Intellectual Virtues

Many boosts involve teaching and learning different mindsets or ways of thinking to improve decision-making competencies.²⁵¹ While such boosts differ in details, they share the common feature of being more likely to be successful if people are motivated and engaged to learn.²⁵² Loyola Marymount University philosophy professor, Jason Baehr, defines intellectual virtues to be “deep personal qualities or character strengths required for good thinking and learning.”²⁵³ Baehr proposes these nine foundational intellectual virtues²⁵⁴: curiosity, intellectual autonomy, intellectual humility, attentiveness, intellectual carefulness, intellectual thoroughness, open-mindedness, intellectual courage, and intellectual tenacity. Baehr divides these intellectual virtues into three groups.²⁵⁵ First are intellectual virtues necessary to motivate the process of learning and towards the right direction: curiosity, intellectual autonomy, and intellectual humility.²⁵⁶ Second are intellectual virtues necessary to maintain the process of learning on

²⁴⁸ Blumenthal & Huang, *supra* note 246.

²⁴⁹ DACHER KELTNER, BORN TO BE GOOD: THE SCIENCE OF A MEANINGFUL LIFE 11–13 (2009).

²⁵⁰ Blumenthal & Huang, *supra* note 246.

²⁵¹ See Hertwig & Grüne-Yanoff, *Nudging and Boosting*, *supra* note 11, at 146.

²⁵² See JASON BAEHR, CULTIVATING GOOD MINDS: A PHILOSOPHICAL & PRACTICAL GUIDE TO EDUCATING FOR INTELLECTUAL VIRTUES 93 (2015).

²⁵³ *What Are Intellectual Virtues?*, EDUCATING FOR INTELLECTUAL VIRTUES, <http://intellectualvirtues.org/what-are-intellectual-virtues/> [<http://perma.cc/AJS8-3CKB>].

²⁵⁴ *Master Virtues*, INTELLECTUAL VIRTUES ACADEMY, <http://www.ivalongbeach.org/academics/master-virtues> [<http://perma.cc/79W8-5XHH>].

²⁵⁵ BAEHR, *supra* note 252, at 57–58.

²⁵⁶ *Id.* at 57.

the right path: attentiveness, intellectual carefulness, and intellectual thoroughness.²⁵⁷ Third are intellectual virtues necessary to surmount learning challenges and obstacles: open-mindedness, intellectual courage, and intellectual tenacity.²⁵⁸

Curiosity is a source of intrinsic intellectual motivation and consists of wondering, pondering, and asking why questions. Intellectual autonomy entails an active willingness, courage, and ability to think for yourself.²⁵⁹ Intellectual humility means an alertness towards, and a willingness to admit, intellectual limitations, mistakes, and weaknesses.²⁶⁰ Attentiveness involves being present, active listening, and focused observation about important details.²⁶¹

Intellectual carefulness facilitates “avoiding intellectual errors or mistakes, [such as] false beliefs and ignorance.”²⁶² Intellectual thoroughness means a disposition to probe for deeper meaning and understanding in acquiring and communicating knowledge.²⁶³ Open-mindedness is a willingness and ability to consider alternative viewpoints, revise beliefs, and think outside the proverbial box.²⁶⁴ Intellectual courage is readiness to take intellectual risks by persisting in thinking when there is fear of embarrassment or failure.²⁶⁵ Intellectual perseverance is a “tendency [and willingness] to embrace intellectual challenge and struggle.”²⁶⁶

In a 563-page resource guide,²⁶⁷ Baehr provides an overview about intellectual virtues,²⁶⁸ in addition to a closer examination of each intellectual virtue, with examples of each from history (e.g., Copernicus and Galileo) and literature (e.g., Jane Eyre and Hermione Granger), that includes discussion questions: curiosity,²⁶⁹ intellectual autonomy,²⁷⁰ intellectual humility,²⁷¹ attentiveness,²⁷²

²⁵⁷ *Id.* at 57–58.

²⁵⁸ *Id.* at 57.

²⁵⁹ *Id.* at 70.

²⁶⁰ *Id.* at 80.

²⁶¹ *Id.* at 94–95.

²⁶² *Id.* at 104.

²⁶³ *Id.* at 117.

²⁶⁴ *Id.* at 126.

²⁶⁵ *Id.* at 139.

²⁶⁶ *Id.* at 150.

²⁶⁷ *Id.* at 150.

²⁶⁸ *Id.* at 16–54.

²⁶⁹ *Id.* at 57–68.

²⁷⁰ *Id.* at 70–77.

²⁷¹ *Id.* at 79–91.

²⁷² *Id.* at 93–102.

intellectual carefulness,²⁷³ intellectual thoroughness,²⁷⁴ open-mindedness,²⁷⁵ intellectual courage,²⁷⁶ and intellectual tenacity.²⁷⁷ Baehr offers a number of practices to foster intellectual virtues outside classroom settings²⁷⁸ and inside classroom settings.²⁷⁹ Baehr also discusses how to measure growth in intellectual virtues.²⁸⁰

II. MINDFULNESS

Much of the current interest and popularity about being more mindful among athletes,²⁸¹ businesses²⁸² (such as Google²⁸³), law schools and lawyers,²⁸⁴ organizations²⁸⁵ (such as the military²⁸⁶), and laypeople²⁸⁷ is due to psychological and neuroscience

²⁷³ *Id.* at 104–15.

²⁷⁴ *Id.* at 117–24.

²⁷⁵ *Id.* at 126–37.

²⁷⁶ *Id.* at 139–48.

²⁷⁷ *Id.* at 150–61.

²⁷⁸ *Id.* at 164–271.

²⁷⁹ *See id.* at 274–495.

²⁸⁰ *See id.* at 524–41.

²⁸¹ GEORGE MUMFORD, *THE MINDFUL ATHLETE: SECRETS TO PURE PERFORMANCE* (2015); Interview with George Mumford, *The Lakers Meditate?*, MINDFUL (Apr. 15, 2011), <http://www.mindful.org/the-lakers-meditate/> [<http://perma.cc/R4HY-SY2M>]; Christine Yu, *Mindfulness for Athletes: The Secret to Better Performance?*, LIFE BY DAILY BURN (June 10, 2014), <http://dailyburn.com/life/fitness/mindfulness-techniques-athletes/> [<http://perma.cc/6VA4-RLFP>].

²⁸² *See, e.g.*, Antonia Macaro & Julian Baggini, *Business on the Mindfulness Bandwagon*, FIN. TIMES MAG. (Mar. 13, 2015), <http://www.ft.com/cms/s/0/ee65c5e4-c82f-11e4-8fe2-00144feab7de.html> [<http://perma.cc/S22M-FJS5>].

²⁸³ CHADE-MENG TAN, *SEARCH INSIDE YOURSELF: THE UNEXPECTED PATH TO ACHIEVING SUCCESS, HAPPINESS (AND WORLD PEACE)* 3 (2012).

²⁸⁴ Jacob Gershman, *Lawyers Go Zen, With Few Objections*, WALL ST. J. (June 18, 2015), <http://www.wsj.com/articles/lawyers-go-zen-with-few-objections-1434586250> [<http://perma.cc/J2RG-6EBJ>].

²⁸⁵ Jacqueline Carter, *Mindfulness as a Foundation for Organizational Effectiveness*, HUFFINGTON POST (Jan. 17, 2014), http://www.huffingtonpost.com/jacqueline-carte/corporate-based-mindfulness_b_4597952.html [<http://perma.cc/PF8R-WBB4>].

²⁸⁶ *See, e.g.*, Alena Hall, *How Mindfulness Practices Can Help Prepare Military Members for Future Combat*, HUFFINGTON POST (Mar. 10, 2015), http://www.huffingtonpost.com/2015/03/10/mindfulness-in-the-military_n_6833402.html [<http://perma.cc/4QSG-VZQ8>].

²⁸⁷ Frances Weaver, *The Mainstreaming of Mindfulness Meditation*, WEEK (Apr. 5, 2014), <http://theweek.com/articles/448250/mainstreaming-mindfulness-meditation> [<http://perma.cc/2UW7-GHAQ>].

studies finding that being more mindful improves physical health, mental health, and well-being,²⁸⁸ cultivates emotional intelligence,²⁸⁹ reduces anxiety and stress,²⁹⁰ and improves focus and productivity.²⁹¹

Whether mindfulness leads to more ethical behavior depends upon one's precise definition of mindfulness and exactly what one is mindful about.²⁹² If mindfulness is defined as paying attention in a caring, discerning, and open-hearted way, with kind curiosity to ourselves, others, and our environment, instead of just paying bare attention, then such a definition contains an intention of caring about ourselves, others, and our environment.²⁹³ People can also be narrow or wide in the scope of what people are mindful about.²⁹⁴

A. Cognitive Biases as Forms of Mindlessness

People often choose poorly when they act mindlessly or without much awareness, as if acting on automatic pilot.²⁹⁵ It is cognitively too demanding to pay attention to all the stimuli that people receive because attention is a finite, scarce resource.²⁹⁶ To what we pay attention is very often unconsciously determined.²⁹⁷ Psychology professors Christopher Chabris and Daniel Simons' famous "invisible gorilla experiment"²⁹⁸ illustrates that people can exhibit

²⁸⁸ *Benefits of Mindfulness*, HARV. HEALTH PUBLICATIONS, <http://www.helpguide.org/harvard/benefits-of-mindfulness.htm> [<http://perma.cc/E45P-FAYG>].

²⁸⁹ Carolyn Gregoire, *Why Mindfulness Is The Foundation Of Emotional Intelligence*, HUFFINGTON POST (Oct. 31, 2014), http://www.huffingtonpost.com/2014/10/31/search-inside-yourself_n_6061586.html [<http://perma.cc/KPT7-GNE6>].

²⁹⁰ Debra S. Austin, *Killing Them Softly: Neuroscience Reveals How Brain Cells Die from Law School Stress and How Neural Self-Hacking Can Optimize Cognitive Performance*, 59 LOY. L. REV. 791, 838–42 (2013) (discussing the benefits of mindfulness).

²⁹¹ Peter H. Huang, *Happiness Studies and Legal Policy*, 6 ANN. REV. L. & SOC. SCI. 405, 420–22 (2010) (analyzing benefits of mindfulness meditation and loving-kindness meditation).

²⁹² Huang, *supra* note 56, at 54, 59.

²⁹³ *Id.* at 59–61.

²⁹⁴ *Id.* at 64–65.

²⁹⁵ *Id.* at 59.

²⁹⁶ CHRISTOPHER CHABRIS & DANIEL SIMONS, *THE INVISIBLE GORILLA AND OTHER WAYS OUR INTUITIONS DECEIVE US* 6–7, 38 (2010).

²⁹⁷ *Id.* at 230–31.

²⁹⁸ *Id.* at 5–7; Christopher Chabris & Daniel Simons, *Gorilla Experiment*, INVISIBLE GORILLA (2010), http://www.theinvisiblegorilla.com/gorilla_experiment.html [<https://perma.cc/KC2G-DL6U>].

inattentional blindness resulting from paying selective attention. It is not possible to always be mindful of everything due to finite cognition.²⁹⁹ People can learn to choose to be mindful in their mindlessness.³⁰⁰ An example of the potential of being mindful about mindlessness is to form the habit of taking off one of your shoes and placing it on the floor of the backseat row near a baby's child seat so that you will not mindlessly leave a baby locked in your car on a hot day because you will have to get your shoe before or immediately upon leaving your car.³⁰¹

Economics professor Xavier Gabaix proposes a tractable model of bounded rationality based on the theme of people having limited attention.³⁰² In his model, people (just like economists) create simplified models of the world and think about reality via their models.³⁰³ People's models necessarily entail a representation of reality that is sparse,³⁰⁴ in the sense that only very few of the many possible parameters and variables of reality are represented as being nonzero.³⁰⁵ People only choose to pay attention to, or think about, those variables to which people assign nonzero values.³⁰⁶ In Gabaix's model, people choose how much attention to pay to aspects of reality by balancing the benefits and costs of thinking.³⁰⁷ To avoid the infinite regress problem of thinking optimally about how much to think, Gabaix's model makes the simplifying assumption that people's utility losses from inattention are linear-quadratic functions.³⁰⁸ The underlying intuition of Gabaix's model is that people pay more attention to things that are more volatile, matter more for their decisions, entail big losses if they make imperfect decisions, and if the psychic cost of paying attention is

²⁹⁹ CHABRIS & SIMONS, *supra* note 296, at 38; Peter H. Huang, *Meta-Mindfulness: A New Hope*, 19 RICH. J.L. PUB. INT. 303, 316 (2016).

³⁰⁰ Huang, *supra* note 299, at 314, 316.

³⁰¹ See Melanie Payne, *Shoe Trick Will Prevent Child Deaths in Hot Cars*, NEWS-PRESS (June 20, 2014), <https://www.news-press.com/story/news/investigations/melanie-payne/2014/06/20/tell-mel-neverleft-campaign/11102697/> [<https://perma.cc/KNZ4-2N67>].

³⁰² Xavier Gabaix, *A Sparsity-Based Model of Bounded Rationality*, 129 Q.J. ECON. 1661, 1661, 1663 (2014).

³⁰³ *Id.* at 1662.

³⁰⁴ *Id.* at 1662–63.

³⁰⁵ *Id.*

³⁰⁶ *Id.* at 1669, 1673.

³⁰⁷ *Id.* at 1670.

³⁰⁸ *Id.* at 1699–1700.

low.³⁰⁹ The overarching idea of mindfulness is to develop the ability to be able to pay attention to those aspects of reality that matter in any given situation.³¹⁰ Learning how to discern what matters is part of practicing mindfulness and meta-mindfulness.³¹¹

Gabaix analyzes how numerous cognitive biases in behavioral economics reflect a particular form of inattention,³¹² such as inattention to true prices and the shrouding of add-on costs,³¹³ inattention to taxes,³¹⁴ neglected risks,³¹⁵ hyperbolic discounting being global inattention to the future,³¹⁶ prospect theory being inattention to true probabilities,³¹⁷ overconfidence being inattention to one's true ability,³¹⁸ believing one's beliefs to be more accurate than they are being inattention to the precision of one's signals,³¹⁹ underestimating the correlation between strategies in a game being attention to conditional probability,³²⁰ projection bias being local inattention to future circumstances by anchoring on present circumstances,³²¹ base-rate neglect being inattention to base probabilities,³²² correlation neglect being inattention to correlation of random variables,³²³ insensitivity to sample size being inattention to sample size,³²⁴ over- and under-reaction to news being inattention to autocorrelation of a stochastic time

³⁰⁹ *Id.* at 1671–72.

³¹⁰ Huang, *supra* note 299, at 313–14.

³¹¹ *Id.* at 314, 317.

³¹² Gabaix, *supra* note 302, at 1695; Xavier Gabaix, *Behavioral Inattention*, in HANDBOOK OF BEHAVIORAL ECONOMICS (Douglas Bernheim, Stefano DellaVigna & David Laibson eds., forthcoming) (draft chapters at 9–16).

³¹³ Xavier Gabaix, *supra* note 312, at draft chapters 10, 22, 24, 27 tbl.1).

³¹⁴ *Id.* at 10, 21–22, 27 tbl.1.

³¹⁵ *Id.* at 10–11.

³¹⁶ *Id.* at 11, 22.

³¹⁷ *Id.* at 11–12.

³¹⁸ *Id.* at 13.

³¹⁹ Gabaix, *supra* note 312, at 13.

³²⁰ *Id.*

³²¹ Gabaix, *supra* note 302, at Online Appendix, 44–45; Gabaix, *supra* note 312, at 13.

³²² Gabaix, *supra* note 302, at Online Appendix, 43–44; Gabaix, *supra* note 312, at 13.

³²³ Gabaix, *supra* note 312, at 13–14.

³²⁴ Gabaix, *supra* note 302, at Online Appendix, 45–46; Gabaix, *supra* note 312, at 14.

series,³²⁵ left-digit bias being inattention to non-leading digits,³²⁶ exponential growth bias being inattention to compounding of interest rates,³²⁷ and insensitivity to predictability, misconceptions of regression to the mean, and illusion of validity all being forms of inattention to the stochasticity of the world.³²⁸

B. How Mindfulness Can Improve Decision-Making

Experimental research finds that practicing mindfulness reduces these cognitive biases: affective impact bias,³²⁹ implicit age bias,³³⁰ implicit race bias,³³¹ and sunk-cost bias.³³² In addition, practicing mindfulness can reduce racially discriminatory behavior³³³ and reduce pursuing personally costly vengeance or revenge in ultimatum games.³³⁴ More generally, practicing mindfulness can decrease the impact of cognitive biases by improving people's decision-making through improving people's moods and reducing people's anxiety and negative affect.³³⁵

Co-founder of the Civility Project at Johns Hopkins, Professor Forni, memorably states that “[m]istakes are bad choices we make when we are not ready to make good ones.”³³⁶ Soll, Milkman,

³²⁵ Gabaix, *supra* note 312, at 14–15, 24–26, 27 tbl.1.

³²⁶ *Id.* at 15, 23–24, 27 tbl.1.

³²⁷ *Id.* at 15.

³²⁸ Gabaix, *supra* note 302, at Online Appendix, 45; Gabaix, *supra* note 312, at 14.

³²⁹ Amber S. Emanuel et al., *The Role of Mindfulness Facets in Affective Forecasting*, 49 PERSONALITY & INDIVIDUAL DIFFERENCES 815, 816–18 (2010).

³³⁰ Adam Lueke & Bryan Gibson, *Mindfulness Meditation Reduces Implicit Age and Race Bias: The Role of Reduced Automaticity of Responding*, 6 SOC. PSYCHOL. & PERSONALITY SCI. 284, 287–89 (2015).

³³¹ *Id.*

³³² Andrew C. Hafenbrack et al., *Debiasing the Mind Through Meditation: Mindfulness and the Sunk-Cost Bias*, 25 PSYCHOL. SCI. 369, 369, 374 (2014).

³³³ Adam Lueke & Bryan Gibson, *Brief Mindfulness Meditation Reduces Discrimination*, 3 PSYCHOL. CONSCIOUSNESS: THEORY, RES. & PRAC. 34, 39 (2016).

³³⁴ Ulrich Kirk et al., *Interoception Drives Increased Rational Decision-Making in Meditators Playing the Ultimatum Game*, 5 FRONTIERS NEUROSCI. 1, 9–10 (2011).

³³⁵ Greta B. Raglan & Jay Schulkin, *Decision-making, Mindfulness, and Mood: How Mindfulness Techniques Can Reduce the Impact of Biases and Heuristics Through Improved Decision-making and Positive Affect*, 4 J. DEPRESSION & ANXIETY 168, 172–73 (2014).

³³⁶ PIER M. FORNI, *THE THINKING LIFE: HOW TO THRIVE IN THE AGE OF DISTRACTION* 87 (2011).

and Payne introduce a concept of decision readiness,³³⁷ in which a person's System Two thinking³³⁸ is ready to monitor a person's System One thinking,³³⁹ interrupt wrong judgments, and avoid wrong decisions. Being mindful facilitates decision readiness.³⁴⁰

A way mindfulness meditation can improve decision-making is by allowing people to practice and get better at being mindful, which in turn can improve decision-making for all of the reasons discussed above.³⁴¹ Another way that mindfulness meditation can improve decision-making is if mindfulness meditation reduces anxiety and stress³⁴² because there is evidence that "anxiety increases threat perception, which, in turn, results in self-interested unethical behaviors."³⁴³ There is also evidence that just four days of mindfulness meditation training for twenty minutes per day can improve the ability to sustain attention, executive functioning, working memory, and visual-spatial processing of undergraduates,³⁴⁴ perhaps as the result of reducing self-reported anxiety and fatigue.³⁴⁵ More generally, mindfulness meditation can improve people's decision-making by improving their decision readiness in the same ways that mindfulness can, as the above paragraph notes.³⁴⁶

Professors Natalia Karelaia and Jochen Reb analyze how and when mindfulness can improve people's decision-making.³⁴⁷ They divided up the process of decision-making into these four stages³⁴⁸:

³³⁷ Soll et al., *supra* note 131, at 929–30.

³³⁸ KAHNEMAN, *supra* note 5, at 13.

³³⁹ *Id.* at 13.

³⁴⁰ *Id.* at 930; Raglan & Schulkin, *supra* note 335, at 172–73.

³⁴¹ Fadel Zeidan et al., *Mindfulness Meditation Improves Cognition: Evidence of Brief Mental Training*, 19 CONSCIOUSNESS & COGNITION 597, 603–04 (2010).

³⁴² Madhav Goyal et al., *Meditation Programs for Psychological Stress and Well-being: A Systematic Review and Meta-analysis*, 174 J. AM. MED. ASS'N INTERNAL MED. 357, 361, 364 (2014).

³⁴³ Maryam Kouchaki & Sreedhari D. Desai, *Anxious, Threatened, and Also Unethical: How Anxiety Makes Individuals Feel Threatened and Commit Unethical Acts*, 100 J. APPLIED PSYCHOL. 360, 360 (2015).

³⁴⁴ Zeidan et al., *supra* note 341, at 597, 602–04.

³⁴⁵ *Id.* at 601, 603.

³⁴⁶ Raglan & Schulkin, *supra* note 335, at 172–73; Zeidan et al., *supra* note 341, at 603–04.

³⁴⁷ Natalia Karelaia & Jochen Reb, *Improving Decision-making through Mindfulness*, in MINDFULNESS IN ORGANIZATION: FOUNDATION, RESEARCH, AND APPLICATIONS 163, 164–65 (Jochen Reb & Paul W. B. Atkins eds., 2015).

³⁴⁸ *Id.* at 165, fig.7.1.

(1) Decision Framing, (2) Information Gathering and Processing, (3) Making Conclusions, and (4) Learning from Feedback.

Karelaia and Reb point out how mindfulness could hamper decision-making if additional options lead to cognitive overload, delay choice, or in the limit cause choice paralysis.³⁴⁹ The focusing of attention to the present moment that mindfulness entails may also result in prioritizing immediate as opposed to long-term goals.³⁵⁰ A counterpoint is that practicing mindfulness helps people realize that their current thoughts, feelings, and bodily sensations are only fleeting and temporary.³⁵¹ This realization should lead people to appreciate that their present goals are likely to change in unpredictable ways.³⁵² Being more mindful about, empathetic with, and sensitive to people's future selves may also help people choose wisely regarding their future selves.³⁵³

Being mindful can also help people discern the difference between important and necessary versus unimportant and unnecessary decisions.³⁵⁴ Such discernment allows people to prioritize the choices they face and spend limited attentional, cognitive, and economic resources on consequential choices instead of wasting effort, time, and energy on micromanaging their lives.³⁵⁵ Judiciously focusing on choices that matter also lowers the anxiety from being overwhelmed by having to make too many choices.³⁵⁶

Mindfulness can help people realize when they should choose to stop continuing a plan of action.³⁵⁷ A correlational and three experimental studies³⁵⁸ found that increased mindfulness meditation reduces irrational escalation of commitment by reducing the related sunk-cost bias,³⁵⁹ in which people continue a course of

³⁴⁹ *Id.* at 168.

³⁵⁰ *Id.*

³⁵¹ *Id.* at 178.

³⁵² *Id.* at 175.

³⁵³ *Id.* at 175.

³⁵⁴ *Id.* at 168–69.

³⁵⁵ *Id.* at 169.

³⁵⁶ *Id.*

³⁵⁷ *Id.* at 170.

³⁵⁸ Hafenbrack et al., *supra* note 332, at 370–74 (presenting these studies).

³⁵⁹ Hal R. Arkes & Catherine Blumer, *The Psychology of Sunk Cost*, 35 *ORG. BEHAV. & HUM. DECISION PROCESSES* 124, 124 (1985) (presenting a field study and questionnaire studies finding the sunk-cost effect); Hafenbrack et al., *supra* note 332, at 374.

action because of prior unrecoverable expenditures in effort, money, or time. A financial example of the sunk-cost effect is that many people find it hard to sell a stock whose price has dropped.³⁶⁰ Karellaia and Reb believe that another reason that mindfulness reduces irrational escalation of commitment is that mindfulness reduces ego involvement and personal attachment to past choices and uncomfortable feelings that result from criticism of past choices.³⁶¹

Economics Nobel laureate Herbert Simon³⁶² famously stated that attention is a scarce resource:

In an information-rich world, the wealth of information means a dearth of something else: a scarcity of whatever it is that information consumes. What information consumes is rather obvious: it consumes the attention of its recipients. Hence a wealth of information creates a poverty of attention and a need to allocate that attention efficiently among the overabundance of information sources that might consume it.³⁶³

Mindfulness may result in less extensive information search because mindfulness itself entails heightened utilization of the limited cognitive resource of attention.³⁶⁴ The impact of such reduced scope of information search is unclear though because while there is the possibility of missing key decision-relevant information, there also is less negative affect from onerous information search and less reliance on external criteria for choice.³⁶⁵

Mindfulness may help people become more aware of the uncertainties they face by reminding people of the impermanent and temporary nature of their bodily sensations, feelings, and

³⁶⁰ Terrance Odean, *Are Investors Reluctant to Realize Their Losses?*, 53 J. FIN. 1775, 1777–78 (1998) (providing empirical evidence that investors hold losing investments too long).

³⁶¹ Karellaia & Reb, *supra* note 347, at 170.

³⁶² *Herbert A. Simon Facts*, NOBEL PRIZE, <https://www.nobelprize.org/prizes/economics/1978/simon/facts/> [<https://perma.cc/LU2L-D73K>]; *Nobel Laureates and Research Affiliations*, NOBEL PRIZE, <https://www.nobelprize.org/prizes/lists/nobel-laureates-and-research-affiliations/> [<https://perma.cc/D93K-7XX9>].

³⁶³ Herbert A. Simon, *Designing Organizations for an Information-Rich World*, in *COMPUTERS, COMMUNICATIONS, AND THE PUBLIC INTEREST* 40–41 (Martin Greenberger ed., 1971).

³⁶⁴ Karellaia & Reb, *supra* note 347, at 172.

³⁶⁵ *Id.*

thoughts.³⁶⁶ Karelaia and Reb hypothesize that mindfulness can help people have an increased tolerance of uncertainty by detaching people from their feelings of unease with uncertainty.³⁶⁷ Mindfulness can lead people to realize if they engage in excessive information search and redirect their efforts more productively elsewhere.³⁶⁸ Mindfulness can reduce illusory pattern detection, which is particularly likely when people feel a lack of control.³⁶⁹ Mindfulness practice can mitigate many of the difficulties of learning from experience that this Article detailed earlier,³⁷⁰ if Karelaia and Reb are correct that “mindful decision makers are more likely to *learn from feedback* and importantly, learn the right lessons.”³⁷¹

Mindfulness can lead to compassion and self-compassion.³⁷² Leah Weiss teaches a course at the Stanford University Graduate School of Business titled *Leading with Mindfulness and Compassion*.³⁷³ The course “is based on the theory that a compassionate attitude can significantly reduce the distress people feel in difficult situations, as well as make you a better leader.”³⁷⁴ Compassionate business leaders can change toxic work environments.³⁷⁵ There is recent evidence that self-compassion improves problem-solving, resilience after failure, and quality of life, while it decreases anxiety, depression, and stress.³⁷⁶

Finally, and importantly for law,³⁷⁷ practicing mindfulness can lead to individual development and societal reform.³⁷⁸

³⁶⁶ *Id.* at 175.

³⁶⁷ *Id.* at 175.

³⁶⁸ *Id.*

³⁶⁹ *Id.* at 175–76; Jennifer A. Whitson & Adam D. Galinsky, *Lacking Control Increases Illusory Pattern Perception*, 322 *SCI.* 115, 115 (2008) (presenting data from six experiments).

³⁷⁰ *See supra* Section I.A.

³⁷¹ Karelaia & Reb, *supra* note 347, at 182.

³⁷² Huang, *supra* note 224, at 96, 97, 112, 120, 125, 129, 130.

³⁷³ Melinda Sacks, *Chief Kindness Officers?* *STAN. MAG.* (Dec. 15, 2017), <https://medium.com/stanford-magazine/compassion-class-at-the-graduate-school-of-business-62fbcdb37c2c> [<http://perma.cc/9PMG-PE6M>].

³⁷⁴ *Id.*

³⁷⁵ *Id.*

³⁷⁶ *Id.*

³⁷⁷ *See, e.g.*, Angela Harris, Margareta Lin, & Jeff Selbin, *From ‘The Art of War’ to ‘Being Peace’: Mindfulness and Community Lawyering in a Neoliberal Age*, 95 *CAL. L. REV.* 2073 (2007).

³⁷⁸ GRETCHEN KI STEIDLE, *LEADING FROM WITHIN: CONSCIOUS SOCIAL CHANGE AND MINDFULNESS FOR SOCIAL INNOVATION* (2017).

Gretchen Ki Steidle believes that personal transformation and social change are both crucial for a just society.³⁷⁹ Steidle is the founder³⁸⁰ and president³⁸¹ of Global Grassroots,³⁸² an international non-profit organization whose defining “mission is to catalyze women and girls as leaders of Conscious Social Change in their communities.”³⁸³ The phrase Conscious Social Change refers to “a design methodology that employs mindfulness throughout the process of designing a social solution.”³⁸⁴ Conscious Social Change³⁸⁵ consists of these five capacities and associated guiding questions³⁸⁶:

- 1) Cultivating Presence: What is happening?³⁸⁷
- 2) Becoming Whole: What is True?³⁸⁸
- 3) Ensuring Well-Being: What is needed?³⁸⁹
- 4) Engaging Mindfully: What is helpful?³⁹⁰
- 5) Leading from Within: What is possible?³⁹¹

Steidle reviews the neuroscience and psychotherapeutic evidence demonstrating the benefits of mindfulness.³⁹² Steidle details how mindfulness helps people to become better change agents and leaders, who are able to create more sustainable solutions, forge stronger relationships, and inspire change in others.³⁹³ Steidle

³⁷⁹ *Id.*

³⁸⁰ *Our Founder*, GLOBAL GRASSROOTS NETWORK, <http://www.globalgrassroots.org/founder.html> [<https://perma.cc/8GSE-N4SC>].

³⁸¹ *Board of Directors*, GLOBAL GRASSROOTS NETWORK, <http://www.globalgrassroots.org/board.html> [<https://perma.cc/9ZDY-JT5F>].

³⁸² *Who We Are*, GLOBAL GRASSROOTS NETWORK, http://www.globalgrassroots.org/who_we_are.html [<https://perma.cc/VU83-4CEE>].

³⁸³ *Mission and Vision*, GLOBAL GRASSROOTS NETWORK, http://www.globalgrassroots.org/mission_vision.html [<https://perma.cc/ZW4V-QCBL>].

³⁸⁴ *Id.*; STEIDLE, *supra* note 378, at 37–44.

³⁸⁵ SOCIAL CONSCIOUS CHANGE, <http://www.conscioussocialchange.org/> [<https://perma.cc/RX7K-H4CH>].

³⁸⁶ STEIDLE, *supra* note 378, at xx, 40.

³⁸⁷ *Id.* at 45–63.

³⁸⁸ *Id.* at 65–109.

³⁸⁹ *Id.* at 111–34.

³⁹⁰ *Id.* at 135–92.

³⁹¹ *Id.* at 193–203.

³⁹² *Id.* at 1–35.

³⁹³ *Mindfulness: Why Being Present Can Make You a Better Manager*, KNOWLEDGE@WHARTON (Feb. 5, 2018), <http://knowledge.wharton.upenn.edu/ar>

lists and describes organizations that integrate mindfulness into social change.³⁹⁴ Steidle presents mindfulness practices for individuals and groups.³⁹⁵

III. THINKING BOOSTS

This part of the Article analyzes structured ways to think better and more systematically by utilizing thinking tools that people may be unfamiliar with, namely thinking architecture and thinking technologies.³⁹⁶ Pen, paper, stylus, and tablet are familiar thinking tools.³⁹⁷ As a humorous television commercial states, though: “[t]he wrong tools can only take you so far.”³⁹⁸ There should be less resistance towards efforts at increasing people’s thinking because few people should claim that they are just not thinking people.³⁹⁹ In the movie, *Bridge of Spies*,⁴⁰⁰ a character says: “Sometimes people think wrong. People are people.” Shlomo Benartzi and John Payne introduce the phrase “thinking architecture,” which is “a structured process that allows us to break down a complex problem, such as what to do in retirement, into a series of manageable thinking steps, so as to improve outcomes.”⁴⁰¹ Thinking architecture differs from traditional checklists⁴⁰² as each step in thinking architecture “is designed to deal with a particular behavioral challenge or mental blind spot ... to fortify the weakest

title/mindfulness-how-being-present-can-make-you-a-better-manager/ [https://perma.cc/NHJ3-3CN6].

³⁹⁴ STEIDLE, *supra* note 378, at 209–13.

³⁹⁵ *Id.* at xv–xvi, 7, 30–35, 57–63, 174–92, 202–03.

³⁹⁶ Keith Oatley & Maja Djikic, *Writing as Thinking*, 12 REV. OF GEN. PSYCHOL. 9, 9–10, 12 (2008).

³⁹⁷ *Id.*

³⁹⁸ Blake Ebel, *PowerShares QQQ “Uphill battle”*, YOUTUBE (Nov. 26, 2014), <https://www.youtube.com/watch?v=iyrl26nztKI> [http://perma.cc/ZUX2-SSBD].

³⁹⁹ *Id.*

⁴⁰⁰ *Bridge Of Spies* (Amblin Entertainment 2015).

⁴⁰¹ SHLOMO BENARTZI WITH ROGER LEWIN, THINKING SMARTER: SEVEN STEPS TO YOUR FULFILLING RETIREMENT ... AND LIFE 5 (2015); *see also* BENARTZI WITH LEHRER, *supra* note 57, at 197–98.

⁴⁰² KAHNEMAN, *supra* note 5, at 226–27 (explaining the virtues of simple algorithms and checklists). *See generally* ATUL GAWANDE, THE CHECKLIST MANIFESTO: HOW TO GET THINGS RIGHT (2011) (extolling on the virtues of checklists).

parts of the mind.”⁴⁰³ In a sense, thinking architecture is a low technology version of thinking technology.⁴⁰⁴

There is experimental evidence that even a twenty-five-minute training session on statistical reasoning (specifically, the law of large numbers) significantly increased the frequency and quality of people applying statistical reasoning to a wide range of everyday life problems that were outside the context of the training.⁴⁰⁵ These problems included scenarios that are not usually viewed in terms of probabilities, such as whether a person’s personality can be inferred from first impressions,⁴⁰⁶ whether the performance of group members can be predicted from the performance of one of its members,⁴⁰⁷ choosing which of two colleges to attend,⁴⁰⁸ hiring an actress for the lead in a Broadway play,⁴⁰⁹ how to determine if you like Chinese food,⁴¹⁰ and how to figure out if you like vacations.⁴¹¹

A. *Thinking Technologies*

This part of the Article considers various engaging and fun technologies that can help people think better and in so doing improve their decision-making. Virtual reality simulations can improve the accuracy of people’s perceptions of their future selves by helping people learn how their current decisions and behavior shape their future selves.⁴¹² Behavioral economist Colin Camerer suggested that “computer morphing of a body image could be used to show a person, for example, what they would look like in one year if they continue their steady diet of fast food or, oppositely, if they stuck with their personal trainer three times a week for a

⁴⁰³ BENARTZI WITH LEWIN, *supra* note 401, at 5.

⁴⁰⁴ *Id.*

⁴⁰⁵ Geoffrey T. Fong et al., *The Effects of Statistical Training on Thinking About Everyday Problems*, 18 COGNITIVE PSYCHOL. 253, 253, 269–70, 280, 282 (1986).

⁴⁰⁶ *Id.* at 285–88.

⁴⁰⁷ *Id.* at 286.

⁴⁰⁸ *Id.* at 287.

⁴⁰⁹ *Id.* at 288.

⁴¹⁰ *Id.*

⁴¹¹ *Id.* at 288–89.

⁴¹² JIM BLASCOVICH & JEREMY N. BALENSON, INFINITE REALITY (2011); INFINITE REALITY, <http://www.infinitereality.org/research.html> [<http://perma.cc/467M-M5BD>].

year.”⁴¹³ Regulators could mandate that fast food restaurants provide a hologram projection of what a customer might look like as they age if they regularly ate healthy versus unhealthy items.⁴¹⁴

Experimental studies have found evidence of a phenomenon known as the Proteus effect, where people infer their expected behaviors and attitudes based upon observing their avatar’s appearance, and conform their online behavior to their digital self-representations independent of how others perceive them.⁴¹⁵ In one study, people assigned to more attractive avatars in immersive virtual environments engaged in more self-disclosure than subjects assigned to less attractive avatars.⁴¹⁶ In another study, those assigned taller avatars behaved more confidently in negotiating than others assigned shorter avatars.⁴¹⁷ The effects in these studies have been found to extend to an actual online community and subsequent face-to-face interactions.⁴¹⁸

Serious games are games that “have an explicit and carefully thought-out educational purpose and are not intended to be played primarily for amusement.”⁴¹⁹ Simulation games should be more effective than alternative instructional methods according to interactive cognitive complexity theory because simulation games engage people’s cognitive and affective processes simultaneously.⁴²⁰ A meta-analysis examining data on 6,476 individuals in 65 studies finds people trained by computer-based simulation games had 20 percent more self-efficacy, 14 percent more skill-based knowledge

⁴¹³ Colin F. Camerer, *Wanting, Liking, and Learning: Neuroscience and Paternalism*, 73 U. CHI. L. REV. 87, 103 (2006).

⁴¹⁴ *Id.*

⁴¹⁵ Nick Yee & Jeremy Bailenson, *The Proteus Effect: The Effect of Transformed Self-Representation on Behavior*, 33 HUMAN COMM. RES. 271, 271, 285 (2007).

⁴¹⁶ *Id.*

⁴¹⁷ *Id.*

⁴¹⁸ Nick Yee et al., *The Proteus Effect: Implications of Transformed Digital Self-Representation On Online and Offline Behavior*, 36 COMM. RES. 285, 285 (2009).

⁴¹⁹ CLARK C. ABT, SERIOUS GAMES 9 (1975); see also DAVID MICHAEL & SANDE CHEN, SERIOUS GAMES: GAMES THAT EDUCATE, TRAIN, AND INFORM (2006); PSYCHOLOGY, PEDAGOGY, AND ASSESSMENT IN SERIOUS GAMES (Thomas M. Connolly et al. eds., 2014).

⁴²⁰ Robert D. Tennyson & Robert L. Jorczak, *A Conceptual Framework for the Empirical Study of Games*, in COMPUTER GAMES AND TEAM AND INDIVIDUAL LEARNING 3 (2008).

level, 11 percent more factual knowledge level, and 9 percent higher retention rate than people in control groups.⁴²¹

Some professions have begun to explore the use of serious games to teach contextualized decision-making skills. A medical simulation computer video game, *JDoc*, “immerses the player in the believable world of a busy hospital at night and educates them as to the diagnostic procedures and medical criteria required while working on-call in a hospital ward.”⁴²² *JDoc* provides an engaging way for junior doctors to learn communication skills, decision-making skills, diagnostic and medical procedures, interpersonal skills, and medical information.⁴²³ Another virtual environment serious game,⁴²⁴ *DREAD-ED* (Disaster Readiness through Education), is a cooperative multiplayer game designed to teach communication and group decision-making skills to emergency management personnel.⁴²⁵ A company called Knack⁴²⁶ develops app-based video games that provide various measures of a player’s character, decision-making, emotional/social intelligence, leadership, mindset, and thinking.⁴²⁷ Human resources departments can utilize such information to avoid cognitive biases in their hiring processes.⁴²⁸ People can utilize such information to increase their self-awareness and choose professions that fit their strengths.⁴²⁹

Serious games can train players to recognize and mitigate cognitive biases in decision-making.⁴³⁰ A video adventure game

⁴²¹ Traci Sitzmann, *A Meta-Analytic Examination of The Instructional Effectiveness of Computer-Based Simulation Games*, 64 PERSONNEL PSYCHOL. 489 (2011).

⁴²² Aidan Sliney & David Murphy, *JDoc: A Serious Game for Medical Learning*, PROC. FIRST INT’L CONF. ADVANCES COMPUTER-HUM. INTERACTION 131, 131 (2008).

⁴²³ *Id.* at 132.

⁴²⁴ Nina Haferkamp et al., *Training Disaster Communication By Means of Serious Games In Virtual Environments*, 2 ENT. COMPUTING 81, 81 (2011).

⁴²⁵ *Id.*

⁴²⁶ *Knack Story*, KNACK, <https://www.knack.it/story/> [<http://perma.cc/N95C-Q8B4>].

⁴²⁷ *Knack Mission*, KNACK, <https://www.knack.it/mission/> [<https://perma.cc/72B6-RW2L>].

⁴²⁸ Keith Fiveson, *It Takes EQ, Not Just IQ*, HR EXCH. NETWORK (Jan. 4, 2010), <https://www.hrexchangenetwork.com/hr-talent-management/articles/it-takes-eq-not-just-iq> [<http://perma.cc/9BFS-FUB2>].

⁴²⁹ *Id.*

⁴³⁰ Benjamin A. Clegg et al., *Gaming Technology for Critical Thinking: Engagement, Usability, and Measurement*, 58 PROC. HUM. FACTORS & ERGONOMICS SOC. ANN. MEETING 2370, 2370 (2014); Flach et al., *supra* note 163, at 272.

called *Missing: The Pursuit of Terry Hughes*⁴³¹ incorporates an engaging storyline about Terry, “a gregarious, well-liked figure with an extravagant social life”⁴³² who goes missing. Terry’s brother Chris becomes worried when she disappears and asks her neighbor, the player of the game, to look around Terry’s apartment for clues about why Terry is missing.⁴³³ This game moves a player through these four instructive phases: (1) eliciting a target cognitive bias in a naturalistic scenario, (2) examining a player’s actions or asking a player questions to determine if a cognitive bias happened, (3) providing feedback to a player about whether a player avoided or exhibited a cognitive bias, and (4) reinforcing a player’s understanding of a cognitive bias by providing other examples that highlight similar cognitive bias aspects and contexts.⁴³⁴

It should be unsurprising that learning to recognize and mitigate cognitive biases are crucial skills for intelligence analysts.⁴³⁵ Players of this game achieved statistically significant immediate increases in their knowledge about cognitive biases, by 37 percent for students and 44 percent for analysts.⁴³⁶ The immediate bias mitigation effects were improvements of 25 percent for students and 27 percent for analysts.⁴³⁷ Of the players who completed follow-up testing after eight weeks, cognitive bias knowledge retention decreased from 37 percent to 25 percent among students and from 39 percent to 26 percent among analysts, while bias mitigation decreased from 29 percent to 28 percent among students and from 27 percent to 20 percent among analysts.⁴³⁸

⁴³¹ Carl Symborski et al., *Missing: A Serious Game for the Mitigation of Cognitive Biases*, 1, 1, PROC. INTERSERVICE/INDUSTRY TRAINING, SIMULATION, & EDUC. CONF. (2014), <http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.682.9522>; see also Carl Symborski, *Leidos Sirius Missing*, 34–45, <http://www.gametechnology.com/sites/default/files/Rita%20Bush%20Sirius%20Game%20Tech%20presentation%2020140819%20%28all%20panelist%20slides,final%209.pdf> [<https://perma.cc/X69T-XNWB>].

⁴³² Symborski et al., *supra* note 431, at 5.

⁴³³ *Id.*

⁴³⁴ *Id.*

⁴³⁵ RICHARDS J. HEUER JR., PSYCHOLOGY OF INTELLIGENCE ANALYSIS, 112–13 (2007).

⁴³⁶ Symborski et al., *supra* note 431, at 10.

⁴³⁷ *Id.*

⁴³⁸ *Id.* at 10–11.

A different version of the game, *Missing: The Final Secret*,⁴³⁹ taught players about recognizing and mitigating these other cognitive biases: anchoring bias (“overweighting the first information primed or considered in subsequent judgment”⁴⁴⁰), social projection bias (“assuming others’ emotions, thoughts, and values are similar to one’s own”⁴⁴¹), and representativeness bias (“using the similarity of an outcome to a prototypical outcome to judge its probability”⁴⁴²).

Players of this version “exonerate their employer of a criminal charge and uncover the criminal activity of her accusers.”⁴⁴³ Players of this game experienced immediate medium to large debiasing effects that persisted at least two months later and these “effects were domain-general: bias reduction occurred across problems in different contexts, and problem formats that were taught and not taught in the interventions.”⁴⁴⁴

Recent research with an experimental empathy training video game, *Crystals of Kaydor*, found that adolescents who played daily for two weeks had increased connectivity in their brain networks that are linked to empathy and perspective, with some displaying altered neural networks related to emotion regulation.⁴⁴⁵

University of Denver computer science professor and chair, Scott Leutenegger,⁴⁴⁶ and University of Denver electronic media art & design and digital media studies professor Rafael Fajardo⁴⁴⁷

⁴³⁹ Carey K. Morewedge et al., *Debiasing Decisions: Improved Decision-making with a Single Training Intervention*, 2 POL’Y INSIGHTS. & BRAIN SCI. 129, 134 (2015).

⁴⁴⁰ *Id.* at 132.

⁴⁴¹ *Id.*

⁴⁴² *Id.*

⁴⁴³ *Id.* at 137.

⁴⁴⁴ *Id.*

⁴⁴⁵ Tammi R. A. Kral et al., *Neural Correlates of Video Game Empathy Training in Adolescents: A Randomized Trial*, 13 NPJ SCI. LEARNING 1, 3–7 (2018); *Video Game Can Change the Brain, May Improve Empathy in Middle School Children*, CTR. FOR HEALTHY MINDS (Aug. 7, 2018), https://centerhealthyminds.org/news/video-game-changes-the-brain-and-may-improve-empathy-in-middle-school-children?utm_source=Center+for+Healthy+Minds&utm_campaign=c124d11a15-EMAIL_CAMPAIGN_2018_03_27_COPY_01&utm_medium=email&utm_term=0_cce2315563-c124d11a15-9218095 [https://perma.cc/5TRN-XU6N].

⁴⁴⁶ *Scott T. Leutenegger Biography*, U. DENV. FACULTY WEBPAGE, <http://www.cs.du.edu/~leut/> [http://perma.cc/V2XF-F9XE].

⁴⁴⁷ FACULTY WEBPAGE, <http://www.rafaelfajardo.com/> [http://perma.cc/U3WZ-G4NC].

coined the phrase “humane games” to encompass (1) games for change, (2) games for health, and (3) games for education.⁴⁴⁸ Two examples of humane games simulate opposing cultural realities and perspectives at the United States–Mexico border, specifically at El Paso–Ciudad Juarez: in *Crosser*TM,⁴⁴⁹ reminiscent of the arcade classic *Frogger*TM, a player attempts to illegally cross the river/border and in *La Migra*TM,⁴⁵⁰ inspired by the arcade classic *Space Invaders*TM, a player is a border patrol agent of the United States Immigration and Naturalization Service who attempts to prevent illegal entry. These socially conscious games exemplify video games as “vehicles and venues for cultural commentary and criticism.”⁴⁵¹ Other humane games concern blame shifting back and forth between political parties,⁴⁵² rescuing civilians,⁴⁵³ decimation of numbats in Australia due to the invasive species, the European Red Fox,⁴⁵⁴ and the 2009 recession.⁴⁵⁵

Professors Sara Konrath, Brad Bushman, Rich Tolman, and Matthew Winslow utilized evidence-based techniques in creating the Random App of Kindness (RAKi) to increase the development of empathic habits in teenagers (ages ten to seventeen).⁴⁵⁶ RAKi is a collection of nine smartphone mini-games.⁴⁵⁷ Initially, three

⁴⁴⁸ HUMANE GAMES, <http://humanegames.tumblr.com/> [<http://perma.cc/YG5N-Q67G>].

⁴⁴⁹ *Crosser*, RAFAEL FAJARDO, <http://www.rafaelfajardo.com/projects/crosser.html> [<http://perma.cc/3YUJ-6SNX>].

⁴⁵⁰ *La Migra*, RAFAEL FAJARDO, <http://www.rafaelfajardo.com/projects/migra.html> [<http://perma.cc/96MP-7DXR>].

⁴⁵¹ Rafael Fajardo, *Pixels, Politics and Play: Digital Video Games As Social Commentary*, 3 INTELLIGENT AGENT MAG. (Summer/Fall 2003), http://www.intelligentagent.com/archive/Vol3_No2_gaming_fajardo.html [<https://perma.cc/3U26-LX7H>].

⁴⁵² Esanche2, *Pass the Blame*, SCRATCH (Apr. 14, 2009), <https://scratch.mit.edu/projects/488451/> [<http://perma.cc/3M8K-MSJ5>].

⁴⁵³ Tfushimi, *Iraq rescue*, SCRATCH (Apr. 13, 2009), <https://scratch.mit.edu/projects/487383/> [<http://perma.cc/WCB2-84YR>].

⁴⁵⁴ Redokapi, *Foxes and Numbats*, SCRATCH, <https://scratch.mit.edu/projects/487551/> [<http://perma.cc/3XKS-4RBW>].

⁴⁵⁵ QusaTalma, *Gauntlet Recessions*, SCRATCH, <https://scratch.mit.edu/projects/487445/> [<http://perma.cc/YB9Z-QYVK>].

⁴⁵⁶ Sara Konrath, *Random App of Kindness*, <http://www.rakigame.com/#home/> [<https://perma.cc/LX8S-MXFN>].

⁴⁵⁷ *Id.*

games are available to a player: *Match the Emotion* teaches a player to improve recognition of emotions in other people's faces by matching eyes, noses, and mouths on cartoon faces to specific emotions.⁴⁵⁸ *Water the Venus Fly Trap* teaches a player to inhibit a dominant response by instructing a player to water an animated plant as quickly as possible and stop as quickly as possible upon being prompted to not water that plant.⁴⁵⁹ *Stop the Baby from Crying* teaches a player empathy by figuring out what a crying baby needs and giving it to the baby.⁴⁶⁰ Upon completing a mini-game successfully three times, another mini-game is unlocked.⁴⁶¹ *Help the Old Woman across the Street* teaches a player the cognitive form of empathy of role or perspective taking by presenting the visual point of view of an old woman crossing a street.⁴⁶² Upon completing another mini-game successfully three times, another mini-game is unlocked.⁴⁶³ *Dance!* teaches a player to develop pro-sociality by dancing in sync with a character.⁴⁶⁴ Upon completing a third mini-game successfully three times, another mini-game is unlocked.⁴⁶⁵ *Pet the Dog* teaches a player empathy by gently stroking a dog and cleaning her fur to transform her from being sad to happy.⁴⁶⁶ Upon completing a fourth mini-game successfully three times, another mini-game is unlocked.⁴⁶⁷ *Tracing Expressions* teaches a player empathy by tracing a character's facial expressions.⁴⁶⁸ Upon completing a fifth mini-game successfully three times, another mini-game is unlocked.⁴⁶⁹ *Angry Man* teaches a player anger management and impulse control by calmly walking away quickly from an angry man yelling unintelligibly.⁴⁷⁰ A bonus

⁴⁵⁸ *Id.*

⁴⁵⁹ *Id.*

⁴⁶⁰ *Id.*

⁴⁶¹ Amanda Bindel, *Random App of Kindness Review*, COMMON SENSE MEDIA, <https://www.commonsensemedia.org/app-reviews/random-app-of-kindness> [<https://perma.cc/4ZTJ-UAB8>].

⁴⁶² *Id.*

⁴⁶³ Bindel, *supra* note 461.

⁴⁶⁴ *Id.*

⁴⁶⁵ *Id.*

⁴⁶⁶ *Id.*

⁴⁶⁷ *Id.*

⁴⁶⁸ *Id.*

⁴⁶⁹ *Id.*

⁴⁷⁰ *Id.*

game *Balloons* has a player choose between being more prosocial or more self-focused.⁴⁷¹ Preliminary data analyses found teens randomly assigned to play RAKi for two months displayed empathic emotional responses to someone in distress and had less aggressive beliefs and behaviors compared with teens who played a control game for two months.⁴⁷² Boys who played RAKi were more than three times more likely to help someone in distress than those who did not.⁴⁷³ Most girls were, independent of playing RAKi, already willing to help.⁴⁷⁴

Because serious games and humane games are games, they can harness and leverage people's desire to play and effectively reframe learning from being an onerous chore to a fun, enjoyable experience.⁴⁷⁵ A similar phenomenon occurs when people are motivated to engage in aerobic exercise by playing video games that involve people moving and becoming physically active.⁴⁷⁶

B. Diversity

Much of the discussion about diversity focuses on identity diversity, that is differences in people's cultural identities, demographic attributes, ethnicities, expertise, geographic locations and/or origins, occupations, race, religion, sexual orientation, physical abilities, socioeconomic status, and training.⁴⁷⁷ Identity diversity is correlated with another notion of diversity, namely cognitive diversity, which refers to differences in how people think about and process problems.⁴⁷⁸ Cognitive diversity⁴⁷⁹ consists of differences in cognitive repertoires,⁴⁸⁰ which consist of these five components: information⁴⁸¹ (e.g., data, facts), knowledge⁴⁸² (e.g., understanding,

⁴⁷¹ *Id.*

⁴⁷² *Id.*

⁴⁷³ *Id.*

⁴⁷⁴ *Id.*

⁴⁷⁵ See MICHAEL & CHEN, *supra* note 419, at 21.

⁴⁷⁶ Huang, *supra* note 95, at 314, n. 397.

⁴⁷⁷ SCOTT E. PAGE, THE DIVERSITY BONUS: HOW GREAT TEAMS PAY OFF IN THE KNOWLEDGE ECONOMY 54 (2017).

⁴⁷⁸ See *id.*

⁴⁷⁹ See PAGE, *supra* note 58, at 314.

⁴⁸⁰ PAGE, *supra* note 477, at 52–67.

⁴⁸¹ *Id.* at 56–57.

⁴⁸² *Id.* at 57–58.

structure), heuristics or algorithms⁴⁸³ (e.g., differential diagnosis, recipes), representations,⁴⁸⁴ which consist of perspectives⁴⁸⁵ (e.g., alphabetical order or chronological order) and categorizations⁴⁸⁶ (e.g., west coast, east coast, midwestern, and southern), and mental models (e.g., econometric models, weather forecasting). Fostering cognitive diversity encourages cross-learning and group synergies.⁴⁸⁷ Identity diversity is correlated with, and can improve organizational thinking through, cognitive diversity. For example, cultural experimental psychological research finds differences in the cognition, perception, reasoning, and thinking of East Asian cultures compared to western cultures.⁴⁸⁸

Research in complex systems, economics, and political science reveals that diversity can play a myriad of roles in organizations and societies, including providing benefits, such as improved productivity, and creating costs, such as potential miscommunication.⁴⁸⁹ Much of this research is the work of Scott Page, the Leonid Hurwicz Collegiate Professor of Complex Systems, Political Science, and Economics at the University of Michigan, Ann Arbor.⁴⁹⁰ Page and economist Lu Hong prove several theorems providing conditions under which cognitive diversity improves upon individual ability.⁴⁹¹ In nontechnical language, the diversity prediction theorem implies the prediction of a group of people has to be always at least as good as the average prediction of the group's members.⁴⁹² How much better a group's prediction is than

⁴⁸³ *Id.* at 58–59.

⁴⁸⁴ *Id.* at 59–63.

⁴⁸⁵ *Id.* at 60–62.

⁴⁸⁶ PAGE, *supra* note 477, at 62–63.

⁴⁸⁷ See PAGE, *supra* note 58, at 327, 335.

⁴⁸⁸ See RICHARD E. NISBETT, *THE GEOGRAPHY OF THOUGHT: HOW ASIANS AND WESTERNERS THINK DIFFERENTLY ... AND WHY* xx–xxi (2004) (describing psychological research experiments about cultural differences in cognition). *But see* PAGE, *supra* note 477, at 145–48 (cautioning that members of any identity category vary in their cognitive repertoires).

⁴⁸⁹ See *generally* PAGE, *supra* note 58 (providing a pragmatic defense of diversity practices).

⁴⁹⁰ Scott E. Page Faculty Website, U. MICH., <https://sites.lsa.umich.edu/scottepage/> [<https://perma.cc/JTW5-ETQG>].

⁴⁹¹ Lu Hong & Scott E. Page, *Groups of Diverse Problem Solvers Can Outperform Groups of High-Ability Problem Solvers*, 101 PROC. NAT'L ACAD. SCI. 16385, 16389 (2004) (providing details of this research).

⁴⁹² PAGE, *supra* note 477, at 247–49.

the average prediction depends on how much cognitive diversity that group has.⁴⁹³ A group just as bad at predicting as its average member must not have any cognitive diversity.⁴⁹⁴ A group much better at predicting than its average member must have a large degree of cognitive diversity.⁴⁹⁵ Cognitive diversity offers a counter to groupthink.⁴⁹⁶

Page demonstrates how cognitive diversity offers everyone the benefits of improved creativity, decision-making, innovation, prediction, problem-solving, and productivity.⁴⁹⁷ Page details precisely how and why organizations and societies can benefit from cognitive diversity.⁴⁹⁸ Page develops policy implications about how organizations can improve their admissions, appointment, and hiring decisions.⁴⁹⁹ In doing so, Page “moves us way beyond accepting diversity as a matter of taste”⁵⁰⁰ to “help establish ‘a science of difference.’”⁵⁰¹ Page’s more recent, less mathematical, and more approachable book⁵⁰² presents empirical evidence of,⁵⁰³ and the business case for,⁵⁰⁴ diversity bonuses that result from more accurate predictions, more effective problem solving, increased creativity, better verification of truth, improved strategizing, and deeper and broader evaluations.⁵⁰⁵

⁴⁹³ *Id.*

⁴⁹⁴ *Id.*

⁴⁹⁵ *Id.*

⁴⁹⁶ *Id.*

⁴⁹⁷ DardenMBA, *Scott Page on Leveraging Diversity, Address at the University of Virginia Darden School of Business*, YOUTUBE (Feb. 4, 2010), <http://www.youtube.com/watch?v=lt9UeknKwZw>; see Claudia Dreifus, *In Professor’s Model, Diversity = Productivity*, N.Y. TIMES (Jan. 8, 2008), <http://www.nytimes.com/2008/01/08/science/08conv.html> (interviewing Page and reporting on this research).

⁴⁹⁸ PAGE, *supra* note 58, at 313–35.

⁴⁹⁹ *Id.* at 352–70.

⁵⁰⁰ Yannis M. Ioannides, *A Review of Scott E. Page’s The Difference: How the Power of Diversity Creates Better Groups, Firms, Schools, and Societies*, 48 J. ECON. LIT. 108, 120 (2010).

⁵⁰¹ *Id.* at 121.

⁵⁰² PAGE, *supra* note 477.

⁵⁰³ *Id.* at 162–83.

⁵⁰⁴ *Id.* at 184–208.

⁵⁰⁵ LinkedIn Editors, *Diversity Creates Bonuses. It’s Not Just a Nice Thing To Do*, YOUTUBE (Sept. 20, 2017), <https://www.youtube.com/watch?v=FKCYtzkDEXw>; The Andrew W. Mellon Foundation, *The Diversity Bonus*, YOUTUBE (Sept. 29, 2017), <https://www.youtube.com/watch?v=gvKXtOK6Gyw>.

Diversity bonuses are less likely for manual tasks and routine cognitive tasks.⁵⁰⁶ Diversity bonuses are more likely when tasks are cognitive and non-routine.⁵⁰⁷ Thus, knowledge economy tasks that are complex, high-dimensional, and indecomposable into simpler components, are very likely to have large diversity bonuses.⁵⁰⁸ In her commentary about diversity bonuses, Columbia Business School Paul Calello Professor of Leadership and Ethics Katherine W. Phillips points out how the mere presence of identity diversity can produce diversity bonuses in three additional ways rather than directly through cognitive diversity.⁵⁰⁹ First, seeing identity diversity facilitates the consideration and expression of cognitive diversity.⁵¹⁰ Second, identity diversity can reduce conformity with others of the same identity and in doing so result in everybody voicing unique perspectives more confidently.⁵¹¹ Third, a desire to maintain social ties with similar identity individuals can increase discussion of differing opinions, information, and knowledge.⁵¹²

Research in psychology and neuroscience shows how the social dynamics and forces of competition, cooperation, and power

⁵⁰⁶ PAGE, *supra* note 477, at 41, fig. 1.12, 42–46.

⁵⁰⁷ *Id.* at 46–48.

⁵⁰⁸ *Id.* at 46.

⁵⁰⁹ *Id.* at 230–36.

⁵¹⁰ *Id.* at 230–34; Katherine W. Phillips & Denise Lewin Loyd, *When Surface and Deep-Level Diversity Collide: The Effects on Dissenting Group Members*, 999 *ORG. BEHAV. & HUM. DECISION PROCESSES* 143, 158 (2006); Samuel R. Sommers, *On Racial Diversity and Group Decision-Making: Identifying Multiple Effects of Racial Diversity on Jury Deliberations*, 90 *J. PERSONALITY & SOC. PSYCHOL.* 597, 597 (2006).

⁵¹¹ PAGE, *supra* note 477, at 234–35; Vernon L. Allen & David A. Wilder, *Categorization, Belief Similarity, and Intergroup Discrimination*, 32 *J. PERSONALITY & SOC. PSYCHOL.* 971, 971 (1975); Vernon L. Allen & David A. Wilder, *Group Categorization and Attribution of Belief Similarity*, 10 *SMALL GROUP BEHAV.* 73, 73 (1979); Rolf Holtz & Norman Miller, *Assumed Similarity and Opinion Certainty*, 48 *J. PERSONALITY & SOC. PSYCHOL.* 890, 890 (1985); Katherine W. Phillips, *The Effects of Categorically Based Expectations on Minority Influence: The Importance of Congruence*, 29 *PERSONALITY & SOC. PSYCHOL. BULL.* 3, 3 (2003).

⁵¹² PAGE, *supra* note 477, at 234–35; Katherine W. Phillips, Katie A. Liljenquist & Margaret A. Neale, *Is the Pain Worth the Gain? The Advantages and Liabilities of Agreeing with Socially Distinct Newcomers*, 35 *PERSONALITY & SOC. PSYCHOL. BULL.* 336, 336 (2009).

can exacerbate or inhibit discrimination, prejudice, and stereotyping.⁵¹³ Much of this research is due to Susan Fiske, the Eugene Higgins Professor of Psychology at Princeton University.⁵¹⁴ It is cognitively less demanding for people to categorize other people particularly by such observable attributes as age, gender, and race than it is for people to learn about other people as individuals because such learning requires motivation.⁵¹⁵ Fiske shows that being members of a team or depending upon another person motivates people to go past stereotyping.⁵¹⁶ Positive psychology suggests how to design legal policies that promote identity diversity,⁵¹⁷ including how courts can facilitate the design of employer antidiscrimination programs to have greater effectiveness.⁵¹⁸ Research in behavioral economics, communication studies, diffusion studies, network systems, social marketing, and psychology can inform the design of policies that increase identity diversity.⁵¹⁹

CONCLUSION

This Article analyzes three policies to improve people's decision-making: doing nothing, nudging, and boosting. This Article focused on three boosts: mindfulness, thinking technologies, and diversity. This Article advocates that societies facilitate the practice of mindfulness to improve people's decision-making competencies. This Article also advocates that societies facilitate people utilizing thinking technologies to make better decisions. This Article finally

⁵¹³ See generally SUSAN T. FISKE, *ENVY UP, SCORN DOWN: HOW STATUS DIVIDES US* (2012) (examining the neuroscience and psychology of prejudice).

⁵¹⁴ *Susan Fiske Faculty Website*, PRINCETON U. DEP'T PSYCHOL., <http://psych.princeton.edu/psychology/research/fiske/> [<https://perma.cc/C6EZ-J8H2>].

⁵¹⁵ *Id.*

⁵¹⁶ *Id.*

⁵¹⁷ See generally ARE WE BORN RACIST?: NEW INSIGHTS FROM NEUROSCIENCE AND POSITIVE PSYCHOLOGY (Jason Marsh et al. eds., 2010).

⁵¹⁸ See Scott Moss & Peter H. Huang, *How the New Economics Can Improve Employment Discrimination Law, and How Economics Can Survive the Demise of the "Rational Actor"*, 51 WM. & MARY L. REV. 183, 251–53 (2009) (describing antidiscrimination implications of emotional contagion and how positive emotions foster creativity).

⁵¹⁹ See generally ALAN R. ANDREASEN, *MARKETING SOCIAL CHANGE: CHANGING BEHAVIOR TO PROMOTE HEALTH, SOCIAL DEVELOPMENT, AND THE ENVIRONMENT* (1995) (detailing how to change people's behavior); NICK COONEY, *CHANGE OF HEART: WHAT PSYCHOLOGY CAN TEACH US ABOUT SPREADING SOCIAL CHANGE* (2011).

advocates that organizations and societies should foster identity diversity and inclusion. Societies can and should facilitate practicing mindfulness, utilizing thinking technologies, and identity diversity by educating people about and providing people with opportunities to directly experience first-hand mindfulness, thinking technologies, and identity diversity.⁵²⁰ Offering people opportunities to warm up to or warm onto mindfulness, thinking technologies, and identity diversity are likely to convince many people of the benefits and efficacy of mindfulness, thinking technologies, and identity diversity in improving decision-making competencies in many situations across many domains.⁵²¹

All three proposals exemplify promulgating learning architectures that allow people to better learn how to think about and make decisions.⁵²² All three proposals do not require, force, or make people do anything.⁵²³ All three proposals also differ from choice architecture and information architecture in explicitly focusing on and analyzing how to effectively teach people to learn how to improve their decision-making processes.⁵²⁴ Instead of assuming or believing that people's decision-making abilities are fixed or too expensive to improve, this Article adopts and advocates that societies and people adopt growth mindsets about people's decision-making skills.⁵²⁵

This Article advocates that government should fund additional basic and applied research about how, when, why, and under what conditions various forms of mindfulness, particular thinking technologies, and identity diversity can improve decision-making. There is widespread interest already about mindfulness, thinking technologies, and identity diversity among businesses and the public.⁵²⁶

Mindfulness is not expensive to practice and thus is accessible to all.⁵²⁷ Concerns exist over how large the benefits to

⁵²⁰ *See supra* Introduction.

⁵²¹ *Id.*

⁵²² *Id.*

⁵²³ *Id.*

⁵²⁴ *Id.*

⁵²⁵ *Id.*

⁵²⁶ *See supra* Part II.

⁵²⁷ TIM RYAN, A MINDFUL NATION: HOW A SIMPLE PRACTICE CAN HELP US REDUCE STRESS, IMPROVE PERFORMANCE, AND RECAPTURE THE AMERICAN SPIRIT xix (2012).

mindfulness are, whether there are drawbacks or downsides to mindfulness practice for some, and if a secularized version of mindfulness lacks a crucial ethical component.⁵²⁸ Many people who are financially comfortable already have access to some version of and guided training about mindfulness.⁵²⁹ This Article advocates the democratization of mindfulness to enable people who are disadvantaged, disempowered, or poor to also have access to some version of and guided training about mindfulness. Thinking architecture is also inexpensive to employ and can be accessible to many people.⁵³⁰ Decision researchers can and should empirically investigate whether different populations who learn about thinking architectures choose wisely in sustainable ways across diverse situations.⁵³¹ Thinking technologies vary from inexpensive mobile apps to expensive virtual reality simulators.⁵³² Government can subsidize the development, dissemination, and consumer adoption of humane games for change, health, and education, and serious games teaching people to recognize and mitigate cognitive biases.⁵³³ As with mindfulness, many people who are financially comfortable already have access to thinking tools for themselves and their kids.⁵³⁴ This Article advocates the democratization of thinking technologies to enable people who are disadvantaged, disempowered, or poor to also have access to thinking technologies. This Article advocates the dissemination of information about benefits from identity diversity and cognitive diversity in organizations and society.

⁵²⁸ See Brent M. Wilson et al., *Increased False-Memory Susceptibility After Mindfulness Meditation*, 26 PSYCHOL. SCI. 1567, 1567 (2015) (discussing one downside to mindfulness); Tim Lomas, *Recontextualizing Mindfulness: Theravada Buddhist Perspectives on the Ethical and Spiritual Dimensions of Awareness*, 9 PSYCHOL. RELIGION & SPIRITUALITY 209, 209 (2017).

⁵²⁹ See Claire Adams Spears, *Perceptions of Mindfulness in a Low-Income, Primarily African American Treatment-Seeking Sample*, 8 MINDFULNESS 1532, 1532 (2017).

⁵³⁰ See BENARTZI WITH LEHRER, *supra* note 57, at 199.

⁵³¹ See BENARTZI WITH LEWIN, *supra* note 401, at 2, 5.

⁵³² JIM BLASCOVICH & JEREMEY N. BAIENSON, INFINITE REALITY (2011); See RANDOM APP OF KINDNESS, <http://www.rakigame.com/#home> [<https://perma.cc/LX8S-MXFN>].

⁵³³ See SUNSTEIN, *supra* note 106, at 32.

⁵³⁴ See Laura D. Stanley, *Beyond Access: Psychosocial Barriers to Computer Literacy*, 19 INFO. SOC. 407, 407 (2002).

Ideally, societies will one day teach all kids in primary schools about the importance and value of mindfulness, thinking technologies, and identity diversity.⁵³⁵ Societies should then continue teaching students in secondary schools more in depth about mindfulness, thinking technologies, and identity diversity.⁵³⁶ Until that day and possibly even after then, colleges, professional schools, and continuing professional education programs can and should teach their students about the benefits of mindfulness, thinking technologies, and identity diversity in particular areas of specialization and professional decision-making domains.⁵³⁷

⁵³⁵ *See supra* Introduction.

⁵³⁶ *Id.*

⁵³⁷ *Id.*

