

Memos to the President From a “Council of Psychological Science Advisers”

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On September 15, 2015, President Obama issued an Executive Order recommending that executive departments and agencies use “behavioral science insights to better serve the American people.” The articles in this special section were already in press when the order was issued, and this serendipity further underscores the timeliness of this special section. These articles propose many examples of the very actions that could be taken by federal (as well as state and local) agencies to promote psychological science in the spirit of President Obama’s order.

Many psychological scientists hope that our work will be used to benefit humanity and not just our own CVs. This hope has often gone unrealized, in part because it can seem as though there is an invisible barrier between our science and the people who could most directly advocate for policy change. Fortunately, in recent years, this barrier has become more permeable.

In 2010, the United Kingdom’s government announced the launch of the Behavioural Insights Team—also known as the “Nudge Unit”—a group dedicated to applying insights from psychology and behavioral economics to public policy. In the United States, 2013 saw the creation of the White House Social and Behavioral Sciences Team, housed in the Office of Science and Technology Policy, similarly dedicated to promoting evidence-based policy evaluation. Comparable groups are formed (or being formed) in countries ranging from the Netherlands to Singapore to Australia. Although these groups do not guarantee that psychological science will be used to guide policy, they engender opportunities for psychologists to “have a seat at the table.”

Simultaneously, books such as Richard Thaler and Cass Sunstein’s *Nudge* (2008), Dan Ariely’s *Predictably Irrational* (2008), and Daniel Kahneman’s *Thinking Fast and Slow* (2011) have applied psychological insights to public policy problems ranging from tax fraud to well-being to health behavior to saving for retirement. Indeed,

in his role as Administrator of the White House Office of Information and Regulatory Affairs in the first Obama administration, Sunstein advocated for the utility of psychological science in assessing the impact of policies on citizens.

Of course, psychologists do have some history of contributing to public policy. In law, for example, in the early 1950s, future Supreme Court Justice Thurgood Marshall asked psychologists Kenneth and Mamie Clark to testify about their research on racial preferences in several school desegregation cases; that research and testimony later informed the Supreme Court decision in *Brown v. Board of Education* (1954). More recently, psychological research on false convictions has been used by the federal government and various states, courts, and police precincts to change policies regarding the processes of conducting line-ups and interrogations, the admission of eyewitness experts as witnesses in court, and the blind acceptance of physical forensic evidence.

We believe that the current interest in behavioral science within government offers psychologists a new, more direct channel to influence public policy. We are not the first to note—and encourage—this developing trend, which includes *The Behavioral Foundations of Public Policy* (an edited volume published in 2012) and new journals devoted to policy, such as *Policy Insights from the Behavioral and Brain Sciences* and *Behavioral Science and Policy*, both of which published their first issues in 2015.

When we conceived of this special series, we modeled our ethos on that of the Council of Economic Advisors, whose mandate reads:

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The Council of Economic Advisers, an agency within the Executive Office of the President, is charged with offering the President objective economic advice on the formulation of both domestic and international economic policy. The Council bases its recommendations and analysis on economic research and empirical evidence, using the best data available to support the President in setting our nation's economic policy.¹

We imagine a complementary body, the Council of Psychological Science Advisors, charged with offering the President objective advice using the most robust psychological science to inform public policy. Our efforts build on related imaginings and calls to action, including the conversation between Walter Mischel and David Brooks at the Association for Psychological Science Annual Convention in 2011, and pieces by Thaler (2012) in the *New York Times* and Barry Schwartz (2012) in *The Atlantic* (and see Sunstein, in press). We chose a “Memo to the President” format: short papers that outline an important policy problem or societal issue, review the relevant psychological research, and use that research to suggest actionable policy changes.

After the Call, the Deluge

Rather than invite selected researchers to submit papers, we decided to cast a wide net, hoping to capture a diverse set of psychological scientists interested in policy. It was a two-stage process. In September 2014, we issued an Open Call for Proposals. Prospective authors were told that we would publish about 10 brief (1,500-word) memo-style articles that would pair a societal problem with a psychological “solution” to make a succinct point about how psychological science can inform policy. Authors submitted an abstract summarizing their idea. We expected 50 submissions; we hoped for 80 submissions; we received 222 submissions involving over 400 different authors, leaving no doubt that psychologists are interested in policy applications of their science.

Some submissions did not fulfill our criteria: They described either psychological research or a policy problem but not both. Some described research that (we believed) was not yet ripe for enactment, and some proposed solutions that had already been enacted. And, for better and for worse, many submissions exhibited significant overlap. The two general topics with by far the greatest number of submissions were health and education; both are well represented in our final selection of memos. That said, the range of topics was enormous and it was gratifying to see the scope of psychological science applications that might one day help shape policy.



In addition to seeking a broad set of topics, we sought a broad set of approaches. Would the suggested policy change involve education or regulation? Was it targeted at actions by individuals acting alone or aimed at public (e.g., schools, courts) or private (e.g., businesses) organizations? Were the recommendations targeted at changing how people act in their existing circumstances or at changing the circumstances in which they act?

Tackling Key Challenges

To honor the enthusiasm and generativity of the submissions, we decided to invite 12 memos rather than the original 10. But we did not accept only 12 proposals. Because of the high quality of some of the overlapping proposals, we invited 17 groups to participate but required 9 of them to work with other groups as teams on the same memo. The final set of memos addresses core issues that underlie some of the key domestic and global challenges we face.

Health

The series includes several articles concerned with improving health. Rothman and colleagues (2015, this issue) note the difficulties people experience in closing the gap between good intentions and actual behaviors, highlighting how the science of habit change and goal formation can improve health. Mann, Tomiyama, and Ward (2015, this issue) focus on environmental changes that can promote exercise and reduce overeating — offering recommendations to combat obesity that move away from models that blame individuals for lack of willpower.

Two very different populations that are both at heightened risk for injuring themselves are adolescents and older people; changing their environments can reduce

these risks. Steinberg (2015, this issue) highlights how research on adolescent brain development can be used to create wiser environments that reduce common risky teen behaviors, such as unprotected sex and substance abuse. Similarly, Ross and Schryer (2015, this issue) draw from research on memory cues to show that there are many environmental changes that make it easier for older (and younger) adults to remember to take their medicines, navigate their way through unfamiliar places, and generally reduce the negative repercussions of ordinary memory failures.

Education

Psychological science can also play a central role in improving educational outcomes. Rattan, Savani, Chugh, and Dweck (2015, this issue) review research on creating "academic mindsets," which shows that emphasizing growth and belonging can close pernicious achievement gaps and promote educational equality and help all students to meet their full academic potential. Shifting the focus from the school to the home, Maloney, Converse, Gibbs, Levine, and Beilock (2015, this issue) leverage research on parent-child interactions to illustrate how policy changes that promote early childhood education in the home may enable children to enter school better prepared and on a more equal footing.

Our institutions and organizations

Several memos offer suggestions for helping people be more safe and productive at school and work, and making those environments more rewarding to individuals and society. Barnes and Drake (2015, this issue) address the widespread problem of sleep deficits, describing the mismatch between students' school requirements and their sleep patterns, as well as the serious repercussions that follow from extended and ever-changing work shifts. Ayal, Gina, Barkan, and Ariely (2015, this issue) show how environments that remind people to be ethical and reduce anonymity can greatly reduce not only large-scale fraud but also the small indiscretions that underlie everyday unethical behavior. Finally, Galinsky et al. (2015, this issue) point to the many social and economic benefits that follow from enhancing diversity (e.g., in the workplace) and creating a society with greater exposure to diverse ideas and peoples.

Securing our future

Across many domains, individuals make bad decisions that in aggregate have negative future consequences for society. At the individual level, Herschfield, Sussman, O'Brien, and Bryan (2015, this issue) review the mistakes

people make in predicting the future and offer suggestions to help individuals make better financial choices and reduce credit card debt. Dhimi, Mandel, Mellers, and Tetlock (2015, this issue) consider how research on judgment and decisionmaking can improve intelligence for national security. Finally, van der Linden, Maibach, and Leiserwitz (2015, this issue) draw on research on group norms and psychological distance to motivate individual action to reduce global climate change.

Together, these memos are filled with policy suggestions that can help people do more of the things they want to do and less of the things they do not want to do; that reduce personal and societal risk; and that promote health, learning, and equality. They illustrate the promise of using psychological science to guide policy to solve significant societal problems.

We invited comments from two of the foremost international leaders on the application of behavioral science to shape public policy: Cass Sunstein, a Professor at Harvard Law School and former member of the Obama administration, and David Halpern, a psychologist who leads the United Kingdom's Behavioural Insights Team. Sunstein and Halpern review the success stories of behavioral science being used to shape policy in the United States and United Kingdom, respectively, and consider how the suggestions put forward in this special section could advance policy. Critically, although they believe that some suggestions are more likely to be actionable than others, they convey the clear message that psychological science can and should inform effective policymaking.

Conclusion

In 2009, Robert Cialdini wrote a provocative piece for this journal titled "We Have to Break Up," explaining why he had decided to retire early from his psychology department. He described how the field of psychology, in its increased emphasis on underlying mental processes, had moved away from research applicable to current social issues and to people's lives more generally. We only partly agree: There is no doubt that psychologists need to do more research that has direct policy relevance, but this special series demonstrates that psychologists already have much to offer. Our hope is that this set of Memos to the President will illustrate ways that existing psychological research can inform current policy issues and also stimulate new research to tackle these and other societal problems.

Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

Note

1. <https://www.whitehouse.gov/administration/eop/cea/about>

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Hale and Hearty Policies: How Psychological Science Can Create and Maintain Healthy Habits

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Abstract

Strategies are needed to ensure that the U.S. Government meets its goals for improving the health of the nation (e.g., *Healthy People 2020*). To date, progress toward these goals has been undermined by a set of discernible challenges: People lack sufficient motivation, they frequently fail to translate healthy intentions into action, their efforts are undermined by the persistence of prior unhealthy habits, and they have considerable difficulty maintaining new healthy patterns of behavior. Guided by advances in psychological science, we provide innovative, evidence-based policies that address each of these challenges and, if implemented, will enhance people's ability to create and maintain healthy behavioral practices.

Keywords

health behavior, intention, maintenance, habits, policy

Each decade since 1979, the U.S. Government has specified national goals regarding the health of the nation; yet attainment of these goals has proven difficult (e.g., National Center for Health Statistics, 2012). *Healthy People 2020*, launched in December 2010, specified 26 goals including reducing the rates of obesity, increasing the rates of colorectal cancer screening, and reducing the rates of substance use behaviors such as smoking and binge drinking (U.S. Department of Health and Human Services, n.d.). According to an update in 2014, 4 out of the 26 objectives have been met, 10 showed modest improvement, and 12 showed no improvement or had gotten worse (Koh, Blakely, & Roper, 2014). As initiatives are designed and implemented to meet these goals, it is critical that advances in psychological science guide these efforts.

Most of the health outcomes identified in these reports rest on people's behavior—the actions they take and those they fail to perform. Underlying these behavioral patterns is an important, discernable set of challenges. People fail to take appropriate action even though they recognize what should be done and intend to take action. The persistence of unhealthy habits undermines efforts to perform a new behavior, and even people who initiate

a new pattern of behavior find it difficult to maintain it long enough to achieve the desired outcome (Rothman, Sheeran, & Wood, 2009). Fortunately, innovative, evidence-based strategies are available to address each of these challenges. Investigators have developed strategies that can help people to (a) focus on beliefs that motivate healthy action, (b) form intentions that are more likely to lead to healthy action, (c) disrupt the influence of prior unhealthy habits, and (d) develop routines that lead to new healthy habits. In the sections that follow, we outline these strategies and describe how and when these tools can be used to enhance policies designed to advance public health.

Strategies That Motivate Action

How should we encourage people to visit the dentist, eat a healthier diet, or stop smoking? Intervention efforts, especially those that involve health messages, rest on the

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assumption that people will be motivated to modify their behavior if they understand the costs posed by their unhealthy habits (Rothman & Salovey, 2007). Yet, psychological science shows that people are reluctant to recognize personal risks and are overconfident about their own invulnerability to health problems (Dunning, Heath, & Suls, 2004). What evidence-based strategies motivate action while avoiding people's tendency to minimize their own vulnerability?

Thinking about other people can motivate action

An approach that successfully increased hand washing in hospitals involved emphasizing the impact of one's behavior on others (Grant & Hofmann, 2011). This contrasts with the limited success of more standard appeals to encourage medical professionals to wash their hands, such as, "Hand hygiene prevents you from catching diseases." Specifically, when an appeal was altered to refer to "patients" instead of "you," rates of hand washing increased by 10% and soap use increased by 45%. Why is it effective to shift people's focus away from consequences for themselves and toward consequences for others? People can easily convince themselves of their own invulnerability, but they are less motivated and able to do this when judging others' risk (Dunning et al., 2004).

Policy implications. Initiatives that focus attention on consequences for others may be particularly effective in situations in which messages about personal health consequences are likely to be processed defensively (Dunning et al., 2004; Rothman & Salovey, 2007). For example, people may be motivated to minimize information about their personal risk for catching the flu and thus show limited interest in getting a flu shot, but they are willing to acknowledge and act on information about the health risk the flu poses to their young children or elderly parents. People can also be reminded of the indirect consequences of their health behaviors: If they do not take care of themselves, their loved ones may suffer. With this knowledge in mind, policymakers should modify regulations regarding signs to promote hand washing in medical facilities and in eating establishments (i.e., highlighting the impact of the behavior on patients and customers, respectively). Public service announcements might similarly encourage people to quit smoking for their spouses or get flu shots for their parents or children.

Strategies That Aid the Translation of Intentions Into Action

Even when people decide to take action to improve their health, there is, on average, only a 50% chance that their

intention will lead to action (Sheeran, 2002). Why is there a gap? In many cases, people fail to get started—an intention is forgotten, the opportunity to take action passes, or confusion about how to act engenders paralysis. In addition, people's initial efforts can be derailed—they fall prey to temptations, distractions, low willpower, or fatigue (Gollwitzer & Sheeran, 2006).

Bridging the gap between intentions and action

An evidence-based strategy that can help people get started and stay on track as they pursue a health goal is the formation of *if-then plans* (Gollwitzer, 1999; Gollwitzer & Sheeran, 2006, 2008). If-then plans provide a structure in which people (a) identify key opportunities for, or obstacles to, taking action, (b) specify a way to respond to each opportunity and obstacle, and then (c) formalize a link between the opportunity or obstacle and the response:

"If (opportunity/obstacle) arises, then I will (respond in this way)!"

Because if-then plans specify in advance when, where, and how to respond to critical situations, they enable people to seize opportunities that they might otherwise miss and manage obstacles that might otherwise be overwhelming. For instance, patients who wrote down the plan "If it is [time] and I am in [place], then I take my pill dose!" took 79% of their medication on schedule as compared with 55% of patients who did not formulate a plan (Brown, Sheeran, & Reuber, 2009). Similar patterns of results have been observed across a broad array of health behaviors ranging from cancer screening (e.g., Neter, Stein, Barnett-Griness, Rennert, & Hagoel, 2014) to dietary behavior (Adriaanse et al., 2011) and physical activity (Bélanger-Gravel, Godin, & Amireault, 2013). Moreover, if-then plans are especially effective when people find themselves in circumstances that impair their ability to translate healthy intentions into action (e.g., limitations in self-control, Gawrilow, Gollwitzer, & Oettingen, 2011; feelings of arousal, Webb et al., 2012; or forgetfulness, Chasteen, Park, & Schwarz, 2001).

Policy implications. If-then plans are easy to deliver (Oettingen, 2012; see www.woopmylife.org) and can be readily integrated into a number of policy initiatives. For example, key documents such as appointment letters, medication or behavioral prescriptions and instructions, and health education leaflets should be modified to include a structured opportunity for people to develop if-then plans. The benefit of formulating if-then plans and strategies to support their use should also be

integrated into the training provided to healthcare professionals.

Strategies to Disrupt Existing Habits

Even after someone has adopted a new pattern of behavior (e.g., a new diet), older, habitual patterns can linger and remain a challenging adversary. Because habits involve memory systems that are relatively separate from those that represent people's goals and conscious intentions, old habits do not change immediately when people adopt new goals (Walker, Thomas, & Verplanken, 2014). Instead, familiar contexts and routines can bring the old, unwanted behavior to mind, leaving people at risk of lapsing back into unhealthy behavior patterns (Wood & Neal, 2007). What evidence-based strategies mitigate the continued pull of unhealthy habits and provide an opportunity for people to sustain a new pattern of behavior?

One approach involves capitalizing on context changes in people's lives (e.g., moving to a new house, starting a job, having a child). The shifts in context associated with these changes reduce people's exposure to cues that trigger old habits (Wood, Tam, & Witt, 2005). Disruptions in old habits can also arise when people deliberately modify the microenvironments in which they work and live (e.g., changing the visibility or arrangement of food choices; Sobal & Wansink, 2007) or develop personalized if-then plans to counter the unwanted habitual response (Adriaanse et al., 2010).

A second approach involves policies that introduce behavioral friction to existing contexts that make it harder for people to follow their unhealthy habits. For example, with the introduction of smoking bans in UK pubs, people with strong habits to smoke while drinking were no longer able to effortlessly light a cigarette when they felt the urge to smoke (Orbell & Verplanken, 2010). The behavioral friction induced by having to leave the pub to smoke may have disrupted the automated associations between drinking and smoking and, in turn, contributed to reduced smoking rates. Similarly, with bans on the visible display of cigarettes in retail environments, potential purchasers have to remember to deliberately request cigarettes in order to buy them (Wakefield, Germain, & Henriksen, 2008). In both cases, the policy is designed to make people shift from relying on an automated, reflexive response to a more deliberate, effortful decision.

Policy implications

Policy initiatives can utilize these two different strategies in a number of ways. First, social marketing campaigns could be structured to capitalize on opportunities afforded by changes in people's work or home environments. For example, communities could provide free

vouchers for public transportation to people who have recently moved. Building codes could also be modified to ensure that healthy behavioral options are salient and, if possible, the default choice (e.g., salience of stairs vs. elevators in building entranceways). Second, the approaches that have been used to disrupt smoking-related behaviors could be disseminated to settings where automated, reflexive responses to cues are known to underlie an unhealthy pattern of behavior. For example, restaurants that offer "value meal" packages should provide a healthy food as the default option (e.g., apple slices instead of French fries).

Strategies to Develop Routines That Create New Habits

The benefits afforded by changes in health practices such as increased physical activity only accrue if the change in behavior is sustained over time; yet people have difficulty maintaining new patterns of behavior (Rothman, Baldwin, & Hertel, 2004). What can be done to increase the likelihood that people's healthy choices develop into new habits? In daily life, people who are able to stick with healthy behaviors often rely on well-practiced habits that reliably meet their health goals (Galla & Duckworth, in press). For example, they might structure their homes with a consistent set of visible cues that promote healthy choices (e.g., accessible fresh vegetables) and remove cues that trigger unhealthy ones (e.g., TVs in bedrooms).

One approach to transforming new behaviors into strong habits involves facilitating the repetition of the desired behavior in a stable context (Danner, Aarts, & de Vries, 2007). For example, when people perform a behavior repeatedly in the same context (e.g., taking a walk after dinner), over time it becomes sufficiently automated to be performed without thinking (Lally, Van Jaarsveld, Potts, & Wardle, 2010). Although the number of repetitions necessary to instill a habit can vary considerably, once it is formed, people can rely on the well-practiced behavior to protect them when they are distracted (Labrecque, Wood, Neal, & Harrington, 2015) or their willpower is low (Neal, Wood, & Drolet, 2013). Another approach to automating new behavior involves piggybacking a new health behavior onto an existing habit. For example, dental flossing habits were established most successfully when people practiced flossing immediately after they brushed their teeth (rather than before; Judah, Gardner, & Anger, 2013; see also, Labrecque et al., 2015).

Policy implications

Forming new habits through repetition in stable contexts and through piggybacking onto existing habits can inform the design and dissemination of new policies. First,

Table 1. How Evidence-Based Solutions Can Be Used to Address Four Challenges to Successful Health Behavior Change

Challenges to successful health behavior change	Solution	First example policy recommendation	Second example policy recommendation
Insufficient motivation to take action	Highlight implications of performing behavior for others	Policies to promote hand washing in health care facilities and eating establishments should emphasize the implications for patients and customers, respectively.	Policies to promote precautionary behaviors such as wearing seat belts or bike helmets could remind parents of the consequences for their children.
Failure to turn intention into action	Form if-then plans	Policies should ensure that people can formulate if-then plans on documents such as doctor's appointment letters.	Policies should ensure that the provision of medication prescriptions or behavioral instructions include an opportunity to formulate an if-then plan.
Old habits persist and interfere with a new plan of action	Remove or bypass cues that trigger an old habit	Distribute public transportation information and free transit vouchers to people who have recently moved.	Design buildings so that stairways are salient and encountered before elevators.
	Create behavioral friction to impede the habitual response and encourage consideration of alternatives	Ban display of products such as cigarettes in retail stores so that purchasers have to request them.	Restaurants should provide healthy alternatives as the default option in "value meal" packages (e.g., apple slices instead of fries).
New pattern of behavior is not sustained	Form stronger habits through context-stable repetition or piggyback a new desired behavior onto an existing habit or context cue	Elementary school curricula could include the regular performance of context-stable health behaviors (e.g., hand washing after using the restroom).	Product labels as well as pharmacists can instruct patients how to piggyback medication onto existing daily routines.

interventions should be designed to reinforce consistent behavioral practices (e.g., exercising at the same time each day). The structure and routines that characterize school and work environments may make these settings particularly well suited for this intervention approach. For example, school policies, especially in elementary schools, could be structured to reinforce healthy behavior such as consistent hand washing after using the restroom or repeated fruit and vegetable consumption during school lunches (e.g., Lowenstein, Price, & Volpp, 2014). Second, innumerable opportunities exist to connect a new behavior to an existing habit in people's daily lives. For example, campaigns could link replacing smoke alarm batteries to when people change the clock for daylight savings or pair a new health practice (e.g., taking pills) with a daily habit (e.g., eating dinner).

Summary

Given the important personal and societal benefits that come from meeting or exceeding the goals identified in reports such as *Healthy People 2020*, it is imperative that policy initiatives utilize evidence-based strategies to promote healthy behavior. The developments in psychological science that we have reviewed provide an

evidence-based framework to address challenges that have confounded past attempts at behavior change. Because the approaches we have highlighted provide solutions to specific challenges, investigators should take care to use them accordingly. To facilitate their application, Table 1 summarizes the link between each challenge and its given solution and provides example policy recommendations.

Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

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Promoting Public Health in the Context of the “Obesity Epidemic”: False Starts and Promising New Directions

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Abstract

In the battle to combat obesity rates in the United States, several misconceptions have dominated policy initiatives. We address those misconceptions, including the notion that restrictive diets lead to long-term weight loss, that stigmatizing obesity is an effective strategy for promoting weight reduction, and that weight and physical health should be considered synonymous with one another. In offering correctives to each of these points, we draw on psychological science to suggest new policies that could be enacted at both the local and national levels. Instead of policies that rely solely on individual willpower, which is susceptible to failure, we recommend those that make use of environmental changes to reduce the amount of willpower necessary to achieve healthy behavior. Ultimately, the most effective policies will promote health rather than any arbitrary level of weight.

Keywords

obesity, dieting, weight stigma, policy

Misconceptions about obesity have hindered policy efforts to promote health. In this article, we provide three major corrections and suggest policies based on psychological science that offer promising new directions for improving health (summarized in Table 1).

1. Restrictive Diets Do Not Work

Obesity levels have increased dramatically over the last 35 years, and the most commonly recommended treatment, dieting, is practiced by over 100 million people in the United States. However, regardless of the particular type of restrictive diet that people follow, weight that is lost in the short term is rarely kept off in the long term (Franz et al., 2007; Tomiyama, Ahlstrom, & Mann, 2013). Individuals typically cannot maintain weight loss through restrictive dieting because deprivation ultimately triggers a biological starvation response in which neurological changes render food especially attention-grabbing, difficult to stop thinking about, and more rewarding to consume (Adam & Epel, 2007). Simultaneously, hormonal changes increase feelings of hunger and reduce one's sense of fullness (Sumithran et al., 2011), and metabolic changes allow the body to sustain itself on fewer calories,

resulting in greater fat storage (Leibel, Rosenbaum, & Hirsch, 1995). Moreover, general self-control ability, or willpower, is reduced (Page et al., 2011). Even under optimal circumstances, willpower is surprisingly fragile (Hagger, Wood, Stiff, & Chatzisarantis, 2010) and susceptible to failure in response to regular daily experiences involving simple cognitive distraction (Ward & Mann, 2000) or negative emotional states (Greeno & Wing, 1994).

Policy implications

It is clear to us that restrictive diets should no longer be recommended or promoted. Instead, the enormous quantity of financial resources currently devoted toward discovering the ideal restrictive diet should be redirected toward evidence-based, scientifically grounded strategies for improving health.

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Table 1. Correcting Three Common Misconceptions About Obesity and Suggested Policies Derived From Scientific Evidence

Evidence-based finding	Example policy recommendations
Restrictive diets do not work	<ul style="list-style-type: none"> • Deemphasize funding research on restrictive/willpower-based diets • Regulate cafeteria design to visually highlight vegetables • Mandate serving vegetables in schools before other food is present • Restrict sales of large sizes of sugar-sweetened drinks • Implement “equal time” legislation regulating unhealthy and healthy food advertisements • Fund research to test long-term effects of these types of environmental changes
Weight stigma will not reduce obesity	<ul style="list-style-type: none"> • Require pre-testing of public service announcements and anti-obesity campaigns to ensure they are not stigmatizing • Make weight a protected class
Weight does not equal health	<ul style="list-style-type: none"> • Retire weight and BMI as measures of health; emphasize validated measures such as blood pressure, cholesterol, glucose, and heart rate • Implement education programs aimed at measuring and interpreting blood pressure levels • Institute scale buyback programs to permit trade-ins for blood pressure monitors • Decrease maximum allowable elevator speeds, especially in low-rise buildings • Introduce physical activity in environments not usually associated with such behaviors • Incentivize workplace physical activity using programs such as Instant Recess • Fund research testing long-term effects of these types of policies.

Psychological science has highlighted the capacity for basic manipulations of one’s immediate surroundings to increase health-promoting behaviors without relying primarily on individual willpower. For example, research has found that healthier eating in school cafeterias can be facilitated by a modification as simple as placing photographs of vegetables in compartmentalized food trays (Reicks, Redden, Mann, Mykerezzi, & Vickers, 2012) or by making other small changes, such as using larger serving utensils for healthy foods or placing healthier foods near checkout areas (Wansink, 2014). Indeed, just providing children carrots at their lunch table before the rest of their meal is made available has been shown to more than quadruple the grams of carrots consumed (Redden et al., 2015). These types of changes do not damage commercial profits and may increase them (Wansink, 2014).

Lab studies have also shown that slightly increasing the inconvenience of obtaining unhealthy foods (by placing them just out of reach) leads to reduced consumption of those foods (Maas, de Ridder, de Vet, & de Wit, 2012). Policies restricting the sale of large-size, sugar-sweetened beverages, which make consuming extra quantities marginally more inconvenient, may therefore constitute an effective means for reducing individuals’ sugar intake. However, these simple strategies have been tested primarily in short-term studies, and we recommend that longer term tests be prioritized.

Targeted policies can also make use of the stress and distraction that typically precipitate failures in willpower and characterize much of modern life. Research has shown that stress and distraction narrow attention to the most prominent cues in one’s immediate surroundings (Mann & Ward, 2007). In the current “toxic food environment”

(Brownell & Horgen, 2004), unhealthy eating cues tend to be the most attention grabbing, but if cues in the environment promoting healthy eating were rendered more noticeable (e.g., through public service ads), our research suggests that stress or distraction could actually foster healthy behavioral choices instead of preventing them. In particular, we found that dieters experiencing attentional distraction consumed 45% less of a high-fat milkshake when the unhealthy consequences of drinking it were highlighted (Mann & Ward, 2004). Much like the “equal time” rule for opposing political candidates required by the Communications Act of 1934, policies could mandate that broadcasters allow equal time for both healthy and unhealthy food advertisements, rather than saturating the airwaves with the latter.

2. Weight Stigma Does Not Reduce Obesity

Some health policy scholars have conjectured that stigmatizing obese people will motivate such individuals to lose weight (e.g., Callahan, 2013). In fact, public health campaigns, most notably the Strong4Life campaign aimed at children, have already begun to incorporate these stigmatizing messages. Psychological research finds, however, that such an approach will likely backfire (Vartanian & Smyth, 2013). Being exposed to weight stigma causes increased eating, predicts exercise avoidance, depletes the very mental resources needed to control one’s behavior, and is linked to an increased (not decreased) risk of becoming obese over time (Hunger & Tomiyama, 2014). Furthermore, weight stigma results in increases in psychological and physiological indices of stress, a state that

is harmful to health and can lead to weight gain (for a review, see Tomiyama, 2014). Accordingly, campaigns that make use of stigma to motivate weight loss are likely to fail.

Policy implications

Public service announcements and anti-obesity campaigns should be scientifically tested to ensure they are not stigmatizing. Furthermore, rather than simply being anti-obesity focused, such campaigns should be psychologically informed and provide concrete, actionable steps that individuals can take to be healthier.

Policies that classify weight as a protected class, similar to race, gender, or sexual orientation, may help to reduce the stigma of obesity (Pomeranz, 2008), thereby preventing unhealthy behaviors that arise from weight stigma. Of course, classifying weight as a protected class may primarily serve to protect obese individuals from discrimination rather than weight stigma more broadly, making it a necessary but not sufficient step. However, evidence from similar protections of sexual minorities indicates this step may constitute an effective counter to stigma (Hatzenbuehler, McLaughlin, Keyes, & Hasin, 2010) and may even positively impact physical and mental health (Hatzenbuehler, Keyes, & Hasin, 2009; Oldenburg et al., 2014). Again drawing on evidence gathered with regard to LGB individuals (Hatzenbuehler, 2011), school-based policies may help reduce the negative consequences of bullying experienced by overweight and obese children. Being the victim of bullying in childhood predicts poor health in adulthood, as well as increased criminal behavior, greater relationship violence, and less wealth (Wolke, Copeland, Angold, & Costello, 2013), and therefore represents an important intervention target.

3. Weight \neq Health

Weight is an imperfect measure of health (Tomiyama et al., 2013). Except among the most obese (Body Mass Index [BMI] = 40+; 6.3% of the population), obesity does not appear to shorten lifespan (Flegal, Kit, Orpana, & Graubard, 2013), and nationally representative data indicate fully 19.5 million (31.7%) obese adults are metabolically healthy (Wildman, Muntner, Reynolds, & McGinn, 2008). Commonly cited linkages between obesity and poor health may be partly explained by other factors that are known to be strongly related to health problems, including the fact that obese people are more likely to be sedentary, of lower socioeconomic status, and not receiving preventive medical care (Bacon & Aphramor, 2011). Importantly, regardless of the strength of the association between weight and health, evidence abounds that health

can be improved through physical activity, maintaining proper nutrition, and reducing stress—even in the absence of weight loss (e.g., Heran et al., 2011).

Policy implications

We suggest that weight and BMI be retired as measures of health and be replaced with more valid indicators, such as blood pressure and heart rate, as well as levels of cholesterol and blood glucose. Future research might investigate the efficacy of devising a simple composite measure that incorporates these various markers into an easy-to-comprehend “health score” for individuals to track. At present, for health purposes, individuals would typically be better advised to track their blood pressure than their weight. Indeed, in many ways, blood pressure constitutes a simpler metric than BMI, as the healthy cutoff (120/80) is essentially the same for all individuals, whereas BMI requires a mathematical computation of weight and height (with healthy levels varying depending on such factors as muscle mass). To facilitate this practice, we propose the creation of programs designed to educate people both on healthy blood pressure levels and how to use a blood pressure monitor. A more creative suggestion would be to allow individuals to trade in their household scales for blood pressure monitors, a practice similar to gun buy-back programs. In short, once the focus is shifted to more appropriate health measures, it becomes clear that the goal should be to work to improve peoples’ health regardless of their weight.

A clear path toward achieving that goal involves increasing physical activity. Exercise and other forms of physical activity have been found to reduce depression and anxiety (Salmon, 2001), prevent disease (Kuehn, 2014), and increase longevity (Samitz, Egger, & Zwahlen, 2011; Williamson & Pahor, 2010). Over the last half century, there has been a steady decrease in the amount of physical activity individuals experience while performing their jobs, doing housework, or using modes of transportation (Brownson, Boehmer, & Luke, 2005), and these activities provide an ideal focus for interventions that do not rely primarily on willpower. Incidental activity can be enhanced through alterations to the physical environment, whether these changes involve moving parking spaces farther from building entrances or constructing buildings that feature convenient and accessible stairways to reduce elevator use (see Lopez & Hynes, 2006). One study found that slowing elevator doors by a mere six seconds cut elevator use in half (Van Houten, Nau, & Merrigan, 1981). Clearly, additional research is needed to investigate whether multiple small changes in activity might compound over time and translate into health benefits.

Normative pressures should be considered as well. In our own research on perceptions of eating and physical

activity, we have found that societal standards support consuming food in an enormous range of environments, whereas engaging in almost any kind of physical movement in many of those same environments (e.g., running in place while waiting in line at the post office) is perceived to be highly unusual. The efficacy of changing normative standards for physical activity in nontraditional environments (e.g., outside of a gym or park) should be investigated.

One example of promoting norms for physical activity and improving health in the workplace can be seen in Instant Recess, a scientifically based (and fun) 10-minute movement break designed to be incorporated into workplace meetings (see www.instantrecess.com). Businesses could be provided with incentives to offer opportunities in terms of both time and space in which simple physical activity can occur. Indeed, interventions that incorporate workplace physical activity have resulted in increased worker productivity (Cancelliere, Cassidy, Ammendolia, & Côté, 2011). At the same time, our nation should reverse the trend of limiting physical education in schools and instead mandate it for all school-age children, with enhanced goals for physical activity incorporated into existing educational standards.

Conclusion

In this article, we have provided suggestions for implementing promising scientifically based policies to improve the health of Americans (see Table 1 for a summary). By turning away from primarily willpower-based strategies, we can move toward policies that harness the power of environmental changes to foster healthy behavior for all, regardless of the number on the scale.

Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

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How to Improve the Health of American Adolescents

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Abstract

The major threats to the health of American teenagers are behavioral—risky and reckless things adolescents do that threaten their well-being and that of others. The primary approach to preventing adolescent risk taking has been classroom-based health education. Yet, most systematic research indicates that even the best programs are successful mainly at changing adolescents' knowledge but not in altering their behavior. Research on adolescent brain development has revolutionized our understanding of this stage of life, but our approach to deterring adolescent risk taking remains grounded in old, antiquated, and erroneous views of the period. Classroom-based health education is an uphill battle against evolution and endocrinology, and it is not a fight we are likely to win. Instead of trying to change teenagers into something they are not, we should try to reduce the risks they are exposed to. We should spend less money and effort trying to influence how adolescents think, and focus more on limiting opportunities for their inherently immature judgment to hurt themselves or others. Although there is evidence that some programs aimed at strengthening adolescents' self-regulation may also deter risky behavior, our public health policies should emphasize changing the context in which adolescents live, rather than solely attempting to change adolescents themselves.

Keywords

adolescence, risk taking, brain development, health education

We have made great strides in the prevention and treatment of illness and disease among American adolescents. Today, the major threats to the health of American teenagers are behavioral—things adolescents do that threaten their well-being and that of others. Most forms of risky behavior reach their peak during adolescence—the list includes such varied activities as crime, experimentation with drugs, unprotected sex, intentional self-injury, reckless driving, and accidental drownings (Steinberg, 2014). Mortality rates during adolescence are two to three times those in childhood (Dahl, 2004).

The dominant strategy for preventing adolescent risk taking has been school-based health education (Bearman, Jones, & Udry, 1997). According to the National Longitudinal Study of Adolescent Health, at least 90% of American secondary school students have received classroom-based instruction about the dangers of one or more health-risk behaviors, such as smoking, drinking, or unsafe sex (Harris et al., 2009). In some communities, this health education has been supplemented successfully with contextual interventions, such as programs designed to strengthen efforts by law enforcement to increase

merchants' compliance with laws governing the sale of tobacco or alcohol to minors. The centerpiece of our efforts to diminish adolescent risk taking in America, however, has been health education delivered in classrooms.

School-based health education is grounded in the belief that if we simply tell adolescents what not to do and give them accurate information about how to avoid dangerous activity, they will follow our instructions. But this approach is based on faulty premises, such as assuming that teenagers think about the future consequences of their actions when they are emotionally aroused or having fun (which is usually the case when risky decisions are made) or that they take risks because they do not realize what might happen to them. Neither of these assumptions is correct (Albert & Steinberg, 2011; Reyna & Farley, 2006).

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Recent (Lack of) Changes in Adolescent Risky Behavior

We have made some progress in reducing a few forms of risky behavior, but in the last few years there has been no change in condom use, obesity, or cigarette use, and there actually has been an increase in marijuana use (Steinberg, 2014). The substantial drop in teen births that was reported recently was largely due to a decline in intended pregnancies, as more young women have deliberately postponed childbearing. Unintended pregnancies, which now account for more than 80% of teen pregnancies, did not fall nearly as much (Mosher, Jones, & Abma, 2012). Moreover, the drop in unintended pregnancies was mainly due to the increased use of long-lasting, reversible contraception, like IUDs or birth control implants, which do not protect against sexually transmitted diseases (Boonstra, 2014). These methods work because, once installed, they do not require any thinking on the part of teenagers.

Long-term trends in many types of drug use do not inspire confidence that health education has had much of an effect on this activity, either. Adolescent substance use has been tracked very carefully in the United States since 1975 via a national study called Monitoring the Future (Johnston, Miech, O'Malley, Bachman, & Schulenberg, 2014). Although drug use is assessed along several different temporal metrics in this study (e.g., daily, monthly, annually, lifetime), monthly use is widely accepted as a reasonable indicator of regular use as opposed to either full-blown addiction or transient experimentation.

Twenty years ago, about one fifth of high-school seniors smoked marijuana monthly. That's about what it is today. Twenty years ago, about 30% of high-school seniors got drunk regularly. That figure has fallen in the past two decades, but not by much (24%). Monthly use of illicit drugs other than marijuana in this age group is as common today (8%) as it was 20 years ago (7%). The only place where we have made substantial and sustained progress to deter adolescent substance use has been teen smoking—but most experts agree that this has had almost nothing to do with health education. Fewer teens are smoking today than in the past mainly because the price of cigarettes has increased at more than twice the rate of inflation (Gruber, 2001). Recent evidence indicates that the continuing drop in rates of teen cigarette smoking have been exceeded by increases in teenagers' use of e-cigarettes, which have as-yet undetermined long-term health effects (Johnston, O'Malley, Miech, Bachman, & Schulenberg, 2015).

Correlational studies that track changes in risky behavior over time are subject to all sorts of problems of interpretation, of course—among them, that many things can change over time that affect trends in behavior. Thus, it is

important to look at the results of controlled experiments in which adolescents are randomly assigned to programs designed to change their behavior and are compared with matched groups of adolescents who have been assigned to control groups. These evaluations are just as discouraging as the correlational studies. Most systematic research on health education indicates that even the best programs are successful at changing adolescents' knowledge but not at altering their behavior. Most taxpayers would be surprised—and rightly angry—to learn that vast expenditures of their dollars are invested in health, sex, and driver education programs that either do not work, such as DARE (Ennett, Tobler, Ringwalt, & Flewelling, 1994), abstinence education (Trenholm et al., 2007), and driver training (National Research Council, 2007), or are, at best, of unproven or unstudied effectiveness. Most meta-analyses of school-based health education programs have found that more than half are ineffective and that even those that are successful are only marginally so (Hale, Fitzgerald-Yau, & Viner, 2014).

The New Science of Adolescence

Advances in the science of adolescence help explain why. Risk taking is a natural, hardwired, and evolutionarily understandable feature of this stage of development, one that is seen not only in humans, but in other mammals as well (Spear, 2009). We evolved to take more risks during adolescence so that we would venture out into the wild and find mates at a time when fertility is at its peak (Steinberg, 2014). It may no longer be especially suitable for the world we live in now, but it is in our genes, and there is little we can do to change that. To be sure, there is variability within the adolescent population in the extent to which individuals engage in risk taking and, among those who do, in the extent to which their risky behavior is worrisome, but as a group, adolescents are significantly more likely to engage in risky behavior than adults, both in the real world and on laboratory-based tasks (Defoe, Dubas, Figner, & van Aken, 2015).

Adolescent risk taking is best understood as a natural product of neurobiological immaturity. In particular, adolescence is a time during which brain systems that respond to the prospect of rewards are especially sensitive, but systems that regulate self-control are still developing (Steinberg, 2008). Given what we know about the adolescent brain, the ineffectiveness of programs designed to educate adolescents about the dangers of different types of risky activity is predictable. Information alone is simply not enough to deter risky behavior when individuals are at a point in development where it is easy to become aroused and hard to control the impulses that this arousal generates.

Table 1. Examples of Context-Based Interventions to Improve Adolescent Health

Problem	Solution	Illustrative policy recommendation
Many mental health problems in adolescence are exacerbated by sleep deprivation	Structure adolescents' daily schedule to encourage more sleep	Delay high school start times to 9:00 a.m.
Smoking during adolescence often leads to addiction and chronic illness	Delay experimentation with tobacco until age of highest risk has passed	Raise minimum legal purchase age for tobacco products to 21
Experimentation with precocious sex often occurs during weekday afternoons	Diminish adolescents' time in unstructured, unsupervised activities	Shift funding from classroom-based health education to after-school programs for teenagers
Minors use falsified IDs to purchase alcohol	Limit minors' access to alcohol outlets	Prohibit retail sales of alcohol within 1,000 feet of elementary or secondary schools

Research on adolescent brain development suggests two complementary approaches to deterring adolescents from unhealthy risk-taking that go beyond the mere provision of information that is characteristic of much of the health education American adolescents receive. The first is based on the notion that it may be possible to deter some risk taking through interventions grounded in positive youth development that may strengthen adolescents' self-regulation. Promising approaches in this realm include providing in- and after-school experiences that engage and challenge teenagers, as well as various types of socioemotional learning programs (for a review, see Catalano et al., 2012). Although there are a handful of programs with impressive track records, evaluations of this approach generally indicate considerable variability in efficacy, effect sizes, and long-term success in changing adolescents' behavior. Moreover, as the Catalano et al. (2012) review indicates, relatively few have been subject to the scientific rigors of randomized trials.

A second approach, which is perfectly compatible with the first, is to try to limit opportunities for adolescents' inherently immature judgment to hurt themselves or others (for illustrations, see Table 1). In other words, we also ought to concentrate public health interventions on changing the context in which adolescents live. I have focused on this class of interventions because they represent a significant departure from those that focus on changing how adolescents think or what they believe, which has been the emphasis of conventional health education.

Research on the contextual determinants of adolescents' risky behavior is instructive in this regard. Studies of adolescents' out of school time, for instance, find that students who participate in structured afterschool programs are less likely to drink, use drugs, and be sexually active than their peers who are unsupervised at home or in the community (Mahoney, Vandell, Simpkins, & Zarrett, 2009). Research on school start times shows that delaying the start time of secondary schools not only leads to improvements in student achievement, but also leads to declines in automobile crashes, depression, and substance abuse (Wahlstrom et al., 2014). Underage drinking

is less prevalent in communities where the density of retail outlets for alcohol is lower (Gruenewald, 2011). Raising the minimum age for purchasing cigarettes has been shown to reduce teen smoking, in part by keeping cigarettes out of the social networks of teenagers during the age at which people are most likely to begin and become addicted to smoking (Institute of Medicine, 2015). Graduated driver licensing that places restrictions on teen passengers has greatly reduced teen auto fatalities (Baker, Chen, & Li, 2006). School-based condom distribution programs reduce unsafe sex (Charania et al., 2011). These contextually based interventions are all far more effective strategies for reducing teens' risky behavior than health education, driver education, or sex education.

The success of such interventions does not mean that we should stop providing adolescents with information on how to protect and improve their health. It does mean, though, that the current mix of educational and contextual based approaches to deterring adolescent risk taking should include relatively less of the former and relatively more of the latter.

Policy Implications

Based on research indicating that contextual interventions are likely to be successful in diminishing adolescent risk taking and, therefore, in improving the health and well-being of American young people, I offer the following recommendations:

- Shift some funding of classroom-based health education designed to dissuade adolescents from unhealthy behavior to supervised after-school programming for middle and high school students, especially programming that has the potential to strengthen adolescents' capacity for self-regulation.
- Encourage communities to delay the start time for secondary schools to at least 9:00 a.m. This will have the added benefit of shifting the end of the school day to a later hour, which will decrease the

amount of time adolescents are unsupervised by their working parents.

- Expand funding for condom availability programs in secondary schools.
- Set the federal minimum legal purchasing age for all tobacco products to 21.
- Prohibit retail outlets that sell alcohol from operating within 1,000 feet of elementary schools, secondary schools, playgrounds, and parks, and pass and enforce laws that punish third-party purchasing ("shoulder-tapping") of alcohol for underage individuals.
- Mandate that all states implement a three-tier graduated driver licensing model that complies with guidelines suggested by the Institute for Highway Safety (McCartt & Teoh, 2014). These require a minimum *learner's permit* age of 16, with no unsupervised driving permitted and at least 70 hours of supervised driving before intermediate licensing; a minimum *intermediate license* age of 17, during which unsupervised driving with nonfamily teen passengers and night driving after 8 p.m. are both prohibited; and set the minimum *unrestricted license* age at 18.

The study of adolescent brain development has revolutionized our understanding of this stage of life, but our approach to deterring adolescent risk-taking remains grounded in old, antiquated, and erroneous views of the period. Classroom-based health education is an uphill battle against evolution and endocrinology, and it is not a fight we are likely to win. Instead of trying to change teenagers into something they are not, we should try to reduce the risks they are exposed to. Doing so would improve—and even save—many adolescents' lives.

Declaration of Conflicting Interests

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Outsourcing Memory in Response to an Aging Population

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Abstract

With baby boomers entering old age and longevity increasing, policymakers have focused on the physical, social, and health needs of older persons. We urge policymakers to consider cognitive aging as well, particularly normal, age-related memory decline. Psychological scientists attribute memory decline mainly to cognitive overload stemming from age-related reductions in sensory capacities, speed of cognitive processing, and the ability to filter out irrelevant information. Even in the absence of decline, however, memory is imperfect and forgetting can be especially consequential for older adults. For example, forgetting to take prescription medicines is an age-related problem largely because older adults tend to ingest many more prescription drugs. We propose that policymakers focus on increasing environmental support for memory that can reduce the burden on cognitive resources and thus improve recall. In providing environmental support, policymakers need to pay careful attention to potential age-related changes in physical and cognitive capacity, as well as behavior.

Keywords

cognitive aging, aging and memory, medication adherence, aging and spacial navigation, environmental support for memory

By 2030, about one in five Americans will be 65 or older, a substantial increase from the one in eight today (http://www.aoa.acl.gov/Aging_Statistics/index.aspx). In response to aging populations, the World Health Organization (2007) issued a guide for age-friendly communities that addresses recreational, transportation, housing, and health needs of older persons. We propose that policymakers also act to reduce harmful effects of normal, age-related memory decline.

Age predicts outcomes on many, although not all, tests of memory (West, Crook, & Barron, 1992). Psychological scientists attribute age-related memory decline primarily to cognitive overload resulting from three types of age-related reductions: sensory capacities (e.g., hearing and vision), speed of cognitive processing, and the ability to filter out irrelevant information (Hoyer & Verhaeghen, 2006).

Older adults could improve their memories through individual actions designed to mitigate age-related declines. Hearing loss is associated with memory decline at older ages (Lindenberger, Scherer, & Baltes, 2001), and older adults could partially offset age-related hearing loss by wearing hearing aids. They could engage in aerobic exercise: Exercise is associated with improved cognitive

functioning in older persons, including better memory (Colcombe & Kramer, 2003). They could use memory aids such as written reminders to prompt recall. They could use evidence-based training techniques to boost memory.

However, older Americans do not tend to engage in these actions. Most older adults who could benefit from hearing aids do not wear them (Wingfield, Tun, & McCoy, 2005), and many are sedentary (Matthews et al., 2008). Use of written reminders may not increase with age (Schryer & Ross, 2013); also, reminders are easily overlooked or mislaid. Finally, evidence-based memory training techniques are limited in availability, difficult to learn, and often ignored subsequent to training (Rebok, Carlson, & Langbaum, 2007).

Although policymakers could instigate educational campaigns and incentives to encourage useful individual actions, these interventions are likely to be insufficient. Older persons often view memory decline as an inevitable,

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irreversible consequence of aging (Hummert, Garstka, Shaner, & Strahm, 1994). Individuals who hold this belief are unlikely to strive to improve their memories (Bandura, 1989). Other factors that limit the potential benefits of individual actions include income, education, and health, as well as concerns about vanity or stigmatization. For example, some older persons oppose wearing hearing aids because they believe that it would make them feel or appear old (National Council on Aging, 1999).

As a supplement to individual actions, we recommend that policymakers promote environmental support for memory. Environmental support reduces people's need to rely solely on their own efforts to remember information. Self-initiated remembering is a cognitively demanding process that becomes more difficult at older ages (Craik, 1994). People have been outsourcing memory to the environment for millennia, with writing, art, photographs, and smartphones providing storage and reminders. We propose that policymakers facilitate outsourcing by explicitly taking memory into account when issuing regulations and guidelines. In this article, we provide examples based on psychological research of how policies promoting outsourcing can lessen the everyday consequences of age-related declines in memory.

Timely External Reminders Help People to Act on Their Intentions

Outsourcing in the form of externally generated, timely reminders reduces the necessity for self-initiated remembering. People often underestimate the value of such reminders. Contrary to expectations, external reminders dramatically help individuals to act on their intentions (Koehler & Poon, 2006). We consider the importance of external reminders in a context of special importance to older persons: remembering to take medications.

Medication nonadherence

Remembering to take medications is an example of *prospective memory* (memory for intended actions). Surprisingly, older persons do not exhibit worse prospective memory than younger adults in everyday life (Phillips, Henry, & Martin, 2008; Ross & Schryer, 2013). However, adults of all ages experience prospective memory failures, and the consequences of this type of forgetting can be more severe in old age. Problems of medication nonadherence increase among older adults because they take many more prescription drugs and their health is more fragile (McDaniel & Einstein, 2007). Medication nonadherence costs billions annually due to avoidable treatment failures, illness complications, etc. (Howren, Van Liew, & Christensen, 2013). External reminders delivered through currently available pill

apps on smartphones are of limited use to older Americans because fewer than 25% of them use a smartphone (Pew Research Center, 2014). In promoting external reminders, policymakers should take into account the competencies and proclivities of an aging population.

Policy recommendation. Policymakers should promote simple technical interventions that provide timely reminders, including commercially available pill organizers with LCD displays and talking alarm clocks that indicate when to take medications and confirm that medications have been removed. Specialized packaging of this sort helps to prevent both under- and overdosing (Morrison, Wertheimer, & Berger, 2000; Park & Kidder, 1996). Not all adherence failures are due to forgetting, but policymakers could improve healthcare and put a dent in health costs by mandating packaging that enhances memory. For example, VA prescriptions targeted at older persons could be provided in specialized containers.

External Memory Cues Aid Finding Objects and Places

Finding objects and places involves spatial memory. Spatial memory includes information about the layout of one's environment and the location of objects and places within it. Spatial memory errors increase at older ages (Moffat, 2009). We propose two general approaches to outsourcing spatial memory in order to offset age-related declines: environmental modifications and tracking systems such as GPS. Both approaches rely on the use of external memory cues.

Environmental modifications

Distinctive environmental memory cues improve people's ability to find objects and places (Fewings, 2001; Park, Cherry, Smith, & Lafronza, 1990). As an example of such cues, a fresco from a Pompeii bathhouse contains paintings of couples in different sexual positions. Archeologists speculate that the paintings were memory cues for bathers who placed their possessions on shelves beneath the pictures (Royal Ontario Museum, 2015).

Distinctive external memory cues can facilitate wayfinding in more complex environments. Consider large, unfamiliar parking lots. An increase in spatial memory errors in old age implies that older drivers may have more trouble finding their parked cars (Postma, Van Oers, Back, & Plukaard, 2012). To locate their cars in the absence of external memory cues, drivers must create and remember a cognitive map of the parking lot. The bigger or more complex the lot, the more processing resources it takes to

Table 1. Environmental Support for Memories

Problems	Solutions	Specific policy examples
Self-initiated remembering is more difficult for older persons because of cognitive processing demands	Timely external reminders to prompt remembering	VA prescriptions targeted at older persons provided in specialized containers that remind individuals when to take and whether they have already taken medications
Spatial memory errors increase at older ages	Distinctive external memory cues that reduce cognitive overload caused by creating and remembering mental maps	Architectural differentiation of large parking lots and multiple external memory cues for navigating indoor environments such as hospitals and nursing homes
Wayfinding while driving is distracting and taxes the visual processing resources of older adults	Reduce distraction and visual processing demands caused by the need to search for navigational aids such as street signs while driving	GPS technology designed with aging in mind

create and remember a cognitive map (Carlson, Hölscher, Shipley, & Dalton, 2010). Currently, various sections of lots are often physically identical. Architectural differentiation (e.g., painting of pavement and walls in unique colors in different sections of the lot, numbering parking stalls, and providing names for sections that are displayed on highly visible signs) should provide external memory cues that help persons of all ages to find their cars, but it would be especially beneficial for older persons.

External memory cues are similarly useful in indoor environments such as hospitals and nursing homes. Several types of cues in combination help adults of all ages, even those with severe cognitive impairments (Carlson et al., 2010; Passini, Pigot, Rainville, & Tétreault, 2000; Ulrich, Zimring, Quan, Joseph, & Choudhary, 2004). Painting the walls of different areas different colors offers a visual cue that individuals have moved from one area to another and helps them to remember to which area they need to return. Signs with large clear letters placed prominently throughout the building assist wayfinding. Other building features that reduce dependence on spatial memory include clear lines of sight from the entrance to the main areas of the building (e.g., the elevators are directly in front).

Policy recommendation. Policymakers should provide guidelines that incorporate multiple redundant cues for navigation in large parking lots and buildings such as hospitals and nursing homes. Such cues help older adults by reducing the processing demands involved in creating and remembering cognitive maps.

GPS

An age-related decline in spatial memory and route finding has important implications for driving. In the United

States, personal driving is the most common form of transport for adults over 65 (Rosenbloom & Waldorf, 2001). Many older drivers engage in behaviors designed to enhance safety, such as avoiding driving at night (Baldwin, 2002). Nonetheless, older adults experience more accidents per mile driven than all but the youngest drivers and are more likely to die in traffic accidents (Li, Braver, & Chen, 2003). Policymakers could recommend that elderly adults stop driving, but cessation is associated with greater rates of depression, social isolation, and negative health outcomes (Edwards, Lunsman, Perkins, Rebok, & Roth, 2009). Instead, policymakers should advocate solutions that keep older drivers safely on the road.

Accidents involving older drivers are caused by many different factors, but difficulties with wayfinding are likely contributors (Baldwin, 2002). In one study, it was “relatively common” (no percentage provided) for older drivers to report that accidents happened while they were searching for navigational aids such as street signs or addresses (Rothe, Cooper, & De Vries, 1990, p. 201). Navigating while driving taxes the cognitive resources of adults of all ages, but it poses special risks for older adults: The need to divide or switch attention is more harmful to the performance of older than of younger adults (Dingus et al., 1997; Lindenberger, Marsiske, & Baltes, 2000). GPS tracking technology has the potential to reduce distraction by outsourcing route finding. It should help older adults drive more safely on routes already traveled but not well remembered, as well as novel routes when drivers strive to remember directions that they learned before setting off.

Policy recommendation. Policymakers should promote versions of GPS technology designed with aging in mind. Instructions need to be provided sufficiently early

to permit older drivers to process the information and plan their actions. Older adults benefit more from auditory guidance rather than visual-map guidance. Auditory turn-by-turn navigational instructions reduce visual processing demands, lower navigational errors, and enhance driving performance (Baldwin, 2002).

Conclusions

Psychological scientists attribute age-related memory decline to cognitive overload resulting from reductions in sensory and cognitive capacities. There are two general approaches to mitigating age-related declines: train individuals or modify the environment (Charness, Best, & Souders, 2012). We focus on the latter. Environmental support for memory should help adults of all ages remember, but it would be particularly useful to older adults (Table 1 summarizes our argument). Thus, we argue that policymakers should offer regulations that encourage environmental support for memory. We are not proposing that environmental support supplant behavioral interventions to improve individual memory. Rather, we suggest that it is also advantageous to consider changes that facilitate the outsourcing of memory.

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The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

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Leveraging Mindsets to Promote Academic Achievement: Policy Recommendations

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Abstract

The United States must improve its students' educational achievement. Race, gender, and social class gaps persist, and, overall, U.S. students rank poorly among peers globally. Scientific research shows that students' psychology—their “academic mindsets”—have a critical role in educational achievement. Yet policymakers have not taken full advantage of cost-effective and well-validated mindset interventions. In this article, we present two key academic mindsets. The first, a growth mindset, refers to the belief that intelligence can be developed over time. The second, a belonging mindset, refers to the belief that people like you belong in your school or in a given academic field. Extensive research shows that fostering these mindsets can improve students' motivation; raise grades; and reduce racial, gender, and social class gaps. Of course, mindsets are not a panacea, but with proper implementation they can be an excellent point of entry. We show how policy at all levels (federal, state, and local) can leverage mindsets to lift the nation's educational outcomes.

Keywords

academic achievement, mindsets, fixed-growth beliefs, sense of belonging

Relative to other countries assessed by the Organisation for Economic Co-operation and Development (OECD), U.S. students score below average in math literacy (30th among 54 nations) and average in science (23rd) and reading literacy (20th).¹ Moreover, American students' average achievement level has not improved over the past decade (Organisation for Economic Co-operation and Development, 2013), and race, gender, and social class achievement gaps persist (U.S. Department of Education, 2015). It is clear that the United States must improve educational outcomes, not only to benefit individual students but also to increase national economic growth, social well-being, and global competitiveness (Council of Economic Advisors, 2015; Hanushek & Wöessmann, 2007).

We draw policymakers' attention to an underutilized intervention strategy: changing students' academic mindsets. As opposed to interventions that focus on structural factors (e.g., class or school size) or curricula, often with mixed results (Fullan, 2007; Howley & Howley, 2010), academic mindset interventions highlight the critical role that the psychology of the student plays in determining

educational outcomes (Walton, 2014). We focus on students' mindsets about academic ability (“Can my intelligence be developed?”) and academic settings (“Do people similar to me belong in this school or this field?”). Academic mindsets are powerful when implemented correctly: They can lift grades and motivation, particularly among struggling students, and they can reduce racial, gender, and social class achievement gaps (e.g., Blackwell, Trzesniewski, & Dweck, 2007; Stephens, Hamedani, & Destin, 2014; Walton & Cohen, 2011). They can also be relatively low cost to implement (see Paunesku, 2013, for cost analyses) and can be readily adapted for large-scale implementation (Paunesku et al., 2015). Although academic mindsets will not answer all the challenges facing education, they reliably benefit students and therefore merit greater attention from policymakers.

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Academic Mindset #1: Is My Intelligence Fixed or Can It Be Developed?

Some students view intelligence as fixed, something that they cannot change (a *fixed mindset*), whereas others view intelligence as malleable, something that they can develop over time (a *growth mindset*; Dweck, 1986, 2006). Growth mindsets foster greater learning and achievement in students from elementary school through college, especially during challenging transitions or in difficult courses (Blackwell et al., 2007; Paunesku et al., 2015). This is because students with growth mindsets seek to learn and develop their abilities, and thus pursue challenges, value effort, and are resilient to setbacks; in contrast, students with fixed mindsets avoid challenges (which could reveal “permanent” deficiencies), dislike effort (which they think signals low ability), and give up more easily when facing setbacks (which they view as evidence of low ability; Blackwell et al., 2007; Butler, 2000; Hong, Chiu, Dweck, Lin, & Wan, 1999; Robins & Pals, 2002). A survey of all 10th grade students in Chile showed that students’ mindsets predicted their academic achievement as strongly as family income or other standard economic indices (Claro, Paunesku, & Dweck, 2015).

Growth mindsets especially benefit underperforming students, underrepresented minorities, and women in math and science (Aronson, Fried, & Good, 2002; Good, Aronson, & Inzlicht, 2003; Good, Rattan, & Dweck, 2012; Paunesku, 2013; Paunesku et al., 2015). Therefore, growth mindsets can narrow achievement gaps.

Maximize Students’ Learning and Achievement by Fostering Growth Mindsets

Growth mindsets can be taught through in-school (Blackwell et al., 2007) or online (Paunesku et al., 2015) programs in which students learn that intellectual abilities can be developed over time through hard work, better learning strategies, and help from others. For example, students learn that the brain is like a muscle that grows stronger with rigorous exercise and that every time they take on challenges and persist, the neurons in their brain grow new, stronger connections. Students then learn to apply these lessons in their schoolwork (Blackwell et al., 2007).

Growth mindset training improved math grades among diverse seventh graders in New York City public schools (Blackwell et al., 2007). Growth mindset encouragement woven into Khan academy’s online math units—reminding students before each problem that working on new kinds of problems helps their math brain to grow or that the more they practice math the smarter they become—raised the

number of problems students solved correctly, the number of subsequent math units completed, and how many problems they correctly solved on subsequent units (Yeager, Paunesku, Walton, & Dweck, 2013). Integrating growth mindset principles into an online math game enhanced students’ persistence and use of adaptive strategies (O’Rourke, Haimovitz, Ballweber, Dweck, & Popovic, 2014).

College students who received growth mindset training achieved higher end-of-year GPAs, and, notably, minority students with growth mindset training on average performed as well as nonminority students without training (controlling for SAT scores; Aronson et al., 2002). Moreover, the benefits of growth mindset training have replicated with large samples of high school, community college, and university students across the United States who received as little as one or two online mindset sessions (Paunesku et al., 2015; Yeager et al., 2013). This means that the time, effort, and cost of scaling up can be minimized, while still delivering faithful and psychologically potent interventions.

Academic Mindset #2: Do I Belong Here?

Another key academic mindset is whether students feel a sense of “belonging” in their school or academic field. Many students feel uncertain about belonging, and this can be acute for students from negatively stereotyped groups (Willms, 2003). Belonging concerns are associated with lower achievement and higher dropout rates (Osterman, 2000; Walton & Cohen, 2007). However, when underrepresented students feel that academic settings value people like them, they exhibit less stress during academic challenges (Murphy, Steele, & Gross, 2007), report better mental and physical health (Walton & Cohen, 2011), and earn higher grades (Walton, Logel, Peach, Spencer, & Zanna, 2014). Women in college calculus courses who had stronger belonging mindsets expressed significantly greater interest in higher level math courses (Good et al., 2012). Thus, environments that promote belonging mindsets among negatively stereotyped students can narrow achievement gaps and encourage students to further pursue disciplines in which they are underrepresented.

Maximize Students’ Learning and Achievement by Fostering Belonging Mindsets

Students are more likely to feel that they belong when academic environments communicate growth mindsets (Good et al., 2012) and do not contain stereotypical objects and messages (Cheryan, Plaut, Davies, & Steele, 2009). In one study, minority students learned that older

Table 1. Implementing Academic Mindsets Across U.S. Education Policy

Problem	Solution	Policy recommendations
Fostering growth and belonging academic mindsets are not yet a national education priority.	Include academic mindsets in federal grant call-for-proposal priorities to incentivize states to implement these mindsets.	Large-scale federal programs (e.g., Race to the Top) and new smaller grant opportunities (e.g., Skills for Success) should fund the development and implementation of validated growth and belonging mindset interventions.
	Establish academic mindsets as one of the major issues in education identified by the Department of Education.	Include academic mindsets in the Department of Education's priorities and agenda. Sponsor national conferences on academic mindsets and include key stakeholders.
State education funding programs, policies, and practices do not incorporate validated mindsets programs.	Request federal monies to implement existing interventions and develop new ones.	Test student-directed, teacher-led, in-person, and online interventions to implement academic mindsets state-wide.
Current school programs do not address academic mindsets.	Integrate validated academic mindset programs and practices into existing school programming.	Teach growth and belonging academic mindsets to students during the course of other school programming (e.g., Common Core).
Student learning materials do not teach growth and belonging academic mindsets.	Invest in classroom learning materials that teach growth and belonging academic mindsets.	Choose textbooks and learning materials that effectively integrate growth and belonging mindsets. Supplement existing grading systems with feedback on improvement over time.
Teachers lack essential training in academic mindsets.	Use or develop validated programs to instruct teachers on how to effectively foster growth and belonging mindsets among students.	Propose, develop, implement, and test teacher training materials (e.g., supported through the RESPECT Initiative). Offer validated training to teachers during existing professional development.
Validated mindset interventions are not widely known and are not yet accessible to educators across the country.	Sponsor research and create a publicly available database of academic mindset interventions as they become available.	Include details about academic mindset interventions in the Department of Education's What Works Clearinghouse.

students (both majority and minority students) had similarly felt concern about belonging when they first arrived on campus but had developed a greater sense of belonging to college over time. The minority students who received this message reported feeling greater academic fit at school and later achieved higher GPAs than minority students who did not receive this message (Walton & Cohen, 2007). In fact, this intervention halved the racial achievement gap among college students (Walton & Cohen, 2007, 2011). In another study, information sessions where underrepresented students discussed belonging-relevant experiences later eliminated the social-class-achievement gap (Stephens et al., 2014).

Policy Implications

Policymakers can advocate, prioritize, and implement growth and belonging mindsets (see Table 1). Some

policymakers (e.g., U.S. Secretary of Education, state commissioners, local superintendents) have, as a first step, developed their understanding of how and why mindsets help young people thrive by reading relevant material (e.g., Dweck, 2006), examining existing programs (e.g., www.mindsetkit.org), or engaging with mindset researchers (e.g., Yeager et al., 2013). Others, including President Obama and First Lady Michelle Obama, have highlighted the importance of academic mindsets by vividly describing growth mindsets (M. Obama, 2013; B. Obama, 2014) and belonging mindsets (M. Obama, 2014) in their speeches.

Policymakers can make effective academic mindset practices a funding priority in existing (e.g., the Race to the Top Initiative) and new programs (e.g., the newly announced Skills for Success Grant). Federal grant programs can prioritize the funding of state proposals that include the development and testing of large-scale, age-appropriate mindset

programs. These can be mindset programs delivered directly to students or programs in which educators incorporate mindset messages in their pedagogy. They can also be programs that integrate mindset messages into online platforms (e.g., through the federal ConnectED Initiative).

The Department of Education can identify academic mindsets as a “major issue” in U.S. education, which would open up many possible courses of action. For example, this would afford policymakers the opportunity to create a national discourse around academic mindsets, perhaps by sponsoring national conferences on the topic. It would also incentivize the adoption of validated growth and belonging mindset programs by schools and colleges, education nonprofits, and state education agencies that apply for Department of Education funding. The Department might find opportunities to include mindsets in its surveys (e.g., National Assessment of Educational Progress, National Household Education Survey) to further study their relation to student achievement.

State and local policymakers, including commissioners, superintendents, and principals, have the challenge and opportunity of implementing broad-scale mindset interventions on the ground in the schools. They might look for ways of integrating mindset messages with existing initiatives. For example, in the future, validated belonging interventions might be delivered in the context of social-emotional learning curricula, and validated growth mindset programs might be used in the context of the new, challenging Common Core curriculum or during orientation activities as students make the transition to high school or college (see Yeager et al., 2013).

These policymakers and educators could also favor textbooks, curricula, and learning materials that engender these mindsets (by, for example, rewarding hard work, the trying of different strategies, appropriate help-seeking, and improvement) or could encourage publishers to develop such materials. They could also ask whether current grading practices capture only students’ performance or also their “process” (seeking challenges, showing resilience) and growth over time. Then, policymakers could encourage schools to create and implement grading practices that, in addition to capturing performance, also highlight and reward students’ challenge seeking, perseverance, and improvement over time (as some schools have now done).

We know that educators can transfer their mindsets to students (Rattan, Good, & Dweck, 2012). Therefore, the development and validation of training materials for teachers and administrators (both those in training and those working in schools) will be essential, perhaps with support from federal initiatives focused on developing pedagogy (e.g., the President’s RESPECT Project). These programs should (a) give educators a deep understanding of key academic mindsets; (b) motivate them to

integrate mindsets in their classrooms; and (c) provide them with validated curricula, activities, or intervention materials that they can use to do so.

Any large-scale implementation of academic mindset programs must be paired with rigorous testing because ineffective implementation of even well-validated practices is all too common and fails to yield results (Sun, 2015). We recommend that policymakers encourage schools or communities that want to implement mindset interventions to partner with academic researchers to empirically evaluate the consequences of growth and belonging mindset programs for students’ motivation, teachers’ experiences, and overall school achievement. These evaluations might suggest how to tailor programs for student- and school-specific needs. These data can be captured within the Department of Education’s “What Works Clearinghouse” to equip educators, administrators, and policymakers across the country with academic mindset practices that effectively meet the needs of their students.

Conclusion

The psychology of the student is key to academic achievement. In this article, we have presented two academic mindsets—the belief that your intelligence can be developed and the belief that you belong in your school or discipline. We have shown their direct impact on students’ educational outcomes, and we have described interventions that address and promote them. Further, we have suggested how policymakers can implement academic mindset practices in schools to promote widespread improvements in achievement.

This, of course, is not an exhaustive review. For example, the question of how mindsets are communicated in the home (Gunderson et al., 2013), and how policymakers can help parents to promote productive mindsets, requires further attention and research. Ongoing research is also identifying other beneficial academic mindsets that may further inform policymakers’ efforts to improve education, such as students’ sense of purpose (Paunesku et al., 2015; Yeager et al., 2014) and beliefs about whether all students have high potential (Rattan, Savani, Komarraju, Boggs, & Ambady, 2015; Rattan, Savani, Naidu, & Dweck, 2012). We hope to see a growing collaboration between researchers and policymakers who share the goal of supporting student learning and achievement.

There are many needs that must be met in order to create high quality education across the nation (e.g., high quality teaching, ample school resources). We counsel policymakers, as part of this effort, to capitalize on academic mindsets to enhance student achievement and, thus, to foster the nation’s growth, well being, and competitiveness.

Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

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Note

1. The OECD is composed of 34 member nations and over 70 nonmember nations and provides a forum in which governments work to promote economic growth, prosperity, and sustainable development (see <http://usoecd.usmission.gov/mission/overview.html> for more information). The OECD runs the Programme for International Student Assessment (PISA) every three years in countries that elect to be involved to assess educational systems based on 15-year-old students' reading, math, and science knowledge.

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Jump-Starting Early Childhood Education at Home: Early Learning, Parent Motivation, and Public Policy

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Abstract

By the time children begin formal schooling, their experiences at home have already contributed to large variations in their math and language development, and once school begins, academic achievement continues to depend strongly on influences outside of school. It is thus essential that educational reform strategies involve primary caregivers. Specifically, programs and policies should promote and support aspects of caregiver–child interaction that have been empirically demonstrated to boost early learning and should seek to impede “motivational sinkholes” that threaten to undermine caregivers’ desires to engage their children effectively. This article draws on cognitive and behavioral science to detail simple, low-cost, and effective tools caregivers can employ to prepare their children for educational success and then describes conditions that can protect and facilitate caregivers’ motivation to use those tools. Policy recommendations throughout focus on using existing infrastructure to more deeply engage caregivers in effective early childhood education at home.

Keywords

education, Head Start, motivation, parenting, self regulation

In comparison with their more advantaged peers, children who are born into lower socioeconomic status (SES) families are falling behind in math and language development before they enter formal schooling (Duncan & Magnuson, 2013; Waldfogel & Washbrook, 2011). Primary and secondary education play an important role in mitigating these gaps, but opportunities for school-based intervention are constrained. Achievement gaps grow for 5–6 years before schools are involved, and children spend only about 6.5 hours per day for about half the year in school (U.S. Department of Education, 2008). Indeed, all school-level factors—teacher, classroom, and school attributes—account for only about 20% of student achievement, whereas individual demographics and family background account for approximately 60% of the variation (Goldhaber, 2002). As their children’s first and arguably most important teachers in the hours outside of school, parents or other adult caregivers must be part of any successful reform strategy. However, there is growing evidence that lower SES families face different challenges in engaging their children effectively in the home. Many caregivers may not

be doing everything they can—or even everything they would like—to optimize interactions with their children.

From prenatal support through the start of formal schooling, the federal government makes a substantial investment in early childhood education.¹ Many of these efforts already support families in effective ways, but there is substantial variance across programs in the amount and quality of caregiver engagement. By explicating the general behavioral principles that underlie children’s early learning and their caregivers’ motivation, findings from psychological science can guide policymakers in attempts to get the most out of existing early-childhood policy infrastructure. Drawing from

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basic and field-intervention research, we offer policy recommendations that focus on (a) raising awareness at the program level about the many channels through which caregivers can effectively support child learning at home and (b) structuring environments that help caregivers follow through on their intentions to support their children's early math and language learning. Importantly, fitting these principles to the communities they serve can mitigate concerns about government overreach into an area as personal and culturally variable as parenting. Our sample policy implications (summarized in Table 1) focus on Head Start, the federal preschool program for disadvantaged children, because of the pronounced federal role in establishing performance standards and providing funding directly to Head Start programs,² but the policy implications could be tailored to other federal efforts as well.

Caregivers Matter: The Evidence for Targeting “Parenting Behaviors”

A variety of at-home and in-lab studies of naturalistic caregiver–child interactions have identified specific qualities of interactions that promote later language and math thinking (see Table S1 in the Supplemental Material). These practices can be summarized by the idea of caregivers finding “TEACHing” channels, which include: Talk (quantity and content), Effort-based praise, Anxiety reduction strategies, and Challenging play.

With respect to language skills, it is well established that children from higher SES families hear more words and more complex syntax than do their lower SES counterparts (Hart & Risley, 1995; Hoff, 2003; Huttenlocher, Waterfall, Vasilyeva, Vevea, & Hedges, 2010; Walker, Greenwood, Hart, & Carta, 1994), and both experimental studies and interventions at home show that increasing children's exposure to language is effective at increasing children's vocabulary and language comprehension (see Mayer, Kalil, Gallegos, & Oreopoulos, 2015; Ramey & Ramey, 2004; Suskind et al., in press; York & Loeb, 2014). Similarly, for math skills, a variety of verbal and nonverbal aspects of caregiver–child interaction have been highlighted as predictors of children's developing numerical and spatial thinking. For instance, when controlling for overall parent language input, longitudinal associations have been identified between the number-talk that children hear at preschool-age and their understanding of cardinal number at kindergarten entry (Gunderson & Levine, 2011; Levine, Suriyakham, Rowe, Huttenlocher, & Gunderson, 2011) and between the spatial language children hear at preschool-age and their performance on nonverbal spatial tasks at 4.5 years old (Pruden, Levine, & Huttenlocher, 2011).

The informational content of those interactions is only part of the story. The way in which that information is communicated also matters. By first grade, children already report varying degrees of anxiety about math,

which is negatively related to their math achievement (Ramirez, Gunderson, Levine, & Beilock, 2013). Whereas math input from caregivers who are math-anxious can lead to low math achievement, increased math anxiety, and decreased persistence (Maloney, Ramirez, Gunderson, Levine, & Beilock, 2015), math input from caregivers who are not math-anxious can lead to high math achievement, decreased math anxiety, and increased persistence (Maloney & Beilock, 2012; Vukovic, Roberts, & Green Wright, 2013). Table S1 summarizes additional studies demonstrating the role of early caregiver input in children's cognitive development and academic attitudes.

Given the ample evidence for caregiver influence through a variety of channels, annual performance reporting requirements for Head Start should include documentation of the centers' impact on caregiver beliefs and practices. Distinct from measures of family volunteerism in Head Start centers, these measures should reflect centers' efforts to educate and support caregivers in executing a variety of specific TEACHing behaviors. Reporting requirements would focus programs on connecting with caregivers, raising the quality of such efforts, and would have the secondary benefit of facilitating further research in the area.

Protecting Caregiver Motivation From Motivational Sinkholes

Programmatic efforts to increase caregiver awareness will only be useful if caregivers consistently carry out the relevant behaviors, but awareness of the problem and a general desire to fix it may not be sufficient (Sheeran, 2002). Environments that do not support three essential ingredients for long-term goal pursuit—self efficacy, planning, and feedback—can erode caregivers' motivation, causing “motivational sinkholes” to form beneath good intentions. If caregivers do not feel capable of improving their interactions, if they do not identify and plan for specific opportunities to execute supportive behaviors, and if they do not receive progress-clarifying feedback about their efforts, then they are unlikely to invest. Effective programming—supported by guidelines, resource allocation, and accountability at the policy level—can fill these sinkholes, ensuring that caregivers are operating in environments that optimally promote and sustain their motivation.

The efficacy sinkhole: Low efficacy limits goal setting

People will not put forth effort unless their goals are accompanied by a sense of self-efficacy (Bandura, 1982; Locke & Latham, 1990). This is an important consideration for caregivers because “being a child's first teacher” might be intimidating, perhaps especially to those who may have had limited (or negative) experiences with formal schooling and

Table 1. Summary of Policy Challenges and Proposed “TEACH” Policy Responses in Head Start

Problem	Suggested response	Sample policy manifestation (in Head Start context)
1. Scientific knowledge in action: The evidence base on effectiveness of specific interventions is still emerging.	Encourage existing programmatic efforts to focus explicitly on parents' opportunities to be “TEACHers” (offering their children talk and interaction, effort-based praise, anxiety-free learning interactions, and challenging play).	Annual performance reporting requirements should include documentation of impact on parenting beliefs, practices, and behaviors. Distinct from measures of caregiver volunteerism in Head Start centers, these measures should reflect centers' efforts to educate and support parents in executing TEACHing behaviors.
2. Parent awareness: Parent-child interactions are critical in the early childhood years, but parents may not be aware of the many simple opportunities they have for educational interaction.	Expose parents to best practices in parent-child interactions, emphasizing identifiable role-models.	(a) Use waitlists in the many oversubscribed Head Start centers, as well as the Early Head Start pipeline, to reach more families with information about the wide variety of simple TEACHing behaviors. (b) To expand reach beyond Head Start, support expanded efforts to deliver information through medical and other public support programs with which caregivers already interact.
3. Motivational sinkholes: Parents want to do what is best for their children, but follow-through can be undermined by a lack of self-efficacy, failure to make specific plans, or insufficient feedback.	Support parents in developing their own simple, actionable, goal-directed steps toward effective interaction. Aim for regular implementation and habit formation.	(a) Build efforts to model healthy, effective, culturally appropriate child-caregiver interactions into Head Start programs by facilitating caregiver observation of “model” lessons in the classroom. Remotely, short videos can allow observation of one's child interacting with teachers or showcase caregivers' peers interacting effectively with their own children. (b) Supplement Head Start programming with text messaging-based curricula that provide caregivers with specific, tailored questions, strategies, and tips to increase and improve their interactions, specifically around math and literacy skill development. Emphasize communications that prompt caregivers to respond with, or at least record, specific plans and goals. (c) Provide language pedometers, with accompanying dashboard technology, or app-based technology on smartphones or tablets to the most at-risk families in Head Start programs. Technology should monitor progress and facilitate feedback and conversation with center staff about progress in attaining caregivers' goals for interaction with their children.

who have many competing demands—the circumstances that the most at-risk caregivers are facing. Given that many TEACHing channels involve simple behaviors, self-efficacy could be substantially boosted merely by spreading

accurate information about the many easy things caregivers can do. If caregivers falsely assume, for example, that “quality math input” implies advanced lessons or sophisticated toys, they may feel discouraged; but if they see that

behaviors as simple as counting everyday objects or playing with blocks can help advance their children's math skills (Levine, Ratliff, Cannon, & Huttenlocher, 2012), they should feel motivated to act on their intentions.

Programming and policy implications. Programs like Head Start can boost caregivers' self-efficacy for teaching by modeling effective interactions. When possible, this modeling should showcase caregivers' peers. Centers could host observation sessions, and short videos could be circulated to caregivers who cannot attend. To increase awareness and efficacy beyond the population of enrolled families, similar information could be circulated to waitlisted families at oversubscribed centers; to prospective enrollees who are in the Early Head Start pipeline; and through medical and other public support programs with which parents already interact, such as pediatrician visits covered by Medicaid or the Children's Health Insurance Program (see High et al., 2014, for the American Academy of Pediatrics' literacy-focused recommendations). Head Start can also act as a hub for collecting and sharing objective data about what caregivers are already doing (and could be doing) in different circumstances, thus bolstering the ability of other programs to support caregivers in setting challenging but reachable goals.

The planning sinkhole: Missed opportunities for interaction

General motivation should be scaffolded with specific plans, providing caregivers with a clear sense of how and when to work with their children. Plans that give caregivers ideas for educational opportunities and that follow an "if-then" structure will be most effective, reducing missed opportunities and potentially, over time, leading to habit formation (Gollwitzer & Oettingen, 2011; Wood & Neal, 2007; see also Rothman et al., 2015, this issue). The most effective programs will be those that go beyond the valuable first step of giving parents ideas for educational opportunities (e.g., "Try counting with your child!") to the more valuable second step of working with them to formulate specific structured plans tailored to their own opportunities and routines (e.g., "If we are having Cheerios for breakfast, then we will count the first 10!").

Programming and policy implications. Initiatives that afford extensive contact with caregivers, such as home visitation, can provide focused coaching on translating general desires into well-structured plans. For outreach in which personal contact is more limited, other communications can facilitate this kind of planning. For instance, when pediatricians or community centers distribute books, they could attach a form directly to the book that encourages writing down a specific reading plan. Given the increasing

availability of smartphones (even among low income families; Smith, 2015), text messages are an increasingly popular channel for distributing information and encouragement to parents (e.g., York & Loeb, 2014) and could enable two-way interaction. For instance, when parents receive tips about an activity that they would like to try, they could be encouraged to reply to that text message with a specific action plan that fits the activity into their schedule, which should strengthen their commitment to the plan (Cialdini & Trost, 1998). Pending cost-benefit analyses, text-message outreach might even be a more effective method of outreach than home visitation for serving certain populations.

The feedback sinkhole: lack of connection between efforts and outcomes

Improving caregiver-child interaction is difficult because the link between today's behavior and next year's outcomes is not always clear, so slacking a little may not feel like a failure. Just as a single jelly donut will not ruin a balanced diet, swapping 15 minutes of puzzle play for 15 minutes of television will not, on its own, hold a child back. Because long-term outcomes are determined by the accumulation of isolated decisions and small steps, people may not recognize any given decision as consequential (Fishbach & Converse, 2011). The feedback sinkhole can be filled by giving parents well-structured, specific feedback that clarifies how well they are progressing toward the specific goals they set. Although it is impossible to show parents precisely how today's puzzle play will affect next year's test scores, it is feasible to demonstrate how today's puzzle play contributes to a weekly puzzle-time goal or how today's story time contributes to a monthly reading goal.

Programming and policy implications. The most precise progress monitoring can be accomplished (and the most comprehensive feedback provided) by distributing technology such as language pedometers (e.g., Suskind et al., 2015) or pre-loaded tablets (e.g., Berkowitz, Schaeffer, Beilock, & Levine, 2015; Mayer et al., 2015) that quantify language output or educational media usage. These tools are expensive, but they are arguably worthwhile for the most at-risk families and may eventually be more scalable as smartphone technology continues to improve. When such investments are infeasible or unnecessary, caregivers can still be coached—by Head Start center or other program staff—to keep track of their own progress the way one might count calories or log workouts. Notably, caregivers who are beginning a program will be most encouraged by feedback that emphasizes how much they have already accomplished, whereas caregivers whose commitment is more solid will be most encouraged by feedback that emphasizes where they

need to improve (Koo & Fishbach, 2008), and materials should be structured accordingly.

Promise of the approach

Three recent experimental interventions bundle the aforementioned motivational aspects wisely and provide support for the promise of targeted, efficient interventions. In one intervention with low-income caregivers, personalized coaching and technology-enabled monitoring improved the home language environment over a 6-week observation period (Suskind et al., 2015). Another intervention randomly assigned lower income families of preschoolers to participate in a year-long text messaging campaign and increased student literacy gains by .21 to .34 standard deviations (York & Loeb, 2014). The texts included facts to increase awareness; tips to increase efficacy through recommendations of specific, executable steps; and encouragement about the long-term growth promise of such activities. Finally, in an experiment with Head Start families in Chicago, a multipronged intervention using goal-setting, text-message reminders, and feedback successfully increased parent-child reading time (Mayer et al., 2015). Although these studies are preliminary, they point to the promise of intervening on caregivers' efficacy, planning, and access to feedback to promote both caregiver behaviors and children's achievement-related outcomes.

Conclusion: Efficient Delivery by Supplementing Existing Efforts

Comprehensive interventions—which generally include extensive family outreach—can improve long-term outcomes for children born into lower SES families, but they are expensive and severely limited in how much of the population they can serve. The current recommendations do not involve new programs or infrastructure; they instead maximize the effectiveness of existing, large-scale policy efforts by increasing their focus on, and raising their standards of, caregiver support and outreach. Some programs do already incorporate elements of these recommendations, but the complementary focus on awareness, efficacy, planning, and feedback needs to be more widespread. Though rigorous field research assessing interventions on caregiver-child interaction is still in its infancy (see Kalil, 2014), many low-cost investments can be made now based on the findings of basic correlational and lab research, even as the more rigorous, randomized controlled trials research base continues to evolve. If implemented wisely, these efforts can simultaneously support the many families who face a variety of socioeconomic barriers and the development of further research efforts aimed at closing the achievement gap.

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Supplemental Material

Additional supporting information may be found at <http://pps.sagepub.com/content/by/supplemental-data>

Notes

1. Though the federal role differs across these efforts, five major initiatives include Head Start; Early Head Start and the Early Head Start Child Care Partnerships; the Child Care and Development Fund; Preschool Development Grants; and the Maternal, Infant and Early Childhood Home Visiting program. Importantly, the governmental efforts occur alongside, and sometimes in conjunction with, specific interventions and programs such as Reach Out and Read, READY4K!, Thirty Million Words Initiative, and Vroom.
2. The Head Start program serves approximately 900,000 children with federal funding of over eight billion dollars annually (Gibbs, Ludwig, & Miller, 2013).

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Prioritizing Sleep Health: Public Health Policy Recommendations

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Abstract

The schedules that Americans live by are not consistent with healthy sleep patterns. In addition, poor access to educational and treatment aids for sleep leaves people engaging in behavior that is harmful to sleep and forgoing treatment for sleep disorders. This has created a sleep crisis that is a public health issue with broad implications for cognitive outcomes, mental health, physical health, work performance, and safety. New public policies should be formulated to address these issues. We draw from the scientific literature to recommend the following: establishing national standards for middle and high school start times that are later in the day, stronger regulation of work hours and schedules, eliminating daylight saving time, educating the public regarding the impact of electronic media on sleep, and improving access to ambulatory in-home diagnostic testing for sleep disorders.

Keywords

sleep, sleep health, public health, health policy, daylight savings time

The United States is facing a public health crisis. The CDC recommends at least 10 hours of daily sleep for school-age children and 7–8 hours of sleep per night for adults. Recent reports indicate that nearly 30% of American adults report an average of 6 or less hours of sleep per night, and only 31% of high school students report getting at least 8 hours of sleep on an average school night (Centers for Disease Control and Prevention, 2009a, 2009b).

This sleep crisis has important implications for cognitive outcomes, mental health, physical health, work performance, and safety. Sleep-deprived people are less effective in making decisions (Killgore, Balkin, & Wesensten, 2006) and are less creative (Harrison & Horne, 1999). Sleep-deprived individuals suffer negative moods (Dinges et al., 1997) and are more likely to experience distress (Glozier et al., 2010). Sleep-deprived employees are low in work engagement (Lanaj, Johnson, & Barnes, 2014), high in unethical behavior (Barnes, Schaubroeck, Huth, & Ghumman, 2011), and low in performance (Drake et al., 2001). Sleep-deprived people suffer more obesity (Taheri, Lin, Austin, Young, & Mignot, 2004) and are at greater risk for coronary heart disease (Ayas et al., 2003). Sleep-deprived individuals are more likely to be injured (Barnes & Wagner, 2009), involved in motor vehicle crashes (Drake et al., 2010), and die at an early age

(Kripke, Garfinkel, Wingard, Lauber, & Marler, 2002). Overall, sleep deprivation costs America many billions of dollars per year (Coren, 1998a, 1998b). Sleep disorders (most notably when undiagnosed/untreated) cause similar problems, with many of the same harmful outcomes noted above (Young, Peppard, & Gottlieb, 2002) and cost America billions of dollars each year (Hossain & Shapiro, 2002). Even small amounts of lost sleep produce measurable outcomes. For example, four consecutive nights of only 5 hours of sleep per night hinders cognitive performance to the same degree as blood alcohol content of .06 (Elmenhorst et al., 2009).

Reasons for the Crisis

Sleep is influenced by a variety of factors. However, there are some problems that can be targeted by new policies or the revision of current policies. One issue is that schedules that people live by are not consistent with healthy sleep patterns. There are several factors that contribute to this, beginning even before we are adults. School start

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times are set in a manner that conflicts with the circadian rhythms of children. Late adolescence is characterized by a shift in the circadian rhythm toward being a “night owl,” such that high school students have a physiologically driven natural tendency to go to bed late and sleep late (Phillips, 2009). The Centers for Disease Control and Prevention reports that only 17.7% of public middle and high schools meet the recommendation provided by the American Academy of Pediatrics to start school no earlier than 8:30 a.m. (CDC, 2015). As a result, many students have a hard time concentrating, learning, behaving well, and even staying awake while at school.

These schedule issues continue as we become working adults. Shift work involves having employees work at different times of the day. This often involves employees working night shifts that are in direct opposition to their circadian rhythms, making it hard to stay awake while on the job and hard to get sufficient sleep outside of work (Drake, Roehrs, Richardson, Walsh, & Roth, 2004; Wittmann, Dinich, Merrow, & Roenneberg, 2006). Physiological adjustment to night shifts is often slow (Aschoff, Hoffmann, Pohl, & Wever, 1975), such that employees are often in circadian misalignment. This creates health and safety-related outcomes such as increased risk of obesity, Type 2 diabetes, cancer, and accidents while driving (Schlafer, Wenzel, & Hogl, 2014; Steele, Ma, Watson, Thomas, & Muelleman, 1999). Moreover, frequent changes from night shifts to day shifts disrupt circadian rhythms in a manner analogous to jetlag.

Even infrequent changes can produce such harmful effects. Most of the United States participate in daylight saving time, which entails removing an hour from a day in the Spring (and adding one back in the Fall). Although this hour may seem trivial, this yearly removal of an hour is also disruptive to sleep (Barnes & Wagner, 2009; Lahti, Leppamäki, Lonnqvist, & Partonen, 2006; Kantermann, Juda, Merrow, & Roenneberg, 2007), and it has been empirically linked to a spike in workplace injuries (Barnes & Wagner, 2009), increased cyberloafing (Wagner, Barnes, Lim, & Ferris, 2012), hindered moral decision making (Barnes, Gunia, & Wagner, 2015), increased heart attacks (Janszky & Ljung, 2008), increased auto accidents (Coren, 1996), and even a drop of \$60 billion in stock prices (Kamstra, Kramer, & Levi, 2002). Moreover, daylight saving time actually increases energy costs (Kotchen & Grant, 2011), which is contrary to the original goal of saving energy costs.

Poor access to educational and treatment aids for sleep also plays a role in people deprioritizing sleep, engaging in behavior that is harmful to sleep, and missing out on treatment for sleep disorders. The ongoing integration of digital devices with backlit displays into the everyday lives of Americans has created unintended consequences. Light exposure—especially blue light—inhibits the production of melatonin, which can disrupt sleep and circadian

rhythms. Recent research indicates that using such devices at night hinders sleep (Chang, Aeschbach, Duffy, & Czeisler, 2014; Lanaj et al., 2014). It is especially problematic when people use these devices in bed, which disrupts the association between bed and sleep. These devices have spread without a commensurate increase in the knowledge of how they can be disruptive to sleep, leading to behaviors that are harmful to sleep.

Other people suffer from sleep disorders: Approximately 20% of Americans have obstructive sleep apnea, and 90% of those are undiagnosed (Finkel et al., 2009). Undiagnosed sleep disorders leave people sleep deprived, fatigued, and suffering the consequences of sleep deprivation noted above. Treatment for such disorders is available and effective (Pepperell et al., 2002), but requires detection before implementation. Until recently, detection has been expensive, restricting access from large segments of the American population.

Policy Implications

Establish national standards for middle and high school start times that are later in the day

Several studies indicate that pushing back high school start times leads to an increase in sleep, as well as improvements in daytime sleepiness, fatigue, mood, attendance, tardiness, grades, and scores on achievement tests, in addition to a drop in the number of teen driver car crashes (Boergers, Gable, & Owens, 2014; Owens, Belon, & Moss, 2010; Wahlstrom et al., 2014). A small proportion of schools have made this change, but a national campaign to do so across all high schools could have a dramatically positive impact on the sleep, and consequent health and productivity, of teenagers.

Stronger regulation of work hours and schedules

Some industries and organizations are developing policies to draw from sleep and circadian science to incorporate guidelines for shiftwork. For example, the National Transportation Safety Board and the Federal Aviation Administration provide such recommendations within the transportation industry. However, currently these guidelines only exist in a subset of industries and organizations in America. The National Institute for Occupational Safety and Health (NIOSH) has recommendations for designing shift work schedules that draw from sleep and circadian science that could potentially be applied to industries outside of medicine and transportation, such as agriculture, manufacturing, retail, finance, and information. However, these are currently suggestions rather than firm regulations.

Table 1. Roadmap for Application of Evidence-Based Solutions to the Sleep Crisis

Problem	Solution	Policy examples
School schedules undermine sleep	National standards for later middle and high school start times	National requirement that high schools start their first classes no earlier than 8:30 a.m.
Work schedules undermine sleep	Stronger regulation of work hours and schedules across all industries	Limitations on shift length, regulation of time between shifts, regulation of degree of circadian phase change in consecutive workdays
Daylight saving time policy undermines sleep	Do not practice daylight saving time (like Hawaii and most of Arizona)	Eliminate daylight saving time from all states
Poor access to education regarding sleep	Educate the public regarding the effects of electronic media on sleep	High school module on sleep health utilized nationally; educational module on drowsy driving required before obtaining a driver's license
Poor access to treatment for sleep disorders	Improve access to ambulatory in-home diagnostic testing for sleep disorders	Tax incentives to corporate wellness programs that provide access to ambulatory in-home diagnostic testing for sleep disorders

We recommend that NIOSH work as a regulatory body to actively influence the shift work scheduling systems of all American industries and be given the authority to penalize organizations that do not comply. This would be especially appropriate for occupations such as firefighting, police, and emergency medical technicians. Implementing mathematical-model-based scheduling tools (Hursh et al., 2004; Rangan & Van Dongen, 2013) will increase organizational performance and facilitate the transfer of best practices across companies and industries.

Eliminate daylight saving time

Given that switching to daylight saving time disrupts sleep and leads to a variety of negative cognitive, health, and work outcomes, we recommend eliminating daylight saving time.

Educate the public regarding the impact of electronic media on sleep

An education campaign targeting sleep improvement by smarter use of digital devices could improve sleep in America. Indeed, the National Institutes of Health (2005) has a free high school sleep curriculum supplement series titled "Sleep, Sleep Disorders, and Biological Rhythms" that could be broadly implemented across American high schools. We also recommend the creation of an educational module on electronic media use, sleep, and drowsy driving that must be completed before obtaining a driver's license.

Improve access to ambulatory in-home diagnostic testing for sleep disorders

Home sleep testing (Collop et al., 2011) is a useful resource that could help people with sleep disorders take the first

important step toward obtaining treatment. Government assistance to implement wider screening for sleep disorders would be a powerful approach to improving sleep in America. Provision of tax incentives to health insurance companies, company wellness plans, and medical coverage facilities that provide access to ambulatory in-home diagnostic testing tools would help address this issue.

In summary, the sleep crisis in America can be partly ameliorated with some relatively straightforward policy changes (see Table 1). There will clearly be logistical challenges in implementing many of these recommendations, but the investments involved in meeting those challenges will likely yield a very large payoff.

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Three Principles to REVISE People's Unethical Behavior

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Abstract

Dishonesty and unethical behavior are widespread in the public and private sectors and cause immense annual losses. For instance, estimates of U.S. annual losses indicate \$1 trillion paid in bribes, \$270 billion lost due to unreported income, and \$42 billion lost in retail due to shoplifting and employee theft. In this article, we draw on insights from the growing fields of moral psychology and behavioral ethics to present a three-principle framework we call *REVISE*. This framework classifies forces that affect dishonesty into three main categories and then redirects those forces to encourage moral behavior. The first principle, *reminding*, emphasizes the effectiveness of subtle cues that increase the salience of morality and decrease people's ability to justify dishonesty. The second principle, *visibility*, aims to restrict anonymity, prompt peer monitoring, and elicit responsible norms. The third principle, *self-engagement*, increases people's motivation to maintain a positive self-perception as a moral person and helps bridge the gap between moral values and actual behavior. The REVISE framework can guide the design of policy interventions to defeat dishonesty.

Keywords

dishonesty, ethical dissonance, moral reminders, social monitoring, self-concept

Estimates show that the cost of corruption equals more than 5% of global GDP (US\$ 2.6 trillion, World Economic Forum) with over US\$ 1 trillion paid in bribes each year (World Bank). It is not only a question of ethics; we simply cannot afford such waste.

Organisation for Economic Co-operation and Development (2014)

Dishonesty has reached epidemic proportions in both the public and private sectors. From bribery and large scale frauds to shoplifting and wardrobing (a type of return fraud), the immediate financial costs are worrying, but the threat to society is even more serious because seemingly isolated violations chip away trust, encourage negative social norms, and increase the prevalence and spread of other unethical behaviors (Ariely, 2012; Kirchler, Hoelzl, & Wahl, 2008; Welsh, Ordóñez, Snyder, & Christian, 2015).

The standard economic approach to curbing dishonesty relies on enforcement and deterrence (Becker, 1968). For instance, research examining tax compliance has demonstrated that increasing punishments, and especially increasing the likelihood of being caught, are effective interventions (Andreoni, Erard, & Feinstein, 1998;

Kirchler, 2007). However, the solution of enforcement to defeat tax evasion, corruption, employee theft, and other manifestations of dishonesty is costly and limited. Even if we could station a police officer on every other street corner, it would be virtually impossible to monitor all the actions of all the people all the time. Furthermore, instead of encouraging people to be honest, enforcement teaches them to avoid punishment or to become better cheaters. In fact, external punishments can crowd out internal motivation and further separate people from their moral compass (Ariely, 2012; Ryan & Deci, 2000; Tyler, 2006).

The Internal Ethical Conflict

Insights from the growing field of moral psychology and behavioral ethics show that people care about morality. One robust finding is that most people make an effort to resist temptation and try to behave honestly (Aquino & Reed, 2002). Investigations of misconduct in the real

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world and in laboratory experiments show that people tend to curb their own dishonesty. Even when the chances of detection are minimal, or when under conditions of complete anonymity, most people limit their cheating to an extent far below the maximum possible (Gino, Ayal, & Ariely, 2009; Gneezy, 2005; Mazar, Amir, & Ariely, 2008).

According to the psychological model of dishonesty, people are caught between a rock and a hard place—that is, between the temptation to profit from unethical behavior and the desire to maintain a positive moral image of themselves. This internal conflict—termed *ethical dissonance*—creates severe psychological tension and threatens people's self-concept and moral identity (Ayal & Gino, 2011; Barkan, Ayal, Gino, & Ariely, 2012). Unfortunately, research shows us that people employ various self-serving justifications to reduce ethical dissonance and manage to do wrong and feel moral at the same time (Shalvi, Gino, Barkan, & Ayal, 2015).

Although the picture we portray above seems depressing, there is a silver lining. In a nutshell, understanding the factors that facilitate wrongdoing can help us to design policies and interventions that work against them, stress high moral standards, and tip the scale of people's internal conflict toward ethical behavior (Beshears & Gino, 2015).

The REVISE Framework

We formulated REVISE, a 3-principle framework that can guide intervention and policy:

- *Reminding* emphasizes the effectiveness of subtle cues that increase the salience of morality and decrease the ability to justify dishonesty.
- *Visibility* refers to social monitoring cues and aims to restrict anonymity, prompt peer monitoring, and elicit responsible norms.
- *Self-engagement* increases the motivation to maintain a positive self-image and generates personal commitment to act morally.

Reminding

Empirical evidence shows that people take advantage of grey areas to justify their dishonest behavior (Shalvi et al., 2015). The first principle, reminding, eliminates ambiguity and introduces subtle cues that make people's own moral standards salient. For instance, in a typical lab experiment, we pay participants according to their performance on a relatively simple task. In one group, we monitor and verify participants' performance. In the second group, we inform participants that they can shred any evidence of their real performance and simply tell us

how much money they earned. Participants in this second group are assured that we cannot identify or punish them for cheating. Typically, many participants in the second group cheat by inflating their actual performance. To test the effect of reminding, we asked participants in this group to recall the 10 Commandments immediately prior to doing the task. This simple reminder eliminated cheating (Ariely, 2012; Mazar et al., 2008).

The design of effective moral reminders should take two important points into consideration. First, reminders should be salient—utilizing principles of right and wrong, specific examples of moral “do’s and don’ts,” and even known slogans. For instance, placing signs with *The Ellen Show* motto “Be Kind to One Another” next to handicapped parking spaces is likely to encourage ethical parking behavior. Second, to maintain salience and avoid adaptation, we need to change and reactivate reminders every now and then.

Visibility

Classic research in social psychology has demonstrated that anonymity releases people from their moral shackles (Milgram, 1973; Zimbardo, 2000). The second component of the REVISE framework emphasizes visibility, which encourages ethical behavior through social monitoring cues.

The effectiveness of visibility has been demonstrated in laboratory experiments and field studies. In the lab, participants in a slightly dimmed room cheated more than participants in a well-lit room (Zhong, Bohns, & Gino, 2010). In fact, people are so sensitive to the presence of others that even seeing a picture of eyes can alter their behavior for the better. One study showed that when a picture of eyes was displayed above an honesty jar, honor payments for coffee and tea were nearly three times more frequent than when a picture of flowers was displayed above the jar (Bateson, Nettle, & Roberts, 2006).

In addition to its more direct effect, visibility also shapes social norms. In this respect, visibility can be a two-way street and either encourage good behavior or facilitate bad behavior. Whether observing someone committing a wrongdoing will be condemned (“I am a better person”) or serve as justification for similar behavior (“everybody does it”) depends in part on the way people relate to the wrongdoer. If the person who violates ethical standards is an in-group member or a respected figure, people will easily follow this person's lead. However, if the person is an outgroup member or someone with a bad reputation, people will tend to distance themselves by exhibiting the opposite worthy behavior. Hence, when designing visible environments to enhance social monitoring, we should pay special attention to both the social

Table 1. Applying REVISE to Define General Problems, Solutions, and Specific Recommendation for Policy

Problem	Solution	Examples of policy recommendations
Reminding		
Ambiguity of rules and laws allows people to use self serving justifications and turn a blind eye.	Provide cues that increase the salience of ethical criteria and decrease ability to justify dishonesty. Present cues at critical points (e.g., right before the temptation) and reactivate them every now and then.	<u>Tax compliance:</u> Provide moral reminders in different sections of the tax return. Some cues can specify the victims and damage caused by unreported income. Other cues can highlight the moral uses of tax money. <u>Compliance with handicapped parking:</u> Provide moral reminders next to handicapped parking spaces, such as the Ellen Show motto “Be Kind to One Another” to encourage ethical parking behavior.
Visibility		
Anonymity and lack of peer monitoring diffuses moral responsibility.	Include procedures that increase people’s feeling they are being seen and identified (e.g., by peers/ clients/ supervisors).	<u>Tax compliance:</u> Develop mobile apps to computerize tax forms, personalize the reporting process, and create identified correspondence (e.g., filling in home and work addresses automatically, name of employer, spouse, children). <u>Shoplifting:</u> Place mirrors close to cashier and at exit doors to enhance people’s perception of being watched as they wait in line to pay, and as they leave the store.
Self-engagement		
Disparity between people’s abstract perception of their moral image and their actual behavior allows them to do wrong but feel they are moral.	Break down morality into concrete behaviors. Generate and obtain self-commitment to act morally prior to behavior.	<u>Tax Compliance:</u> Run surveys prior to tax time asking people general questions about their morality, their parents’ moral values, followed by specific questions about cheating on taxes. Change reporting forms by requiring people to start the procedure by signing an honor code and committing to true reporting. <u>Bribery:</u> Members of important law-making committees should have officials sign for and pin Ethical Commitment buttons on their lapels or wear Integrity bracelets on their wrists.

cues and the actors who display them (Cialdini, 1993; Erat & Gneezy, 2012; Gino et al., 2009).

Self-engagement

People state that being moral is central to their self-concept and they really care about honesty in their interactions with others (e.g., Aquino & Reed, 2002; Haidt, 2007; Tyler, 2006). One problem is that people tend to think about their morality in abstract and ideal terms, but violate ethical standards in concrete and seemingly isolated actions. The principle of self-engagement increases awareness by establishing a direct relationship between people’s concrete transgressions and their general perceptions of their morality. Engaging the moral self can help people resist the temptation of unethical behavior and commit to ethical standards.

In a field study that exemplifies the effectiveness of this principle, researchers collaborated with an automobile insurance company that hoped to encourage people to report the true mileage on their cars. Of course, higher mileage leads to a higher premium; therefore, people save money by lying and underreporting. In this study, customers were asked to sign a statement declaring they were telling the truth. Importantly, the

researchers randomly assigned customers to a “regular” statement in which their signature was placed at the bottom of the page (after reporting the car mileage), or a “self-engagement” statement, in which their signature was placed at the top of the page (before reporting the car mileage). This subtle difference had an impressive effect: When people signed their names at the top of the page they reported more mileage (Shu, Mazar, Gino, Ariely, & Bazerman, 2012).

Shaping better moral habits with the principle of self-engagement encourages people to resist everyday temptations and stick to their own highest values. We should educate people about tempting situations and teach them to realize the psychological toll of ethical dissonance.

Policy Implications

The fields of moral psychology and behavioral ethics have grown rapidly in the last two decades and have documented a variety of factors that enable (even good) people to do wrong. The REVISE framework organizes these factors into three main categories and identifies interventions to encourage moral behavior. Table 1 summarizes the framework and presents examples applying REVISE principles to policy in different content areas.

Reminding mitigates grey areas that blur the ethical code, visibility mitigates anonymity and the slippery slope of social norms, and the gap between moral values and actual behavior can be reconciled by encouraging self-engagement.

Dishonesty has never been compulsory and it should not be accepted as an inevitable fact of life. We can revise behavior and encourage ethicality by designing supportive environments that minimize temptations and define clear boundaries between right and wrong (Bazerman & Tenbrunsel, 2011; Sunstein, 2014). Successful public policies should raise moral barriers by reminding people of their own ethical code, encouraging social monitoring and responsible norms, increasing self-awareness and prompting moral commitment.

Declaration of Conflicting Interests

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Maximizing the Gains and Minimizing the Pains of Diversity: A Policy Perspective

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Abstract

Empirical evidence reveals that diversity—heterogeneity in race, culture, gender, etc.—has material benefits for organizations, communities, and nations. However, because diversity can also incite detrimental forms of conflict and resentment, its benefits are not always realized. Drawing on research from multiple disciplines, this article offers recommendations for how best to harness the benefits of diversity. First, we highlight how two forms of diversity—the diversity present in groups, communities, and nations, and the diversity acquired by individuals through their personal experiences (e.g., living abroad)—enable effective decision making, innovation, and economic growth by promoting deeper information processing and complex thinking. Second, we identify methods to remove barriers that limit the amount of diversity and opportunity in organizations. Third, we describe practices, including inclusive multiculturalism and perspective taking, that can help manage diversity without engendering resistance. Finally, we propose a number of policies that can maximize the gains and minimize the pains of diversity.

Keywords

decision making, diversity, economic growth, innovation, transparency

Diversity—heterogeneity in race, ethnicity, gender, cultural background, sexual orientation, and other attributes—is a key ingredient of flourishing societies. Promoting diversity is not just a moral issue, but also a practical one; empirical evidence reveals that diversity has numerous benefits for organizations, communities, and nations (Herring, 2009). Indeed, the success of the United States, a nation founded and sustained by immigrants, has been driven, in part, by its considerable diversity.

Diversity increases creativity and innovation, promotes higher quality decisions, and enhances economic growth because it spurs deeper information processing and complex thinking. This complex thinking allows diverse groups to respond more effectively to dynamic contexts and unforeseen challenges (Page, 2007). Interacting with people from different backgrounds, however, can also be a source of discomfort, mistrust, resentment, and conflict (Montalvo & Reynal-Querol, 2005; Putnam, 2007).

Consequently, the benefits of diversity are often not fully realized. In this article, we draw on empirical evidence from multiple disciplines to detail how diversity, when managed effectively, can have material benefits for all members of a society.

The Benefits of Diversity: Innovation, Higher Quality Decisions, and Economic Growth

We highlight the benefits of two forms of diversity: the diversity present in groups, communities, and nations, and the diversity acquired through individuals' personal

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experiences (e.g., living abroad, exposure to other subcultures).

Benefits of diversity in groups/communities/nations

Homogeneous groups run the risk of narrow mindedness and groupthink (i.e., premature consensus) through misplaced comfort and overconfidence. Diverse groups, in contrast, are often more innovative and make better decisions, in both cooperative and competitive contexts. Even countries produce more national achievements after opening their borders to foreign influences through travel and immigration (Simonton, 1997). These innovation and decision-making benefits happen for two reasons. First, diverse groups have access to a greater variety of perspectives. Second, both majority and minority individuals in diverse groups consider more information and process that information more deeply and accurately (Apfelbaum, Phillips, & Richeson, 2014; Crisp & Turner, 2011; Phillips & Loyd, 2006). For instance, experimental evidence shows that ethnically diverse juries consider more perspectives and make fewer inaccurate statements than homogeneous juries (Sommers, 2006). In addition, people who anticipate joining ethnically or politically diverse groups process the information that will be discussed in the group more thoroughly (Loyd, Wang, Phillips, & Lount, 2013; Sommers, Warp, & Mahoney, 2008) and write more cognitively complex postdiscussion summaries (Antonio et al., 2004). These findings suggest that decision-making groups benefit from diverse composition via enhanced information processing.

Social network analyses point to the economic benefits of diversity. Telephone calling patterns reveal that social network diversity (i.e., interacting with people from different geographic regions) is associated with greater economic prosperity of a community (Eagle, Macy, & Claxton, 2010). Similarly, correlational evidence indicates that U.S. cities with a greater share of foreign-born inhabitants are more successful economically (Ottaviano & Peri, 2006). Even in competitive trading markets, diversity promotes careful, unbiased judgments that prevent price bubbles; market-level accuracy in pricing assets increases in ethnically diverse markets but decreases in homogeneous ones (Levine et al., 2014).

Notably, increased diversity often yields material benefits for both minority and majority group members. For instance, U.S.-born citizens living in U.S. cities where the percentage of immigrants grew from 1970 to 1990 saw their own wages increase (Ottaviano & Peri, 2006). In addition, since introducing the H1-B visa program, which allows U.S. employers to hire highly skilled foreign workers for specialty occupations, the number of H1-B workers in specific geographic areas predicts greater wage

growth for U.S.-born workers in those areas (relative to the national average; Immigration Policy Center, 2014). Similarly, providing women with more economic and political opportunities is associated with greater innovation at both cross-national and cross-state levels (Martin, Mishra, Swaab, & Galinsky, 2015), and providing women with more economic and political opportunities in a country positively predicts the number of Olympic medals that country's female and male athletes win (Bai, Uhlmann, & Berdahl, 2015; Berdahl, Uhlmann, & Bai, 2015).

Diversity is especially vital when policies and decisions affect a population that itself is diverse. For example, demographic diversity within the public sector workforce is related to policy outcomes that better integrate the interests of all of its citizens (Bradbury & Kellough, 2008). Similarly, a diverse judiciary produces a broader and more comprehensive understanding of fairness and justice (Smith, 1994). One implication of these findings is that legal systems likely produce higher quality decisions when the representatives of the law (e.g., police officers, judges, jurors, and lawyers) resemble those appearing before the court; similar implications follow for the representatives of educational systems (e.g., teachers, principals), financial institutions (e.g., bankers, mortgage brokers), and governments (e.g., elected officials).

Benefits of diverse personal experiences

Diversity is not only important among groups, communities, and nations; individuals also benefit from personal experiences with diversity. Diverse personal experiences, such as living or working abroad, are associated with greater creativity (Lee, Theriault, & Linderholm, 2012; Leung, Maddux, Galinsky, & Chiu, 2008; Maddux & Galinsky, 2009). Creative directors of major fashion houses, visual artists, scientists, and managers who have worked abroad produce more creative fashion collections (Godart, Maddux, Shipilov, & Galinsky, 2015), more valuable artwork (Hellmanzik, 2013), more highly cited scientific articles (Franzoni, Scellato, & Stephan, 2014), and more entrepreneurial activity (Tadmor, Galinsky, & Maddux, 2012). Similarly, bicultural individuals (e.g., people with parents from two different countries) display more creativity (Benet-Martínez, Lee, & Leu, 2006), deeper information processing (Tadmor et al., 2012), greater perspective taking (Gutierrez & Sameroff, 1990), and less interethnic tension (Buriel, Perez, Terri, Chavez, & Moran, 1998). Integrating experiences across multiple countries increases generalized trust (Cao, Galinsky, & Maddux, 2014)—a key factor in economic growth and civic engagement (Uslaner & Brown, 2005; Zak & Knack,

2001). These effects occur, in part, because learning and integrating information about other cultures stimulates deeper information processing and complex thinking (Maddux, Hafenbrack, Tadmor, Bivolaru, & Galinsky, 2014; Tadmor et al., 2012).¹

Increasing Diversity and Opportunity by Promoting Transparency

Diversity helps individuals, groups, and nations produce better decisions, more innovation, and greater economic growth. The amount of diversity, however, is often limited by structural factors and psychological forces that produce bias—even when that bias is unintentional. Policies can be implemented to increase diversity by promoting equity of treatment in organizations.

The amount of diversity in organizations is affected by recruitment, selection, and promotion procedures. The first stage, recruitment, is critical because underrepresented individuals often forgo opportunities with organizations they deem unwelcoming. For example, the language used in recruiting documents affects application rates: Masculine language in job advertisements (e.g., dominant, competitive) lowers the appeal of these jobs for women, not because women feel they lack the skills but because they feel they do not belong (Gaucher, Friesen, & Kay, 2011). At the selection stage, it is vital that unbiased hiring criteria are established in advance to prevent those criteria from being used selectively to benefit some groups over others (Uhlmann & Cohen, 2005). Finally, bias can creep in again at the promotion and compensation stage; establishing criteria in advance is critical here, too. Procedures that create accountability reduce the pay gap for women, ethnic minorities, and non-U.S.-born employees (Castilla, 2015). Similarly, monitoring and formal mentoring programs increase the promotion rates of Black and White women (Kalev, Dobbin, & Kelly, 2006).

The foundational principle that cuts across these mechanisms for decreasing bias is transparency. Monitoring and public reporting of hiring practices and salary rates creates accountability and decreases bias. Regular reviews of hiring, mentoring, and promotion criteria help ensure that they are fair and equitable, as even seemingly unbiased selection criteria can produce disparate outcomes (Apfelbaum, Pauker, Sommers, & Ambady, 2010; *Ricci v. DeStefano*, 2009). For example, a study of service and manufacturing organizations in Ireland found that transparency procedures designed to monitor the recruitment, pay, and promotion of minority groups was positively associated with higher labor productivity, greater workforce innovation, and lower voluntary employee turnover (Armstrong et al., 2010).

Government initiatives have also found that greater transparency can increase diversity. In 2011, for example, President Obama instituted a coordinated government-wide initiative to promote diversity and inclusion in the federal workforce with Executive Order 13583; this initiative pledged to add 100,000 employees with diverse (dis)abilities, and it created the Recruitment, Engagement, Diversity, and Inclusion Roadmap to monitor diversity-related progress (Archuleta, 2015b). Four years after its implementation, the President's Management Agenda reported a 10% increase of women in the senior executive service of the government (Archuleta, 2015a). Similarly, in 2010, the Australian Securities Exchange (ASX) mandated that all ASX-listed companies follow a set of recommendations designed to increase transparency and accountability in the recruitment of board directors (e.g., publicly report processes for nominating and selecting board members); the percentage of female directors then increased from 8.3% in 2008 to 18.3% in 2014.² Transparency can be used at multiple levels to root out bias and discrimination and to increase diversity, fairness, and equity.

Managing Diversity Effectively

Although diversity has decision-making and economic benefits, without effective management, diverse groups, communities, and nations run the risk of descending into detrimental conflict, which can derail economic growth (Alesina & La Ferrara, 2005). The key is to find ways to maximize the gains and minimize the pains of diversity—to harness innovation and economic growth without producing counterproductive forms of conflict.

The specific framing of diversity policies is a significant factor in determining whether they are met with acceptance or resistance. With respect to race and ethnicity, emphasizing the benefits of *multiculturalism*, which entails valuing intergroup differences, can help groups and nations manage diversity more effectively. Experimental evidence indicates that individuals who read statements endorsing a multicultural approach to diversity are more accurate in their perceptions of other groups (Wolsko, Park, Judd, & Wittenbrink, 2000), display less racial bias (Richeson & Nussbaum, 2004), and engage in smoother interracial interactions (Vorauer, Gagnon, & Sasaki, 2009), than do individuals who read statements endorsing a colorblind approach where differences are explicitly ignored. Multiculturalism also encourages underrepresented individuals to seize opportunities. By communicating acceptance of minority groups (Verkuyten, 2005), multiculturalism helps group members display greater engagement at work (Plaut, Thomas, & Goren, 2009) and achieve higher academic outcomes (Walton & Cohen, 2011).

Table 1. Diversity-Related Problems, Proposed Solutions, and Policy Recommendations

Problem	Proposed solution	Example policy recommendation
Group homogeneity breeds narrow mindedness, groupthink (i.e., premature consensus)	Increase diversity in groups, communities, and nations to spur deeper information processing and complex thinking	Executive orders and taxation policies that incentivize organizations to diversify their employee and supplier base Immigration policies that promote diversity in skills, knowledge, and experiences, such as increasing the number of H-1B visas for skilled workers Immigration policies that simplify the application processes for (temporary) nonimmigrant worker visas Mortgage and housing policies that promote the creation of diverse neighborhoods, such as the Moving to Opportunity Program Education policies that promote diverse undergraduate and graduate student representation, such as providing scholarships to underprivileged groups
Lack of experience and contact with other cultures can impair creativity, decision making, and trust	Increase opportunities for cross-cultural contact and experiences abroad	Taxation policies that incentivize expatriation by eliminating taxes on citizens working abroad (the U.S. is the only industrialized country to tax its citizens while abroad); policies can also incentivize foreign-service employees to bring their diverse experiences back to the U.S. Education policies that increase federal fellowships for study or internships abroad; these policies need to ensure that underrepresented groups also get access to these opportunities
Biased recruitment, selection, and promotion procedures prevent a diverse workforce	Reduce explicit and implicit bias and increase opportunities through accountability and transparent procedures and reporting	Recruitment policies that promote the accurate description of qualifications but eliminate language that can dissuade members of underrepresented groups from applying Selection and promotion policies that commit to unbiased evaluation criteria in advance; regular review of those criteria to reduce disparate outcomes Monitoring policies that report hiring/promotion rates and increase transparency and accountability Ensuring that selection/promotion committees are themselves diverse
Diversity can increase resistance, mistrust, and conflict	Promote inclusive multiculturalism and perspective taking to make effective use of diversity	Education policies that promote inclusive multiculturalism and encourage perspective taking, both in education (primary, secondary, university) and in training foreign-service employees Policies that ensure that mentorship programs are inclusive by stressing the need to support both minority and majority groups

Multiculturalism, however, can be difficult to implement and can also breed resistance from majority groups (Plaut, Garnett, Buffardi, & Sanchez-Burks, 2011), which may explain why analyses from 708 private-sector organizations found that the introduction of diversity training programs was associated with a decrease in the number of Black women in management (Kalev et al., 2006). One key to minimizing such resistance and increasing support for organizational diversity efforts among majority group members is to ensure that multiculturalism is framed inclusively, highlighting the benefits for both minority and majority group members (Jansen, Otten, & van der Zee, 2015; Stevens, Plaut, & Sanchez-Burks, 2008). Mentoring programs are also particularly effective when they are inclusive of all employees, benefitting minority groups without creating perceived exclusion of majority groups.

Related to multiculturalism and its recognition of differences, *perspective taking*—imagining the world from another's vantage point—also helps with effectively managing diversity. Perspective taking by majority group members decreases stereotyping (Galinsky & Moskowitz,

2000), reduces racial bias (Todd & Burgmer, 2013), increases recognition of racial discrimination (Todd, Bodenhausen, & Galinsky, 2012), and promotes smoother interracial interactions (Todd, Bodenhausen, Richeson, & Galinsky, 2011). Perspective taking also allows people to anticipate and integrate others' interests and priorities with their own to produce higher quality and mutually beneficial decisions (Galinsky, Maddux, Gilin, & White, 2008; Galinsky, Magee, Rus, Rothman, & Todd, 2014).

The practices of inclusive multiculturalism and perspective taking also help catalyze the innovation and decision-making benefits of diversity. For example, organizational climates that value diversity increase information processing and exchange and thus produce better decisions (Homan, van Knippenberg, Van Kleef, & De Dreu, 2007). Similarly, when team members consider one another's perspectives, diverse teams are more creative (Hoever, Van Knippenberg, van Ginkel, & Barkema, 2012).

For communities and societies, inclusive multiculturalism and perspective taking can also enable constructive cross-cultural contact, which itself often (though not

always) reduces prejudice and conflict (Pettigrew & Tropp, 2006). Importantly, communities in which neighbors trust and help one another have lower levels of conflict and violence, especially in neighborhoods with greater diversity (e.g., a high concentration of immigrants; Sampson, Raudenbush, & Earls, 1997).

Policy Implications

Empirical evidence demonstrates that diversity creates and sustains economic growth, improves decision making, and produces new innovations; however, other research has identified barriers that limit current diversity levels and produce psychological resistance to efforts to increase diversity. Policies are therefore needed to promote the diversity present in groups, communities, and nations. To increase diversity, we recommend executive orders and taxation policies that incentivize organizations to diversify their employee and supplier base and that increase the number of H-1B visas (and ease the visa application process itself) for highly skilled foreign workers. To encourage the pursuit of diverse personal experiences, we recommend policies that create federal fellowships for study or internships abroad and that encourage foreign work experiences by reducing taxation rates for U.S. citizens working abroad. To overcome organizational barriers that limit diversity, we recommend employment policies that encourage accountability and transparency in recruitment, selection, and promotion procedures. Finally, to minimize resistance to, and detrimental conflict that can emerge from, increased diversity, we propose that all policies be inclusive of both minority and majority group members. Our full list of policy recommendations appears in Table 1.

The U.S. government can have a tremendous impact because it is the largest employer in the world (Alexander, 2012). The policies it sets for its own employees directly affect millions of people and establish a model for other institutions to follow. Both federal and state governments can also influence organizational practices in private companies when those companies seek contracts with government agencies or when state/city governments offer incentives to recruit new businesses. Of course, legislation will only be effective insofar as it offers incentives and regulatory resources as part of a comprehensive, systematic approach to increasing and managing diversity.

The United States is both an economic leader and one of the most diverse countries in the world. We hope that these policies will push the United States further down these two interconnected paths with greater economic growth and civic engagement for all.

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The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

Notes

1. Non-Whites are severely underrepresented in study abroad programs and foreign-service assignments and thus frequently miss out on these experiences (DePilis, 2013; PBS, 2014; Tensley, 2015). It is important that all U.S. citizens have opportunities to acquire these diverse experiences.
2. In 2014, President Obama signed two additional executive orders (13665 and 11246 amended) designed to increase pay transparency among federal contractors, who comprise nearly one quarter of the U.S. workforce. In 2015, the Federal Housing Finance Agency required that the Federal Home Loan Banks and the Office of Finance include demographic information on their boards of directors and outreach activities in their annual report.

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Leveraging Psychological Insights to Encourage the Responsible Use of Consumer Debt

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Abstract

U.S. consumers currently hold \$880 billion in revolving debt, with a mean household credit card balance of approximately \$6,000. Although economic factors play a role in this societal issue, it is clear that psychological forces also affect consumers' decisions to take on and maintain unmanageable debt balances. We examine three psychological barriers to the responsible use of credit and debt. We discuss the tendency for consumers to (a) make erroneous predictions about future spending habits, (b) rely too heavily on values presented on billing statements, and (c) categorize debt and saving into separate mental accounts. To overcome these obstacles, we urge policymakers to implement methods that facilitate better budgeting of future expenses, modify existing credit card statement disclosures, and allow consumers to easily apply government transfers (such as tax credits) to debt repayment. In doing so, we highlight minimal and inexpensive ways to remedy the debt problem.

Keywords

consumer debt, behavioral economics, psychological interventions, public policy, judgment and decision making

U.S. consumers currently hold \$880 billion in revolving debt, with a mean credit card balance of nearly \$6,000 (Board of Governors of the Federal Reserve System, 2014a, 2014b). The typically high interest rates on such debt can impede productive consumer spending and investment, such as homeownership. Many intractable factors, both economic (e.g., high interest rates and low wages; Zafar, Livingston, & VanDerKlaauw, 2014) and psychological in nature (e.g., scarcity; Shah, Mullainathan, & Shafir, 2012) undoubtedly contribute to this problem. However, a variety of psychological forces that are amenable to intervention also affect consumers' decisions to take on debt. Specifically, people make erroneous predictions about future spending habits, rely too heavily on values presented on billing statements, and categorize debt and saving into separate mental accounts. The presence of these context-based psychological barriers suggests that policies designed to counter them may help ameliorate the problem.

Although there are many types of debt, we focus on revolving debt (e.g., credit cards). Given that the evidence for the success of financial education is mixed (e.g., Fernandes, Lynch, & Netemeyer, 2014), we propose

interventions that are psychological rather than pedagogical in nature. (See Table 1 for a summary of these interventions as well as the barriers they are meant to overcome.)

Incorporating the Future

People have difficulties thinking about the future: They view their distant selves as strangers (Bryan & Hershfield, 2012) and fail to consider their changing tastes over time (Loewenstein, O'Donoghue, & Rabin, 2003). It is perhaps unsurprising, then, that consumers often act in ways that prioritize the present (e.g., overspend today) and leave negative consequences for the future (e.g., large debt burdens). Recent research suggests some factors that make it difficult to escape this debt cycle: People underpredict their future expenses (Peetz & Buehler, 2009, 2012) and overspend on unusual items that are often

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Table 1. Psychological Barriers Undermining Successful Financial Outcomes and Suggestions for Overcoming Them

Problem	Solution	Example policy recommendation
Mispredicting future income and spending	Highlight recurring nature of one-time events for consumers	<ul style="list-style-type: none"> • Match government transfers with budgeting tools (e.g., Mint.com) that explicitly incorporate exceptional expenses • Split tax refunds into 12 separate payments
Relying too heavily on suggested payment amounts contained in credit card statements	Modify anchors presented to credit card customers	<ul style="list-style-type: none"> • Remove 3-year payoff amount for consumers who regularly pay more • Increase 3-year payoff amount (e.g., to a 2-year payoff amount) for consumers who regularly pay that amount or less
Separating saving and debt into separate mental accounts, and prioritizing saving over debt repayment	Put debt repayment on an even playing field with building savings	<ul style="list-style-type: none"> • Provide tax credits for debt repayment • Allow existing government transfers to be applied to debt repayment

considered in isolation (Sussman & Alter, 2012). The latter is especially problematic given the large costs associated with these exceptional purchases over time. The inverse is also true: People have the tendency to overspend when they receive income that can be considered exceptional (e.g., a tax refund; Arkes et al., 1994), neglecting to realize that such frivolous spending year after year can have a significant negative effect on their overall wealth. Interventions that help people accurately understand future expenses and income may thus minimize current spending and future debt.

Given that hundreds of billions of dollars flow from the government to households annually, such transfers may be an ideal setting for policymakers to implement interventions that help people meet budgeting goals. These interventions should help consumers plan for the future by incorporating exceptional expenses into budgeting tools and spreading spending across time.

Our first policy recommendation is to match behaviorally informed budgeting tools with the receipt of government transfers. First, government should follow the lead of major financial institutions in using text messages to alert benefit recipients when the account balance associated with a transfer is low or that an unusually large transaction has been made. Second, cash transfers such as Social Security could be paired with a free app that allows individuals to monitor their spending. Most important, we suggest that any such budgeting tool (e.g., Mint.com) should include a budget category for expenses that are considered out of the ordinary. Doing so could promote accurate budgeting for a class of expenses that may be difficult to predict in isolation and even reduce spending on exceptional items (Sussman & Alter, 2012).

A second intervention would target the largest lump sum payment most American households receive each year: the tax refund. People are faster to spend windfall gains than ordinary income (Arkes et al., 1994) and are more likely to treat a single large annual payment as a

windfall than several smaller repeated payments. Rather than delivering tax refunds in a lump sum, we recommend breaking up payments into multiple streams—for example, as 12 prepaid credit cards.¹ Even if all 12 prepaid cards were delivered at the same time, dividing the payment into 12 units could imply that the refund should not be spent at once, but rather over the course of a year (Soman & Cheema, 2011). Further, because consumers save more when a tax refund is framed as a return to the status quo (i.e., “rebate”) rather than a sudden influx of money (i.e., “bonus”; Epley & Gneezy, 2007), the cards could be marketed as “rebate cards” in an effort to encourage saving.

Improving Credit Card Statements

Recent legislation has tried to aid consumers by providing them with more information on their credit card statements. Namely, the CARD Act of 2009 dictated that credit card statements include payment warnings detailing not only how long it would take to pay off the balance if only the minimum payment were made, but also the suggested payoff amount that would result in the credit card balance being paid off over a period of 3 years. By one estimate, the CARD Act saved consumers approximately \$11.9 billion per year (Agarwal, Chomsisengphet, Mahoney, & Stroebel, 2014).

However, this additional information has the potential to influence repayment in unanticipated ways (e.g., through anchoring processes; Stewart, 2009). Indeed, aspects of the CARD Act can potentially lead customers astray: People unduly gravitate toward paying the 3-year amount rather than the minimum or the full balance (Agarwal et al., 2014), because they view this 3-year amount as a strong suggestion for what they should pay (Hershfield & Roese, 2015). This legislation helped consumers who were previously paying less than the 3-year amount but caused a reduction in the fraction of account

balances that were previously paid in full (Wang & Keys, 2014). As a result, we recommend that policymakers instruct credit card companies to remove the 3-year payment warnings for consumers who regularly pay more than the 3-year amount and increase the warning amount (e.g., state a 2-year payment warning) for those who regularly pay less.

Encouraging Debt Repayment

Prior research has demonstrated that people often create categories for money (i.e., mental accounts) and that this categorization constrains its use (e.g., reserving \$1 in your right pocket for certain purchases and \$1 in your left pocket for others; Thaler, 1985, 1990). This process can cause people to treat savings and debt as distinct financial categories rather than to integrate them into overall wealth (Sussman & Shafir, 2012). In some cases, this categorization can lead consumers to misguidedly take on high-interest rate debt, while simultaneously holding money in low-interest bearing savings accounts (Gross & Souleles, 2002; Sussman & O'Brien, 2014). Existing government infrastructure focused on building savings often reinforces this artificial separation. Policymakers could encourage wealth maximization by broadening the scope to include debt repayment. We envision at least two ways to achieve this goal.

First, current tax policy actively subsidizes saving behavior (e.g., through a tax-deferred saving platform). These policies communicate the problematic idea that when it comes to saving money versus paying off debt, saving is always the right thing to do (i.e., an injunctive norm; e.g., Cialdini, 2003). But, many of the credits designed to promote saving could easily be expanded to provide similar tax benefits for paying down debt and could specifically target high interest consumer debt. Such policies might not only help make debt repayment as salient as saving money for the future, they could also neutralize the existing norm.

Second, small tweaks to the tax filing process could enable consumers to remit a portion of their tax refund to repay debt directly, just as U.S. consumers are now able to split their refund among multiple savings vehicles. More broadly, the recent transition to electronic systems for making government payments (e.g., direct deposit) provides an opportunity to implement scalable behavioral interventions to reduce debt and improve financial well-being. Consumers currently control where these funds are deposited (e.g., a bank account), but they do not have the option of an automatic payment to a debt account. This structure encourages consumers to preserve the mental segregation of asset and debt accounts and makes them less likely to direct the money toward debt repayment once it has been received. We thus

recommend that consumers be given an option to deposit government funds directly toward credit card accounts. Doing so could help consumers by opening the “channel factor”—making debt repayment easier by eliminating the seemingly trivial but meaningful barriers that make behavior more difficult (Lewin, 1951).

Summary of Policy Implications

People have a tendency to underpredict future expenses, rely too heavily on values presented on billing statements, and fail to take into account overall wealth by categorizing debt and saving into separate mental accounts. Drawing on insights from recent psychological research, we make five key policy recommendations to overcome these obstacles: (a) pair government transfers with budgeting tools that remind consumers when they are overspending relative to their own guidelines and explicitly incorporate exceptional expenses, (b) split tax refunds into separate payments, (c) revise suggested alternative payment warnings on credit card statements, (d) provide tax credits for debt repayment, and (e) allow consumers to apply government funds directly toward debt repayment. It is our hope that these suggestions will go a long way toward encouraging the responsible use of consumer debt.

Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

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Note

1. If tax refunds were directly deposited into consumers' bank accounts, an alternative would be to implement an opt-out system in which consumers receive their tax refund via monthly direct deposits, rather than a single installment.

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Improving Intelligence Analysis With Decision Science

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Abstract

Intelligence analysis plays a vital role in policy decision making. Key functions of intelligence analysis include accurately forecasting significant events, appropriately characterizing the uncertainties inherent in such forecasts, and effectively communicating those probabilistic forecasts to stakeholders. We review decision research on probabilistic forecasting and uncertainty communication, drawing attention to findings that could be used to reform intelligence processes and contribute to more effective intelligence oversight. We recommend that the intelligence community (IC) regularly and quantitatively monitor its forecasting accuracy to better understand how well it is achieving its functions. We also recommend that the IC use decision science to improve these functions (namely, forecasting and communication of intelligence estimates made under conditions of uncertainty). In the case of forecasting, decision research offers suggestions for improvement that involve interventions on data (e.g., transforming forecasts to debias them) and behavior (e.g., via selection, training, and effective team structuring). In the case of uncertainty communication, the literature suggests that current intelligence procedures, which emphasize the use of verbal probabilities, are ineffective. The IC should, therefore, leverage research that points to ways in which verbal probability use may be improved as well as exploring the use of numerical probabilities wherever feasible.

Keywords

intelligence analysis, decision science, forecasting, uncertainty

Intelligence analysis involves searching for, selecting, processing, and interpreting data in order to gain an awareness of current situations and forecast potentially important future developments in areas of interest to decision-making stakeholders. Although intelligence analysis is not a branch of science, it bears some important similarities. As in science, it involves generating and testing hypotheses and accurately characterizing the degrees of uncertainty in both the evidence and conclusions reached. Although there are standard processes by which the intelligence community (IC) directs analysis and collects, processes, and disseminates intelligence (e.g., Department of Defense, 2013), these tend not to be based on scientific methods, theories, or past research findings (see National Research Council, 2011; Pool, 2010). In this article, we identify two relevant bodies of literature in the field of decision science that can be used to inform the IC's policies and practices for intelligence analysis and the dissemination of analytic products. The

first research area examines methods for assessing and improving forecasting accuracy, whereas the second examines communication of uncertainty using verbal and numerical probabilities. In practice, these two areas are closely related because intelligence forecasts must be accurately qualified by degrees of uncertainty, and those probabilistic forecasts must in turn be communicated with high fidelity to decision makers.

Decision Research on Forecasting Accuracy

The IC instructs analysts to be accurate (e.g., Office of the Director of National Intelligence, 2015). However, the

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IC does not routinely and quantitatively track predictive accuracy to verify that its forecasts are accurate. There are at least three good reasons the IC should proactively track accuracy: First, forecast accuracy is an empirical issue, and without proper quantitative tracking, one cannot know how good accuracy is or whether improvement is possible. Moreover, various methods for scoring aspects of forecasting skill are readily available (e.g., Swets, 1986; Yaniv, Yates, & Smith, 1991) and can also be applied to rank-ordered data, such as where a verbal probability scale is used to characterize uncertainty (Liberman & Tversky, 1993). Second, political experts have been shown to be overconfident in their forecasts of geopolitical events, and they are easily outperformed by all but the most basic statistical models (Tetlock, 2005). In fact, overconfidence in judgment has been documented in other areas of expert judgment, such as medical diagnosis (e.g., Dawson et al., 1993) and legal judgments (Goodman-Delahunty, Granhag, Hartwig, & Loftus, 2010). Third, the few studies that have examined the forecast accuracy of actual intelligence forecasts made by analysts have yielded mixed results. The most comprehensive study to date found very good performance among strategic intelligence analysts that used numerical probabilities (Mandel & Barnes, 2014) as well as among those who used verbal probabilities to communicate uncertainty (Mandel, Barnes, & Richards, 2014). However, substantially weaker performance in forecasts qualified by verbal probabilities was found in another study with fewer forecasts (Lehner, Michelson, Adelman, & Goodman, 2012).

In addition to assessing forecast accuracy, decision science could help the IC improve its forecast accuracy. Recent psychological research on forecasting has examined statistical interventions that substantially improve the accuracy of probabilistic predictions. These include aggregation algorithms that show an improvement over unweighted linear opinion pools by giving more weight to forecasters who exhibit greater coherence in their judgments of related topics (Karvetski, Olson, Mandel, & Twardy, 2013) or have better track records (Satopaa, Jensen, Mellers, Tetlock, & Ungar, 2014). Likewise, transformation rules that improve calibration, an important facet of forecasting skill, have been recently documented (Baron, Mellers, Tetlock, Stone, & Ungar, 2014), and they have also been used with intelligence forecasts (Mandel & Barnes, 2014).

Other forecasting research has examined behavioral interventions that improve accuracy. For instance, probabilistic judgments are more accurate with training in probabilistic reasoning, cautionary tales about errors and biases (e.g., overconfidence and confirmation biases), and practical advice for making predictions, such as considering multiple reference classes (Mellers et al., 2014). Likewise, visual representations of nested sets in the form of natural frequencies are effective for improving analysts' probability

judgments (Mandel, 2015). Other research has shown that individual-difference testing can be used to identify attributes of better forecasters, such as actively open-minded thinking, knowledge of task-specific skills, and numeracy (Karvetski et al., 2013; Mellers, Stone, Atanasov, et al., 2015). Forecasting can also be improved by using well-coordinated teamwork that allows forecasters to share information, debate rationales, and motivate each other to perform well (Mellers et al., 2014). Finally, assignment of the best forecasters into so-called "superteams," allowing elite performers to interact online with each other, yields additional improvements to forecasting accuracy (Mellers, Stone, Murray, et al., 2015; Tetlock & Gardner, 2015).

Decision Research on Communicating Uncertainty

As noted earlier, analysts work under conditions of uncertainty and are expected to accurately characterize uncertainties regarding their conclusions. Because their judgments are intended for decision makers, they have to both characterize the uncertainties and express them clearly to end users. Uncertainty in intelligence assessments is typically communicated using verbal probabilities. For instance, the National Intelligence Estimate on weapons of mass destruction in Iraq stated, "if left unchecked, it [Iraq] *probably will* have a nuclear weapon during this decade" (Friedman & Zeckhauser, 2012, p. 829, italics added). An important question is whether decision makers interpret the meaning of such statements in the same way as it was intended by the intelligence organization producing the assessment.

Decision research clarifies several points about the use of verbal probabilities pertinent to that question, which policymakers should consider. First, people receiving communications about uncertain estimates prefer them to be expressed numerically even though communicators prefer to use words to convey uncertainty (Brun & Teigen, 1988; Murphy, Lichtenstein, Fischhoff, & Winkler, 1980; Wallsten, Budescu, Zwick, & Kemp, 1993). Second, because of the vagueness of verbal probabilities, most terms have a wide range of permissible meanings when scaled on the 0–1 interval (Dhimi & Wallsten, 2005; Karelitz & Budescu, 2004). Third, and more problematic, individuals vary greatly in the ranges and best estimates they assign to probability terms (Budescu, Weinberg, & Wallsten, 1988; Dhimi & Wallsten, 2005). Finally, people's interpretations of verbal probabilities are affected by several contextual factors, such as whether the event whose uncertainty is being characterized has a low or high base rate (for review, see Wallsten & Budescu, 1995).

Decision research also sheds light on how uncertainty communication might be improved. For instance, given the vagueness inherent in verbal probabilities, methods have

been developed for translating verbal expressions in a communicator's lexicon to equivalently ranked expressions in a listener's lexicon (Dhami & Wallsten, 2005; Karelitz & Budescu, 2004). Another approach is to establish a standardized lexicon of verbal probabilities, and indeed, many intelligence organizations have done so (e.g., Barnes, 2015; Dhami, 2013). Behavioral research methods have been used to develop standardized lexicons that people are more likely to use (Ho, Budescu, Dhami, & Mandel, in press). Communication might also be improved through presentational methods. For instance, when people are given a lexicon equating verbal probabilities with numerical ranges, they often lose track of the equivalents (Budescu, Por, Broomell, & Smithson, 2014). However, consistency with the lexicon can be substantially improved by providing the numerical range equivalents each time a probability term is used in a statement.

Policy Implications

Forecast accuracy

Our recommendations for improving forecast accuracy within the IC are two-pronged (see Table 1). First, the IC should take immediate steps to monitor its forecast accuracy. This would require intelligence organizations to collect probabilistic forecasts, outcomes (i.e., did the forecasted event occur or not?), and putative moderators

of forecasting skill (e.g., analyst experience, forecast time-frame, forecast difficulty). These data would enable the IC to quantitatively score analytic forecasts so that key aspects of forecasting skill, such as calibration and discrimination, could be tracked over time, agencies, and other key variables, some of which might prove to be important moderators of forecasting skill.

Secondly, we recommend that the IC leverage decision research, theory, and methods to improve its forecasting abilities. We outlined several recent developments that could be clustered into two routes of improvement. The first focuses on methods for improving forecast quality through interventions on data sources (including raw forecasts), whereas the second focuses on doing so through behavioral interventions (e.g., through selection, training, and team structuring). We also advise the IC to work with behavioral scientists to devise fair tests of the effectiveness of these methods as implemented. This is an important step that is sorely lacking in the IC's application of structured analytic techniques to promote analytic rigor (Pool, 2010).

Communication of uncertainty

We recommend two courses of action for improving the communication of uncertainty (see Table 1). The first, as we noted earlier, focuses on exploiting means of improving

Table 1. Summary of Challenge Areas, Proposed Solutions, and Policy Recommendations

Challenge areas	Proposed solutions	Policy recommendations
	Forecasting accuracy	
The IC currently does not regularly monitor its forecasting accuracy.	Use quantitative methods for scoring forecasting skill. Code a wide range of variables to discover drivers of forecasting skill.	The IC should implement a monitoring system whereby forecasts are routinely logged and the outcomes of forecasted events are recorded.
Forecasting in the IC is largely based on unaided expert judgment, which is often suboptimal.	Use decision science showing how forecasting skill may be improved through data and behavioral interventions.	<i>Data example:</i> The IC could use transformations to debias forecasts (e.g., correct over- or under-confidence) <i>Behavioral example:</i> The IC could select analysts on the basis of individual differences that predict forecast accuracy. They could form "superteams."
	Uncertainty communication	
The IC mainly uses verbal probabilities to communicate uncertainty, yet verbal probabilities are notoriously vague. Such terms tend to vary in meaning across individuals.	Verify communication effectiveness through research on existing methods and use decision research to improve verbal probability use. Use numerical probabilities in place of verbal probabilities wherever feasible.	<i>Example 1:</i> Use methods that translate analysts' terms into ones that have equivalent meaning for decision makers. <i>Example 2:</i> Remind decision makers of numerical interpretations of verbal terms in the text of an analytic report. Adopt numerical probabilities in contexts where precision matters, such as forecasting.

communication using verbal probabilities, such as using translation methods or presentational methods that at least remind users of what the vague terms are supposed to mean. The IC should also monitor inconsistencies among standards promulgated in different organizations and take steps to eliminate discrepancies that might proliferate rather than mitigate confusion.

The second course of action we recommend is to use numerical probabilities in place of verbal probabilities wherever feasible. To the extent that communications about uncertainty, risk, and probability are intended to be as accurate as possible, the scientific literature reviewed earlier makes a clear case for the use of numerical probabilities. Numerical probabilities can be precise (e.g., 87.5% chance) or imprecise (e.g., 75% chance of rain, plus or minus 10%). However, even when such probabilities express imprecision, they are not vague.

Conclusion

The IC should adopt an evidence-based approach to monitoring and improving its performance. Such an approach would address the aforementioned key challenges and also strengthen the IC's accountability processes, enabling it to better protect itself from the adverse consequences of blame games that ensue following significant errors (Tetlock & Mellers, 2011). Decision science is well positioned to assist the IC because of its quantitative methods for measurement and testing cognition and behavior, its theoretical models of human judgment and decision making, and its history of dealing with applied problems. The IC should capitalize on it.

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Improving Public Engagement With Climate Change: Five “Best Practice” Insights From Psychological Science

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Abstract

Despite being one of the most important societal challenges of the 21st century, public engagement with climate change currently remains low in the United States. Mounting evidence from across the behavioral sciences has found that most people regard climate change as a nonurgent and psychologically distant risk—spatially, temporally, and socially—which has led to deferred public decision making about mitigation and adaptation responses. In this article, we advance five simple but important “best practice” insights from psychological science that can help governments improve public policymaking about climate change. Particularly, instead of a future, distant, global, nonpersonal, and analytical risk that is often framed as an overt loss for society, we argue that policymakers should (a) emphasize climate change as a present, local, and personal risk; (b) facilitate more affective and experiential engagement; (c) leverage relevant social group norms; (d) frame policy solutions in terms of what can be gained from immediate action; and (e) appeal to intrinsically valued long-term environmental goals and outcomes. With practical examples we illustrate how these key psychological principles can be applied to support societal engagement and climate change policymaking.

Keywords

climate change, public engagement, behavioral policy

In 2013, President Barack Obama issued an executive order titled “Preparing the United States for the Impacts of Climate Change,” which requires federal agencies to begin preparing for one of the most serious challenges facing our planet and its inhabitants: global climate change. Although this initiative is important to adequately limit and prepare for climate change, significant further actions are needed at the federal, state, and local government level, as well as in industry, civic organizations, and individual households. Yet, a persistent lack of public engagement with the issue poses serious challenges to accomplishing these actions (Gifford, 2011; Leiserowitz, 2006; Weber & Stern, 2011). In fact, most Americans continue to view climate change as a nonurgent issue and consistently rank it well below the economy, terrorism, health care, and a myriad of other issues (Pew Research Center, 2014). This lack of engagement has led to much deferred public decision making about enacting effective adaptation and mitigation policies.

Thus far, climate change policymaking has primarily revolved around technological solutions or standard economic models (e.g., market and incentive-based mechanisms). As Shafir (2012) notes, “it is remarkable how small a role the attempt to understand human behavior has played in policy circles” (p. 2). This is surprising because *psychological science* has important insights to offer policymakers in managing climate change, especially because human behavior and decision making are at the very core of the climate change problem (Gifford, 2011). Indeed, the field of psychology is in a unique position to offer a theoretically and empirically based understanding of human behavior at the individual level (Swim et al., 2011). Accordingly, in this article, we draw on extensive research

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from psychology to formulate five simple but important guidelines for improving public policy and decision making about climate change (Table 1).

1. The Human Brain Privileges Experience Over Analysis

Because climate change can only be studied in statistical terms (e.g., by analyzing long-term changes in temperature and precipitation patterns), the issue is generally communicated and presented in relatively abstract, descriptive, and analytical formats. This approach, however, relies on the assumption that people process uncertain (climate) information in a logical and analytical manner (Marx et al., 2007). Yet, decades of research in social, cognitive, and clinical psychology has shown that the human brain relies on two qualitatively different processing systems (Chaiken & Trope, 1999; Evans, 2008; Slovic, 1996).

The first system (i.e., System 1) is often described as intuitive, experiential, automatic, affective (emotional), and fast. System 2, on the other hand, is deliberate, analytical, effortful, rational, and slow (Kahneman, 2012). In practice, these two systems continually interact and operate in parallel to guide human judgment and decision making (LeDoux, 1989). Yet, when they diverge, System 1 often exerts a greater influence in guiding human decision making (Loewenstein, Weber, Hsee, & Welch, 2001). For example, research has consistently shown negative affect to be one of the strongest drivers of climate change risk perceptions and policy support (Leiserowitz, 2006; van der Linden, 2014a). In short, how we feel about a given situation often has a potent influence on our decisions about how to respond (Slovic & Peters, 2006).

Policy implications

Statistical descriptions of the risk of climate change often fail to elicit action because statistical information, by itself, means very little to (most) people. Experience, on the other hand, can be a powerful teacher. For example, although the odds of death or injury from a terrorist attack in the United States are very low, terrorism is ranked as a top national priority, whereas the reality of climate change is not. The difference lies in the fact that for terrorism, vivid, memorable experiences readily come to mind (e.g., 9/11, ISIS). The role of experience, however, has largely been ignored in climate policymaking (Marx et al., 2007), partly because climate change is a slow-moving, “invisible” process that cannot easily be experienced directly (Weber, 2006).

Yet, research has indicated that to some extent, people are able to accurately detect broad changes in local weather and temperature patterns (Akerlof, Maibach,

Fitzgerald, Ceden, & Neuman, 2013; Howe, Markowitz, Ming-Lee, Ko, & Leiserowitz, 2012) and that personal experiences with extreme weather events (e.g., hurricanes) can influence risk perceptions (van der Linden, 2014b), beliefs (Myers, Maibach, Roser-Renouf, Akerlof, & Leiserowitz, 2012), behavior (Spence, Poortinga, Butler, & Pidgeon, 2011), and policy support (Rudman, McLean, & Bunzl, 2013). Public policymakers should try to appeal to both the analytical and experiential processing system and expect that public support for action will require highlighting relevant personal experiences through recall, scenarios and powerful narratives and metaphors (Marx et al., 2007). In short, information about climate change risks needs to be translated into relatable and concrete personal experiences.

2. People Are Social Beings Who Respond to Group Norms

Because climate change is a global problem with global consequences, peoples' sense of *personal efficacy* (i.e., the belief that individual actions can make a difference) is often very low (Kerr & Kaufman-Gilliland, 1997). Indeed, the global nature of the climate change problem tends to make people feel powerless. Instead, it is often more effective to appeal to and leverage the social context in which people make decisions, particularly to help promote *collective efficacy* (i.e., the belief that group actions can make a difference; Roser-Renouf, Maibach, Leiserowitz, & Zhao, 2014). Humans evolved living in social groups, and it is through social comparison with referent others that people validate the correctness of their opinions and decisions (Festinger, 1954). In fact, imitating the behavior of the majority (i.e., following the norm) is a common heuristic in group-living species because it reduces the cost of individual learning. As Cialdini, Kallgren, and Reno (1990) put it, “if everyone is doing it, it must be a sensible thing to do” (p. 1015).

Psychologists generally distinguish between two separate sources of normative influence, namely; *descriptive* and *prescriptive* social norms (Deutsch & Gerard, 1955). Whereas prescriptive norms contain information on how people ought to behave, descriptive norms simply describe how others are behaving (Cialdini et al., 1990). When activated and aligned, social norms can serve as powerful sources of influence. For example, the more people hear social referents (e.g., family and friends) talk about the risk of climate change, and the more climate change is viewed within one's social network as a risk that requires action, the more it amplifies an individual's own risk perception and intention to act (Renn, 2010; van der Linden, 2014b). In short, social norms and contexts play an important role in human decision making.

Policy implications

Although social norms are an “underemployed” lever for managing climate change (Griskevicius, Cialdini, & Goldstein, 2008), to be leveraged, they must first be in place. For example, there is often a divergence between what people ought to do (e.g., evacuate before a hurricane) and what they perceive others doing (e.g., riding out the storm). Policymakers should therefore aim to define, activate, and leverage social group norms. Research has found, for instance, that highlighting descriptive norms such as the high degree of scientific agreement (97%) on human-caused climate change can lead to greater science acceptance and support for public action (Lewandowsky, Gignac, & Vaughan, 2013; van der Linden, Leiserowitz, Feinberg, & Maibach, 2015). Similarly, field experiments have demonstrated that when people are informed about the average energy consumption of their neighbors, they tend to adjust their own energy use to conform to the group norm (Nolan, Schultz, Cialdini, Goldstein, & Griskevicius, 2008; Schultz, Nolan, Cialdini, Goldstein, & Griskevicius, 2007). When energy-conservation norms are promoted and rewarded within a community, pro-environmental behavior change is more likely to be sustained.

3. Out of Sight, Out of Mind: The Nature of Psychological Distance

Discourse among scientists, the media, and policymakers has largely revolved around the future consequences of climate change over varying time scales (e.g., 50 to 150 years). Yet, this focus is problematic, as psychological research has shown that people tend to heavily discount (uncertain) future events when making trade-offs between cost and benefits that accrue at different points in time (i.e., intertemporal choices; Berns, Laibson, & Loewenstein, 2007). In fact, the discounting of future risk events is a pervasive feature of the way in which human psychology evolved; immediate day-to-day concerns take precedence over planning for the future (van Vugt, Griskevicius, & Schultz, 2014). One likely explanation for time discounting is that people psychologically construe representations of future events differently from those of present events (Trope & Liberman, 2010). As temporal distance increases, mental representations become less concrete and increasingly abstract. Accordingly, research has found that many people view climate change as a psychologically distant, future threat (Leiserowitz, 2005; Spence, Poortinga, & Pidgeon, 2012).

In addition to temporal discounting, people discount risks “spatially” as well. For example, research across 18 nations has found that many people systematically judge the risks of climate change to be much more likely

and more serious for other people and places than for themselves (Gifford et al., 2009; Leiserowitz, 2005; van der Linden, 2014b). This phenomenon can partly be explained by two psychological tendencies: (a) the *third-person effect*—the greater the distance between the “first” and the “third” person, the more impersonal the risk becomes (Tyler & Cook, 1984), and (b) *optimism bias* (Weinstein, 1980)—the tendency to believe that others are more likely to be affected by exactly the same risk.

Policy implications

People discount the risks of climate change in both temporal and spatial dimensions (i.e., it is more likely to happen in the future to other people in distant places). One way to reduce such psychological distancing is by highlighting the fact that climate change impacts are already happening. Public communication often emphasizes impersonal global impacts (e.g., sea level rise, average rising temperatures). Yet, policymakers should also emphasize local risks by highlighting the regional impacts of climate change for specific localities and communities (Leiserowitz, 2006). Research has shown that policy frames focusing on the regionally relevant impacts of climate change (and highlight local opportunities for reducing emissions) are often more effective than those that use distant global frames (e.g., Scannell & Gifford, 2013).

4. Framing the Big Picture: Nobody Likes Losing (but Everyone Likes Gaining)

Much of the media, scientific, and policy discourse around climate change has consistently invoked the idea of “losses.” For example, climate solutions are often framed as an immediate loss for society (e.g., higher taxes, reducing energy consumption). Yet, long-standing behavioral research has shown that people psychologically evaluate gains and losses in fundamentally different ways. For example, prospect theory (Kahneman & Tversky, 1979) demonstrates that people are more risk-seeking in loss domains than they are in gain domains. In particular, people are more reluctant to take action when losses are paired with uncertainty (Tversky & Shafir, 1992). In other words, when climate change impacts are framed as potential (i.e., uncertain) losses in the distant future, whereas climate change solutions are framed as certain losses for society at present, it encourages people to conclude that maintaining the status quo may be “worth the gamble.”

Policy implications

These psychological insights suggest that shifting the policy conversation from the potentially negative

future consequences of not acting (losses) on climate change to the positive benefits (gains) of immediate action is likely to increase public support. In fact, in comparison with negative loss scenarios, positive gain frames have shown to increase pro-environmental attitudes and support for mitigation and adaptation policies (Hurlstone, Lewandowsky, Newell, & Sewell, 2014; Spence & Pidgeon, 2010).

5. Playing the Long Game: Tapping the Potential of Human Motivation

Psychologists generally distinguish between two separate sources of motivation: extrinsic and intrinsic. Whereas the former mainly relies on external incentives to produce motivation to change (e.g., monetary incentives), the latter draws on personal and internal processes. In contrast to the predominant assumption among many policymakers that people are inherently (or rationally) motivated by money (Miller, 1999), a large body of psychological research has illustrated that this is not necessarily the case—many people intrinsically care about the well-being of others and the environment (Stern, Dietz, Abel, Guagnano, & Kalof, 1999). Accordingly, recent experiments have shown that appealing to people's intrinsic motivational needs can be a more effective and long-lasting driver of pro-environmental behavior (Bolderdijk, Steg, Geller, Lehman, & Postmes, 2013; van der Linden, 2015). There are two main reasons for this. First, in comparison, extrinsic incentives only tend to work for as long as they can be maintained. Second, external rewards can actually undermine (i.e., “crowd

out”) people's intrinsic motivation to change (Deci, Koestner, & Ryan, 1999).

Policy implications

Policies that only consider short-term extrinsic incentives (e.g., promoting energy conservation to save money) are less likely to be successful because they are not tied to achieving intrinsically valued long-term environmental goals. Ideally, extrinsic policy incentives should be provided in tandem with intrinsic appeals. Because climate change is a long-term global environmental problem, viable adaptation and mitigation solutions will require leveraging stable long-term drivers of pro-environmental behavior and policy support (van der Linden, 2015).

Conclusion

This memo describes five “best practice” insights from psychological science to help improve public decision making about climate change. We argue that climate change has traditionally been framed as an analytical, temporally and spatially distant risk that represents an (uncertain) future loss for society. Yet, psychological research suggests that in order to improve public engagement with the issue, policymakers should emphasize climate change as an experiential, local and present risk; define and leverage relevant social group norms; highlight the tangible gains associated with immediate action; and last, but certainly not least, appeal to long-term motivators of pro-environmental behavior and decision making.

Table 1. Overview of Key Psychological Lessons and Policy Advice

Psychological lesson	Policy guideline	Example policy recommendation
1. The human brain privileges experience over analysis	Highlight relevant personal experiences through affective recall, stories, and metaphors.	The National Park Service (NPS) gives concrete examples of how climate change has already harmed natural resources in specific parks.
2. People are social beings who respond to group norms	Activate and leverage relevant social group norms to promote and increase collective action.	Government climate science agencies could improve efforts to highlight descriptive norms (e.g., the scientific consensus on human-caused climate change).
3. Out of sight, out of mind: reduce psychological distance	Emphasize the present and make climate change impacts and solutions locally relevant.	NASA and The National Oceanic and Atmospheric Administration (NOAA) are supporting efforts to enable TV meteorologists to educate their viewers about current local climate change impacts.
4. Nobody likes losing but everyone likes gaining	Frame policy solutions in terms of what can be gained (not in terms of what is lost).	The Environmental Protection Agency's (EPA) “Clean Power Plan” focuses on cleaning up the nation's fuel supply, which will help clean up the nation's air and water, providing direct health benefits to all Americans.
5. Tapping the potential of human motivation	Leverage intrinsic motivation to support long-term environmental goals.	The President, Congress, and all federal agencies should be openly aspirational in designing climate policy initiatives that tap into citizens' deeply held motivations for building a better tomorrow.

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On Interesting Policymakers

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If a nation created a Council of Psychological Science Advisers, what would it do? The closest analogy in the United States, of course, is the Council of Economic Advisers (CEA), whose advice often matters a great deal. The reason is not typically that the CEA offers interesting or novel academic findings. It is that public officials want to solve concrete policy problems, and the CEA (and other economists, found throughout the national government) can help them to do so.

Suppose that the President of the United States wants his advisors to decide whether to adopt a “cash for clunkers” program, by which the government provides money to subsidize people who trade in their old vehicles for new ones. If the President seeks to stimulate the economy, and also to produce environmental improvements, economists will provide indispensable guidance (above all by projecting the results of the program with a useful cost–benefit analysis). Or suppose that the President wants the Department of Energy to issue a new energy efficiency regulation for household appliances and directs the Department to choose a level of stringency that will maximize net benefits. Again, economists are in the best position to help the Department to succeed in that task by offering an analysis of possible tradeoffs. As stringency increases, the costs will eventually come to exceed the benefits—but at what point? In many ways, economists are like lawyers, who also have specialized knowledge to which public officials need access in order to do their jobs well.

Background, From the Trenches

From 2009 to 2012, I was privileged to work as Administrator of the Office of Information and Regulatory Affairs, which oversees federal regulation. The Office has no psychologists on its staff (I am a lawyer), but within the Executive Office of the President, there was, and continues to be, a great deal of interest in the behavioral sciences and particularly behavioral economics (see Sunstein, 2013). Two of the Administration’s highest priorities have been reform of the health care and financial sectors, and the resulting laws show a strong influence from the behavioral sciences, including psychology, with

particular emphasis on default rules, simplification, and disclosure policies (Sunstein, 2013).

Credit card and tobacco regulation have also been high priorities, and here as well, behavioral science has played a substantial role. First Lady Michelle Obama’s efforts to control childhood obesity have greatly benefited from an understanding of human psychology (see White House Task Force on Childhood Obesity, 2010). With respect to climate change, efforts to reduce greenhouse gas emissions have included new fuel economy labels and aggressive fuel economy standards, and psychological work on myopia (focusing on the short-term), salience, and loss aversion has informed regulatory decisions. For example, an understanding of how and when people neglect the long-term informed the cost–benefit analysis of fuel economy rules.

Recent efforts to encourage savings have been influenced by psychological findings demonstrating the large (and beneficial) impact of automatic enrollment in pension plans (Gale, Iwry, John, & Walker, 2009). With automatic enrollment, participation is much higher. Drawing explicitly on those findings, the Federal Reserve Board has banned automatic enrollment in costly “overdraft protection” programs. The Food and Drug Administration’s final rule on calorie labels and its proposed reforms of the “nutrition facts” panel (United States Food and Drug Administration, 2014, p. 6) referred to psychological research on how people process information. While in office, I issued a guidance document that was binding on (meaning, it has the force of law for) executive agencies, which enlists behavioral science in a discussion of simplification and disclosure policies (Sunstein, 2011). And there are a great deal more examples of the influence of behavioral science—this is merely the tip of the iceberg (Sunstein, 2013). In 2015, President Obama formally created a Social and Behavioral Sciences Team dedicated to using psychology and behavioral economics to inform national decisions; this is a major step.

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I offer this brief overview to provide a sense of when psychological research has proved helpful to the work of the national government. Importantly, that work is driven by problems, not theories; there is a large difference between the role of the public official and the role of an academic researcher. For the former, creativity and originality are not important—what matters is what helps. If the problem is a growth in childhood obesity, low participation rates for important federal programs, or persistent unemployment, the question is straightforward: What solutions are available? Many of the best answers are too mundane for those pursuing an academic career, but officials want something that is “actionable.” For the researcher, by contrast, a novel or fascinating insight or finding or some kind of disruption to received wisdom might be a valuable contribution to knowledge, even if it is not something that would interest a public official even a little.

Current Papers

Most of the best policy suggestions are simple and clear and suitable for actual implementation, preferably in the short-term. For the public official, the idea of automatic enrollment in pension plans is a model of a policy reform, based on psychological research, that can actually work and that national officials can promote or encourage. Changing the default setting on printers from single-sided to double-sided and switching from “miles per gallon” labels to “annual dollars saved” labels belong in the same category. By contrast, research on how doctors can give better guidance to their patients and on how people can break self-destructive habits have far less relevance to national policy (not none—just less).

Importantly, policy suggestions should also pass cost-benefit analysis. A psychologically informed recommendation might have significant benefits, but if the costs would also be very high, it might not be worth the government's effort. Within the policy realm, it is also important to appreciate the term *heavy lift*, which refers to policies whose adoption would face serious obstacles (political or otherwise).

We might consider the many excellent essays in this issue in this light. They can be sorted into two groups: those that offer immediately actionable advice, potentially suitable for use by those who work for the federal government, and those that provide valuable suggestions that are less immediately actionable for such use. The most helpful advice typically falls in the former category, especially if it would not involve a heavy lift—but if psychologists could provide advice that would help on the very largest problems (terrorism, poverty, economic growth, climate change), then a heavy lift would be worth the trouble.

Let us begin with what seem to me to be the articles that fall within the first category. Hershfield, Sussman, O'Brien, and Bryan (2015, this issue) are focused on the problem of consumer debt, and they provide concrete recommendations, including provision of tax credits for debt repayment, and allowing consumers to apply government funds directly toward such repayment. They also argue for changes in existing credit card statements that would nudge people toward reduced debt. Their recommendations appear to follow directly from the psychological findings that they describe. Although a full accounting of costs and benefits is required, those recommendations belong on the federal policymakers' viewscreen.

Steinberg (2015, this issue) tells us a great deal about adolescent risk-taking, and at least some of his advice (“Expand funding for condom availability programs in secondary schools” and “Set the federal minimum legal purchasing age for all tobacco products at 21”) is directed squarely at federal officials and would plausibly have high benefits. Unfortunately, some of that advice would be a quite heavy lift—perhaps too heavy to bear. For example, federal legislation would be necessary to change the federal purchasing age for tobacco products, and it is not clear that the votes are there (though you never know). Dhami, Mandel, Mellers, and Tetlock (2015, this issue) are also focused on a problem that greatly concerns policymakers: how to improve intelligence analysis. Their emphasis on assessing and improving the accuracy of forecasts should certainly be welcome, though it would be valuable to think more concretely about how much their particular recommendations would add. (How much would things change if analysts were instructed to “use numerical probabilities in place of verbal probabilities wherever feasible”?)

Mann, Tomiyama, and Ward (2015, this issue) offer concrete guidance to the many policymakers concerned about the obesity problem. Among other things, they point to three specific policies: regulating cafeteria design to visually highlight vegetables, mandating serving vegetables in schools before other food is present, and restricting sales of large sizes of sugar-sweetened drinks. If the evidence supports these policies (as Mann et al. urge), then they have done a considerable service. Note, however, that national officials lack the authority to regulate cafeteria design, and with respect to mandates, there is serious political resistance (partly on the grounds of federalism and sheer cost), thus raising the specter of the heavy lift.

Barnes and Drake (2015, this issue) believe that the United States faces a “sleep crisis.” That crisis is not much on the viewscreens of high-level government officials (perhaps because they are not nearly getting enough sleep?), but if they are right, then their proposals deserve attention. National standards promoting a later start to the day for middle and high school students would be a

singularly heavy lift, as would abolition of daylight saving time, but Barnes and Drake deserve credit for putting a new issue on the table.

Something similar might be said for the instructive essay by Rattan, Savani, Chugh, and Dweck (2015, this issue) on educational “mindsets,” which also has the virtue of describing specific policy mechanisms. With their focus on uses of Head Start, Maloney, Converse, Gibbs, Levine, and Beilock (2015, this issue) helpfully explore the importance of parental involvement in early childhood education, and they point to low-cost interventions with the potential to do a great deal of good.

The valuable research outlined in some of the articles has a more ambiguous target audience and thus fits more squarely in the latter category I mentioned earlier: valuable but less imminently implementable. Rothman et al. (2015, this issue) offer a range of useful suggestions about how to maintain healthy habits (for example, forming “if-then” plans), but from the standpoint of those who work for the federal (or state) government, it is not clear how much might be done with those suggestions. What leverage, if any, do they have over such issues? There may be some, but the answer is not obvious.

Galinsky et al. (2015, this issue) offer helpful lessons about how to make diversity work, but I am not sure how people in the national government should react to those lessons; perhaps there are implications for the Department of Education or the Equal Employment Opportunity Commission, but they are not immediately obvious. Once officials learn those lessons, what are they supposed to do? (Much of the most helpful policy advice answers that question.) Ross and Schryer (2015, this issue) provide a creative set of solutions to the problem of memory loss among the elderly, but some of their recommendations, however sensible, are unlikely to energize national policymakers (e.g., changes to the design of large parking lots).

Ayal, Gina, Barkan, and Ariely (2015, this issue) provide a crisp and highly illuminating framework for responding to the risk of unethical behavior, but for those who work in (say) the Internal Revenue Service or the Department of Health and Human Services, it is far from clear what might be done with that framework. Compare this to the simple finding offered by some of the contributors to Ayala et al. that levels of dishonesty are decreased when people sign forms at the beginning rather than at the end (Shu, Mazar, Gino, Ariely, & Bazerman, 2012). That finding has a large advantage—it is actionable. Any reader will learn a great deal from Ayala et al., but it is not clear that it reflects the kind of advice that high-level officials would like to see from a Council of Psychological Science Advisers.

For climate change, the most pressing issue is profoundly substantive: How can we actually reduce

greenhouse gas emissions without imposing severe costs on the private sector? Behavioral science, including psychology, has a great deal to say on that question (see Beckenbach & Kahlenborn, 2015). van der Linden, Maibach, and Leiserwitz (2015, this issue) offer valuable advice, not on that question, but on communications. The advice might well prove useful to the White House Office of Communications. But in view of current blockages in the U.S. Congress and sharp polarization on climate change across party lines, we might question how much progress can be made with better communications strategies.

Concluding Thoughts

The articles in this issue span an exceptionally wide range; they offer valuable guidance that promises to improve people's lives. We are at the earliest stages of uses of psychological research not only to understand behavior, but also to adopt new initiatives to achieve widely shared social goals. For the future, it would be valuable to see how that research might help national policymakers to tackle the largest issues on any president's view screen, including employment, economic growth, poverty, and the rise of violent extremism.

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The Rise of Psychology in Policy: The UK's de facto Council of Psychological Science Advisers

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A few years ago, at a meeting organised at the White House, Danny Kahneman made an impassioned plea for the need for a Council of Psychological Advisers (National Institute on Aging & National Institutes of Health, 2013). One of the following speakers was David Laibson, Professor of Economics at Harvard and himself one of the leading proponents of behavioural economics (as well as a former student of Richard Thaler, Cass Sunstein's co-author of *Nudge*). Laibson set out a series of reasons for why economics continued to hold such sway over policymakers, such as its clear steers—whether right or wrong—for macro-level actions, and its quantified clarity for actions one way or another.

Alan Krueger, then Chair of the President's Council of Economic Advisors, was also in attendance, setting out many of the big challenges that he saw facing the United States at that time. The juxtaposition between the grand sweep and levers of the economists and the micro-insights and often uncertain levers of the psychologists was very striking.

The U.S. Council of Economic Advisers was formed in 1946, but a British Council of Economic Advisors was not formed until 1997, initiated by the powerful new Chancellor of the Exchequer Gordon Brown (later Prime Minister). Scotland also formed its own Council of Economic Advisors in 2007. Just as in the United States, the running argument has been that we need to supplement this economic advice with advice from the other social sciences. In the United Kingdom, the argument has pivoted less around the role played by its Council of Economic Advisors and more around the role played by the network of Chief Scientific Advisers that feature in every Department, headed by the Government's overall Chief Scientific Adviser (currently Sir Mark Walport).

In February 2012, the House of Lords Science and Technology Committee made the recommendation:

Given the all-pervasive importance of social science advice to policy making in all departments ... the Government should appoint a Chief Social Scientist

... to ensure the provision of robust and independent social scientific advice.

Yet the deeper question has always been not whether governments appoint high profile figure-heads to symbolise the use of disciplines such as psychology, but whether they act differently as a result of any such advice given. The experience of many leading experts when brought into government, including many department Chief Scientists, has sometimes been a frustrating one where they felt unable to influence policy. Of course, that is partly the nature of government itself: Even Ministers often feel they cannot accomplish what they want.

Nonetheless, something interesting happened in the United Kingdom over the last 5 years in relation to the use of psychology in policy. In 2010, the new Coalition Government formed a small unit, with a base in 10 Downing Street, to apply a more nuanced account of human behaviour to policy, and I was asked to head it. I had been a lifetime-tenure social psychologist at Cambridge but also had spent 6 years as Chief Analyst in Prime Minister Blair's Strategy Unit.

The Behavioural Insights Team was set up with a sunset clause that it would be shut down on its second anniversary unless the team managed to achieve at least a 10-fold return on its cost. The team also set up an Academic Advisory Committee to ensure a direct line and bridge into the wider community of behavioral scientists. To many people's surprise, the team proved to be a great success. In the early days, it drew heavily on the experiences of Cass Sunstein in the White House, though ultimately we took a subtly different route in our methodological approach. Rather than the Executive Orders of the Office of Management and Budget, the UK's Behavioural Insights Team, or "Nudge Unit" as

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everyone soon called it, tried wherever possible to run experiments to test out alternative ideas based on psychological insights (Halpern, 2015).

In some ways, this was less dramatic, and perhaps initially had less impact than the U.S. use of executive orders. But the Behavioural Insights Team approach soon built up a body of results that helped create a deep-seated bedrock of support for the use of behavioural approaches to guide government and policy. The popularising of this experimental approach within government may yet prove to be the most important legacy of the team and of the use of psychology in government.

Many of the proposals in this special section resonate with results found by the UK's Behavioural Insights Team. Let me pick out a few.

Tax and Fraud

Ayal, Gina, Barkan, and Ariely's (2015, this issue) three principles are an elegant summary of the literature, and one that sharply differs from the traditional account in many bureaucratic systems that presumes that cheating behaviour is driven by a "rational" arithmetic calculation of costs and benefits. Echoing these insights, our team found that simple prompts built into reminder letters could substantially increase payment rates. For example, we recently showed that payment rates among the top 1% of tax debtors, who owed more than \$50,000, were boosted by 43% (within 23 days without further action) by including a line in reminder letters stating that the government could not pay for services such as schools and hospitals without tax revenue. Similarly, we have found that using wording that makes clear that ignoring an outstanding debt might previously have been an "oversight" but will from now on be seen as an active choice is an effective way of prompting payment. Such wording can be seen to trigger all three elements of Ayala et al.'s "REVISE": reminding, visibility, and self-engagement. Interestingly, not only were such prompts effective in the United Kingdom, but we found they were also highly effective in Guatemala, in a World Bank funded trial (Behavioural Insights Team, 2015). This illustrates that such nudges can be as effective in both low- and high-tax compliance countries – an important result in its own right.

Health

Several of the articles focus on health, an area where psychologists have a long established contribution. Rothman et al. (2015, this issue) and Ross and Schryer (2015, this issue) review examples of what we might call "behavioural scaffolds" that can help support the creation

of healthier new habits or reinforce more adaptive ones. It is worth noting that many of the proposed solutions could and will be developed by private sector players rather than governments, such as medicine bottles that remind us when it is time to take our medication or personalised pills that combine the range of medications that a person is on.

Though the articles do not discuss them, the advent of e-cigarettes represents such a product class. Though remaining controversial in many countries, the UK evidence—where we have sought to ensure that e-cigarettes are regulated but widely available—strongly suggests that they are a powerful new method to help smokers quit (McNeill, Brose, Calder, & Hitchman, 2015). They have now overtaken nicotine replacement therapy as the most popular single channel for smokers to quit and have been estimated to be around 60% more likely to result in success. Estimates vary, but e-cigarettes appear set to save millions of healthy years of life across the world, and they work because they are a much easier behavioural substitute than conventional pathways to quitting.

Mann, Tomiyama, and Ward's (2015, this issue) discussion of obesity builds on Brian Wansink's (2014) work to make the case for a decisive shift away from willpower-based dieting to environmental changes and product reformulation. Many countries are gradually moving toward this realisation, though the key remaining policy challenge concerns how these wider changes are driven: voluntary deals with industry, consumer pressure, and/or legislation. A key combination may be light-touch regulatory changes that catalyse healthier consumer choices and drive product reformulation and restocking by industry, which in turn further reinforce consumption patterns—what I have termed a "triple nudge" (Halpern, 2015).

Youth and Education

Several papers offer interesting thoughts on using psychological insights to improve outcomes for youth in education, an area we have also found to be well-suited to such insights. Rattan, Savani, Chugh, and Dweck (2015, this issue) rightly highlight Dweck's influential thinking on mindsets and add to it the importance of belonging. This is an area of active research in the United Kingdom, including ongoing large scale trials by the UK's Educational Endowment Foundation dedicated to identifying school-based interventions that can boost attainment—particularly of more disadvantaged students. A common thread to many of these trials—involving more than 4,000 schools and 500,000 children—is that many of the most powerful interventions seem to involve fostering soft skills (like emotional intelligence or patience), curiosity, and "thinking how to think"

(metacognition) in a way that supplements the strategies middle class parents often use with their children. For example, a recent Educational Endowment Foundation trial showed that an hour a week of philosophy with young children boosted their reading, writing, and math scores at age 11 by about a term (semester)—particularly among the most disadvantaged students (Gorand, Siddiqui, & See, 2015). These, and other results, are in turn documented in an easy-to-use toolkit now in use by more than two-thirds of UK schools (Education Endowment Fund, 2015). The Maloney, Converse, Gibbs, Levine, and Beilock (2015, this issue) article takes this logic a step further, exploring how equipping parents to be better “teachers” at home may promote educational achievement in school.

Other Areas

Other areas touched on by the articles in the special section are also of current policy interest, including Hershfield, Sussman, O'Brien, and Bryan (2015, this issue) on debt and Dhami, Mandel, Mellers, and Tetlock (2015, this issue) on intelligence analysis. Some articles raise less familiar issues, such as Galinsky et al.'s (2015, this issue) interesting twist on diversity, and Barnes and Drake's (2015, this issue) memo on sleep (though it is worth noting that UK schools already start later than those in the United States and Europeans in general are more attached to their sleep—though perhaps they should be even more so).

There are some areas where the behavioural evidence may suggest the solution will need to be a lot more than a nudge. This could certainly be taken as a conclusion from Steinberg (2015, this issue) on adolescent risk taking, and van der Linden, Maibach, & Leiserwitz (2015, this issue) on climate change.

Conclusion

A wave of new results demonstrate that behaviourally or psychologically inspired policy interventions can have dramatic effects. Many of these interventions hinge on seemingly small changes that classical economic or legislative approaches would have viewed as minor or insignificant details, such as the setting of defaults or the wording of letters or feedback. There are already 5 million more savers as a result of the UK's 2012 decision to change the defaults on workplace pensions. Millions of days of benefit payments have been saved by getting jobseekers to think about what they will do next week rather than saying what they did the previous week. And hundreds of millions of pounds (dollars) in tax payments have been submitted as a result of better worded tax letters.

Occasionally the results surprise even us. One of our recent findings was that the pass rate of ethnic minority applicants in an online exam to join the UK police was raised from 40% to 60% by adding a prompt to encourage applicants to think about why joining the police mattered to them and their community; the White applicants pass rate remained unchanged at a similar 60% (Behavioural Insights Team, 2015). These results have led us to wonder what else could be achieved by saying the right thing at the right time.

In sum, it was wonderful to read such a great collection of articles, from scholars who also want to answer the “so what?” question. Similar to Cass Sunstein's commentary (2015, this issue), I'd also encourage my psychologist colleagues to explore some of the core areas traditionally left to economists, such as productivity and growth. Such issues rest heavily on worker engagement and motivation, and so-called “animal spirits,” such as consumer and business confidence, which in turn rest heavily on social norms (“What do you think everyone else is doing?”) and other mental heuristics.

Many governments may not formally have a Council of Psychological Science Advisers, but an ever growing number of countries are establishing groups like the Behavioural Insights Team—groups that have a place in decision making, are championing the experimental approach, and are reading your work. These countries include Germany, Australia, Singapore, Netherlands, and Israel, along with international bodies such as the World Bank, UNDP and OECD. Thank you, and keep pushing at that door.

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