

2020 APS James McKeen Cattell Fellows

# Observer

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## METASCIENCE

*THE SCIENCE OF DOING SCIENCE*

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- How Babies Learn Language: Janet Werker's Award Address
- Carol Dweck on Instilling Growth Mindsets in the Classroom
- Research Reveals the Dark Side of Collectivism

# Observer

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## FEATURES

# METASCIENCE

THE SCIENCE OF DOING SCIENCE

26–29

Scientists from a range of disciplines are coming together to take a good look at themselves. APS Fellow **Jonathan Schooler** outlines how psychological science can enrich our understanding of the ways science — and scientists — work.

### 5 *Presidential Column*

#### **Looking at Psychology Through the Lens of Metascience**

APS President **Lisa Feldman Barrett** offers some suggestions for metascience investigations, including a look at the incentive structures that influence researchers' behavior.

### 12 **Stop Blaming Mental Illness**

APS Fellow **Alan Leshner**, who had held some of the most prestigious scientific leadership positions in the United States — including at the National Institute of Mental Health — calls on policymakers to support research into the real causes of mass shootings instead of scapegoating people who struggle with mental disorders.

### 13 **2020 APS James McKeen Cattell Fellows**

**Thomas E. Joiner** and **Richard M. Lerner** are honored for their intellectual achievements in applied psychological research.

### 19 **Rob Goldstone Named New Editor of Current Directions**

New neuroimaging technologies, people's trust in information sources, and electronic behavior tracking are among the topics that APS Fellow **Rob Goldstone** wants to highlight as the new editor of *Current Directions in Psychological Science*.

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#### **Beyond Words**

Babies don't learn language just by listening to speech, but also through what they see and how they move, APS William James Fellow **Janet F. Werker** explains.

### 23 **Why Your Understanding of Collectivism Is Probably Wrong**

While collectivist societies are often viewed as caring and cooperative, new research techniques reveal that the tight social ties of these cultures may also foster tension and distrust, behavioral scientist **Thomas Talhelm** explains.

### 31 *APS-Myers Lecture*

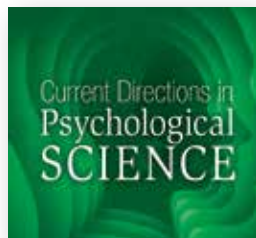
#### **How Growth Mindsets Can Bear Fruit in the Classroom**

APS William James and James McKeen Cattell Fellow **Carol S. Dweck** has pioneered the study of the mindsets that influence students' academic achievement. But teachers' mindsets play a big role in students' success as well, she says.

## Teaching Current Directions in Psychological Science

"The Benefits of Humble Pie"  
by **C. Nathan DeWall**

"Teaching Sleep to the Sleep-Deprived"  
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#### **Nap Tracker**

A pioneer in studying learning and memory during atypical development, University of Arizona professor **Jamie Edgin** is uncovering the effects of poor sleep on learning in children with Down syndrome



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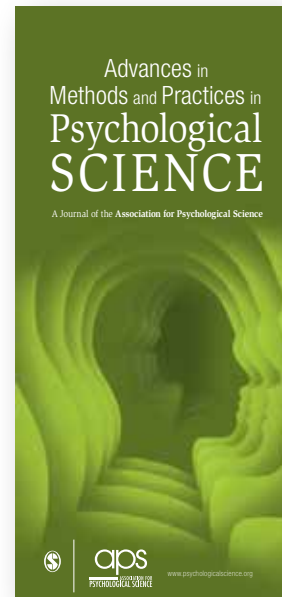
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# Looking at Psychology Through the Lens of Metascience

**A**s psychological scientists, we think hard about the science we do. We formulate hypotheses and design studies. We observe our participants—the speed of button presses, fluctuations in blood pressure, the content of verbal reports—and we infer psychological meanings. I'd like to turn our focus to the process of science in general, which has been dubbed *metascience*. I mean, who can resist a little navel-gazing now and then?

In early September 2019, I attended a conference that encouraged a multidisciplinary study of how scientists do science. This metascientific effort (one among many)<sup>1</sup> considered diverse factors that influence the questions we choose to ask, the experiments we decide to run, the priors we harbor when interpreting the data, and the conclusions we draw. (For more details, see the cover feature by meeting co-organizer Jonathan Schooler.) A dedicated band of psychological scientists, economists, data scientists, historians, and philosophers put their heads together for a couple of days to tackle basic questions of how we conduct ourselves when doing science. Many fascinating topics and insightful observations were discussed; here are a couple of highlights:

- Do you search for references with Google Scholar? This wondrous tool also influences what you read, which papers you cite, and therefore how you do science. The active ingredients of this influence are currently a mystery to us, however, because Google Scholar's algorithms are not public (West, 2019).
- When you see statistics in a published paper, do you read them as evidence or just persuasive storytelling? The evidence suggests that readers more often treat statistics as the latter than the former (Fidler, 2019). Perhaps this is one reason why people continue to trust findings that aren't replicable (Yang, 2019).
- Ever wonder why rival communities of researchers hold stable, mutually exclusive beliefs, despite access to exactly the same scientific findings? It turns out that mathematical



**Lisa Feldman Barrett**  
APS President

models shed light on why these intense scientific polarizations persist. Here's one reason: Each group distrusts the evidence that is taken as definitive in the other camp (O'Connor, 2019). I found this topic particularly captivating, given that one of my own areas of research—the nature of emotion—has been polarized for decades.

The credibility revolution (formerly the replication crisis) dominated discussion at the conference. This was not surprising, because metascience got a big shot in the arm from concerns over whether or not psychology is, in fact, in crisis. When reasonable people looked at the evidence regarding replication rates for published studies, they disagreed on its interpretation. Some scientists recoiled from what they saw as a hurricane of replication failures, while others dismissed the storm as an illusion drawn in with a black Sharpie, like Alabama on Trump's hurricane map. But everyone agreed that some methods-related housekeeping was in order.

The metascience conference was ripe with ideas to prevent scientists from gaming the system to improve their careers. Humans are motivated animals, and science is a motivated human activity with rewards and penalties that shape its process and products. There was widespread agreement that, within the current scientific ecosystem, short-term financial and psychological incentives encourage the publication of research that is not ready for prime time. There was some disagreement, however, about

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APS President **Lisa Feldman Barrett** is a University Distinguished Professor of Psychology at Northeastern University, with appointments at Harvard Medical School and Massachusetts General Hospital. Her research focuses on human emotions and how they are constructed. She is the author of the book *How Emotions Are Made: The Secret Life of the Brain* and is a recipient of the APS Mentor Award, the National Institutes of Health Director's Pioneer Award, and a 2019 Guggenheim Fellowship. Barrett can be contacted at [lfeldmanbarrett@psychologicalscience.org](mailto:lfeldmanbarrett@psychologicalscience.org).



I'd like to see metascience investigations of how incentive structures influence our behavior, not just when we're jumping hoops to secure a job or grant, but also when we're practicing the craft of science. ”

whether methodological innovations derived from the credibility crisis could substantially improve the quality of and confidence in our science.

The meeting organizers invited a panel of scientists (myself included) to discuss “reflections on metascience topics and findings.” I affectionately dubbed us “the curmudgeons panel.” Our job, as the official contrarians of the meeting, was to offer critical observations, kind of like a scientific Greek chorus. Here is a sample of my grumpy concerns:

Yes, it's crucial for scientists to recruit large, representative samples, avoid questionable research practices such as *p*-hacking and HARKing (hypothesizing after results are known), and so

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A number of excellent efforts examine the process of science, such as the Society for the Social Studies of Science, the History of Science Society, the Society for the History of Technology, the Philosophy of Science Association, the European Association for the Study of Science and Technology, and sections within the American Anthropological Association, the American Sociological Association, the American Political Science Association, and the National Women's Studies Association.

on, but such improvements, while necessary, are not a sufficient course correction. Psychological science must do more than *prevent* bad methodological habits—we want to *incentivize* a stronger focus on longer-term scientific gains. I'd therefore like to see metascience investigations of *how incentive structures influence our behavior*, not just when we're jumping through hoops to secure a job or a grant (Bergstrom, 2019), but also when we're practicing the craft of science. Fortunately, psychological scientists know something about studying humans as they engage in motivated activities.

And make no mistake—science is a motivated practice, even when careers are not on the line. Psychological studies of motivation find that two people faced with exactly the same sense data from their surroundings can create very different experiences and behave in very different ways. What's true for our study participants is also true for ourselves. Our judgments and behaviors are shaped in powerful ways by our learning histories, immediate versus long-term goals, expected effort and anticipated incentives, as well as a host of other factors.

I also suspect that the credibility revolution is a symptom of a deeper concern: that many psychological scientists hold outdated assumptions about what a mind is and how a mind works. If I'm right, then we face more than a crisis of method. We have a crisis of theory that makes our experiments more fallible and our findings less robust.

For example, psychological science largely assumes that the human mind is a sequence of independent, stable mental states, each caused by a discrete, universal process. So-called perceptual processes pass information to supposed cognitive processes, which battle with alleged emotional processes for control of behavior. This relay-race view of the mind encourages us to design experiments as a series of independent stimulus-response trials, and our most popular statistical methods also make independent trials a necessary condition for analysis. Scientists have questioned this ontological commitment since the 19th century (e.g., Dewey, 1896), and converging lines of evidence now strongly suggest that a mental event is not a discrete moment in time, but an evolving dynamic, in which behaviors and mental features in one moment both depend on what happened in the previous moment and form a context for what happens in the next (e.g., Hutchinson & Barrett, 2019; Rabinovich et al., 2015; Spivey, 2008). Laboratory experiments that sever one moment from the next may be replicable, but they may not generalize, meaning that they fail to move us closer to a real scientific understanding. Efforts to improve replicability may boost the rigor of stimulus-response methods, but they cannot address the question of whether those methods are appropriate in the first place. As a consequence, perhaps metascience might take up the issue of *how our ontological commitments influence the methods we use and the experiments we construct*. Historically, psychological scientists (Waller et al., 2006) and other fields of study (see footnote 1) have considered these issues, albeit in a less quantitative way.

Let's face it: Science is hard, and predicting and explaining human behavior may be the hardest science of all. Moreover, science always involves a moral dilemma. If you generate a



series of studies that are replicable by the best current scientific standards, do you stop there and publish, or do you explore until you inevitably uncover conditions where your observations do not hold (in another analysis, another social context, another cultural context, etc.)? This dilemma is intrinsic to any science, even one with a superior incentive structure. Good science is not about uncovering true facts—it is about quantifying the degree of doubt in a set of observations (Gee, 2013). Perhaps metascience can teach us how to navigate this dilemma with curiosity.

Science is a challenging endeavor and we are in it together. So let's question everything, from our methods and statistical practices to the ontological commitments embedded in those practices. And who knows? Maybe a bit of formal navel-gazing, through the empirical lens of metascience, will finally usher forth the full, Kuhnian-style revolution that so many of us feel is needed. ●

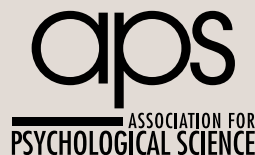
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Prior recipients of a Cattell Fund Award are not eligible.

To be eligible for this year's awards, candidates must not be on sabbatical at any time during the Academic Year 2019–2020. Sabbaticals must be for the Academic Year 2020–2021.

### *Questions?*

Christina L. Williams  
williams@psych.duke.edu  
www.cattell.duke.edu

**The deadline for submissions is January 15, 2020.**

**Applications may be submitted online: [www.cattell.duke.edu/cattappl.html](http://www.cattell.duke.edu/cattappl.html).**



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## Biennial International Seminar on the Teaching of Psychological Science

The 2nd Biennial International Seminar on the Teaching of Psychological Science (BISTOPS) will take place on 13 – 17 July, 2020 in Paris at Maison Suger, at the *Fondation Maison des Sciences de l'Homme—Maison Suger's* residential and working facility.

The seminar will accommodate about 20 participants who have experience in conducting and publishing research on teaching psychology and in successful grant-writing, as well as those who are developing ideas for such research or have a strong interest in doing so.

The seminar is designed to give participants the opportunity

to discuss existing research on the scholarship of teaching and learning in psychology, to exchange new research ideas, to create international research teams, and ultimately to generate empirical studies whose results will promote evidence-based recommendations for improving the teaching of psychological science on an international scale.

For more information, and to apply for a place at the seminar, visit [www.bistops.org](http://www.bistops.org). To request further information, please contact Douglas Bernstein at [douglas.bernstein@comcast.net](mailto:douglas.bernstein@comcast.net).

**Application Deadline:** January 15, 2020. ●

## Psi Chi Celebrated at Yale



On September 4, 2019, more than 20 scientists and students at Yale University gathered for a convocation to mark the 90th birthday of Psi Chi — the International Honor Society in Psychology. In keynote addresses, **Harold Takooshian** of Fordham University recounted the Psi Chi's history, and APS Fellow **Scott Plous** of Wesleyan University described the bright future of international psychology, including "action learning" and MOOCs (Massive Open Online Courses). Those participating included, front row from left: **Cameron Martel** (Yale University), **Artemis Pipinelli** (New York University), **Elaine P. Congress** (Fordham University), **Emily Rehbein** (Pace University), APS Fellow **Florence L. Denmark** (Convocation Moderator), **Martha S. Zlokovich** (Psi Chi), **Scott Plous**, APS Fellow **Laurie Santos** (Yale University), **Yarrow Dunham** (Yale University), **Edward English** (filmmaker). Second row from left: **Marianne Fallon** (Psi Chi), **Joan Hubbard Cousins** (Psi Chi), **Michael Colbert** (Psi Beta), APS Fellow **Tyrone D. Cannon** (Yale University), **John D. Hogan** (St. John's University), and **Harold Takooshian**. Not pictured: APS Fellow **Peter Salovey** (Yale University), **Lynn Butler** (Yale University), **Irina Novikova** (Peoples' Friendship University of Russia). ●

## Misperceptions About Racial Wealth Gap Examined in New Report

The vast majority of Americans underestimate the magnitude of economic inequality between Whites and racial minorities, particularly Black and Latinx people, according a research reported in *Perspectives on Psychological Science*.

In a national survey of more than 1,000 adults from racial and socioeconomic backgrounds largely representative of the demographics of the United States, researchers have found that people overestimate the current state of White-Black wealth equality by 80 percentage points above U.S. government data on actual household wealth.

The respondents also estimated the wealth gap between White and Latinx families to be greater than the gap between Black and White households, when the opposite is true, the researchers led by APS Past Board Member Jennifer A. Richeson and psychological scientist Michael W. Kraus of Yale University report. Participants' views on the wealth disparity between Asian Americans and Whites were slightly less misguided, but still below the actual figures, they write.



“Americans tend to believe that this is a country that is naturally and automatically ascending toward justice,” says Kraus, first author on the report. “This latest work has been about just how deeply these narratives lead us astray from the stark reality of racial economic inequality in our country.”

The research expands on a previous examination on the perceptions of racial economic equality held by Black and White Americans that Kraus, Richeson and graduate student Julian Rucker conducted in 2017. On average, the participants in that work overestimated the current state of Black-White economic equality (based on multiple markers of economic well-being) by about 25% over federal income statistics.

In the latest work, the team — including postdoctoral scholar Ivuoma Onyeador and graduate student Natalie Daumeier — surveyed a broadened spectrum of US residents and added questions related to perceptions of Asian American and Latinx family wealth. They also asked participants to estimate Black-White wealth disparities at 12 points in time between 1963 and

2016. Respondents underestimated this wealth disparity at all time points, with participants approximating the gap at about 40 percentage points lower than its actual size in 1963 and 80 points lower in 2016. Overall, more than 97% of participants overestimated Black-White wealth equality.

The researchers also examined perceptions of Black-White wealth equality at multiple levels of family education and income. They predicted that participants would believe that Black families with high income and advanced education were most likely to have the same amount of wealth as their White counterparts. And indeed, they found that participants underestimated the wealth gap between White and Black families at every level of education and income. The results reveal a desire to find some set of perhaps deserving Black families that have achieved economic parity with their White counterparts, which, in turn, maintains the belief that society is indeed fair and just.

The misperceptions of racial economic inequality are caused by many different factors, the Yale researchers say. The inflated estimates of the Latinx-White wealth gap, for instance, could stem from cognitive factors such as the recent national focus on refugees attempting to cross the U.S. southern border and widespread ignorance of Latinx contributions to the country. Similarly, the more accurate perceptions of the Asian-White wealth gap could arise from the fact that Asian Americans have closer wealth parity with Whites than do the other two racial groups, but may also reflect stereotypes about Asian Americans as high-achieving. Kraus, Richeson and undergraduate researcher Enya Entung Kuo found in a recent study that exposure to narratives that highlight these “model minority” stereotypes of Asian Americans drove people to underestimate wealth differences between Whites and people of Asian heritage in the United States.

In their report, the authors discuss some of the psychological processes and structural forces that may produce these misperceptions about racial progress.

“Americans need to wake up to the notion that race is at the center of economic inequality in the United States,” Kraus says. “And if we really value the American Dream, we need to commit to supporting reparative economic action that will make that dream more of a reality for more Americans and certainly for more Americans from racial minority backgrounds.”

Richeson says that the scientists have a number of plans for expanding on their research. They intend to examine how people’s perceptions of economic equity are influenced by characteristics of people’s neighborhoods, including how racially and economically segregated they are and how disseminating information about the racial wealth gap affects support for new policies aimed at correcting race-based economic disparities.

The research, funded in part by grants from the National Science Foundation and by the School of Management and Department of Psychology at Yale, is available at [journals.sagepub.com/race](https://journals.sagepub.com/race). ●

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**Poster submissions are due by January 31, 2020.**

# Stop Blaming Mental Illness

By Alan I. Leshner



Alan L. Leshner

Photo by Joseph Rodriguez

From *Science* 16 Aug 2019; Vol. 365, Issue 6454, pp. 623, doi: 10.1126/science.aaz0997]. Reprinted with permission from AAAS

**T**he United States is experiencing a public health epidemic of mass shootings and other forms of gun violence. A convenient response seems to be blaming mental illness; after all, “who in their right mind would do this?” This is utterly wrong. Mental illnesses, certainly severe mental illnesses, are not the major cause of mass shootings. It also is dangerously stigmatizing to people who suffer from these devastating disorders and can subject them to inappropriate restrictions. According to the National Council for Behavioral Health, the best estimates are that individuals with mental illnesses are responsible for less than 4% of all violent crimes in the United States, and less than a third of people who commit mass shootings are diagnosably mentally ill. Moreover, a large majority of individuals with mental illnesses are not at high risk for committing violent acts. Continuing to blame mental illness distracts from finding the real causes of mass shootings and addressing them directly.

Mental illness is, regrettably, a rather loosely defined and loosely used term, and this contributes to the problem. Ac-

ording to the American Psychiatric Association, “Mental illnesses are health conditions involving changes in emotion, thinking or behavior...associated with distress and/or problems functioning in social, work or family activities.” That broad definition can arguably be applied to many life stresses and situations. However, what most people likely mean when they attribute mass shootings to mental illness are what mental health professionals call “serious or severe mental illnesses,” such as schizophrenia, bipolar disorder, or major depression. Other frequently cited causes of mass shootings—hate, employee disgruntlement, being disaffected with society or disappointed with one’s life—are not defined clinically as serious mental illnesses themselves. And because they have not been studied systematically, we do not know if these purported other causes really apply, let alone what to do about them if true.

Unfortunately, it has been difficult to determine precisely the causes of mass shootings and the appropriate approaches to preventing them, largely because of a dearth of public funding for this line of research. The U.S. Centers for Disease Control and Prevention (CDC) had historically been the major funder of the public health aspects of firearm-related violence research, and much was being learned. But in 1996, Congress passed the so-called “Dickey Amendment” to the appropriations bill for the CDC, which was interpreted by the agency as prohibiting support for any firearm-related studies, and therefore the agency stopped funding this research. Although agencies including the National Institutes of Health (NIH) and the National Science Foundation have devoted small amounts to studies related to firearm violence, Congressional actions over the last few years have discouraged such investment, and both agencies have virtually stopped funding that kind of work.

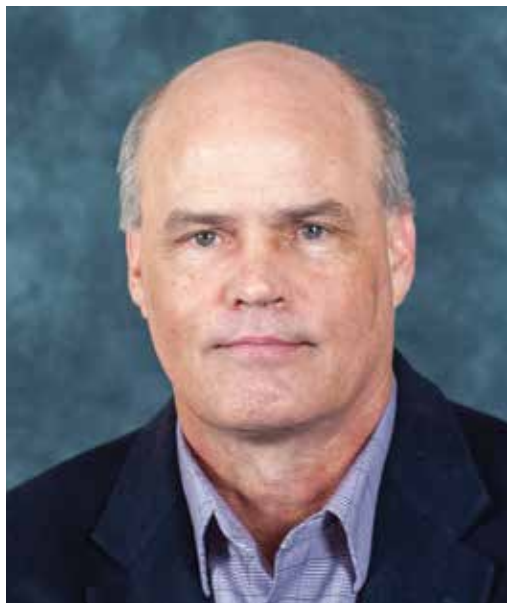
There is now a new opportunity to apply science to the problem of mass shootings. In June 2019, the funding bill passed by the U.S. House of Representatives included \$50 million for the Department of Health and Human Services, split between the NIH and CDC, to support research on firearm violence. It is not a lot of money, given the scope of the problem, but surely a start. The Institute of Medicine and the National Research Council (now parts of the National Academies of Sciences, Engineering, and Medicine) laid out a detailed research agenda in 2013 for investigating firearm-related violence that could easily be updated. The Senate and the White House should agree to this funding bill, and the country should stop scapegoating people who suffer from mental illnesses and get on with determining the real causes of mass shootings. ●

APS Fellow **Alan I. Leshner** is the interim chief executive officer of the American Association for the Advancement of Science (AAAS) and executive publisher of *Science*. He served as Director of the National Institute on Drug Abuse and Deputy Director and Acting Director of the National Institute of Mental Health.

# 2020 APS James McKeen Cattell Fellows

*Thomas E. Joiner and Richard M. Lerner*

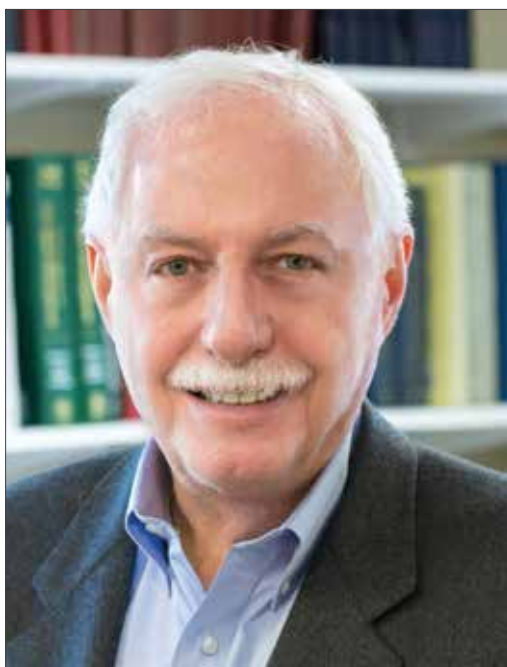
*APS honors two members for their lifetime of significant intellectual achievements in applied psychological research and their impact on a critical problem in society at large. The awards will be presented at the 32nd APS Annual Convention, to be held May 21-24 in Chicago*



## **Thomas E. Joiner**

*Florida State University*

Thomas Joiner is a leading authority on suicidal behavior and its prevention. His influential interpersonal theory of suicide refutes the public's tendency to equate suicide with weakness and cowardice. His model holds that suicide risk begins with a sense of feeling disconnected from and burdensome to others, along with a decreased fear of pain and death and the technical competence to kill oneself. To test and refine the interpersonal theory of suicide, Joiner has worked closely with the US Armed Forces, the Department of Veterans Affairs, firefighters, and other first responders. Further studies in a variety of clinical settings have generated additional support for his theory. Importantly, most of the more than 100 studies published to date on the theory were conducted by teams other than Joiner's. This body of work speaks to the immense influence of Joiner's scholarship. It also suggests that his work is inspiring new generations of scientists to study suicide. Joiner's work has resonated not only among scholars but also among members of the public. Each year, he holds dozens of workshops in which community members learn about current suicide research and are empowered by empirically rooted strategies to help people in crisis.



## **Richard M. Lerner**

*Tufts University*

Richard Lerner's scholarly work (including more than 80 authored and edited books) has largely focused on youth, a topic where he has offered a new vision of positive developmental processes — and a distinct departure from notions of adolescents as inherently difficult or deficient. His paradigm-shifting relational-developmental-systems theory holds that children, through their plastic developmental processes, have the capacity for positive growth. Incorporating biology, sociology, public policy, and psychological science, Lerner has spearheaded groundbreaking longitudinal mixed-methods research on the characteristics of families, communities, and institutions that contribute to positive youth development. His years of research show adolescents' capacity for personal strengths, good family relationships, and positive social contributions. In addition to conducting research, Lerner has served on dozens of national and international boards and committees where he applies his knowledge of human development to the work of government agencies and nonprofit organizations tasked with addressing social issues. His work has shaped a new wave of youth programs that focus not just on specific skill-building but also on opportunities for youth participation and leadership in their communities. ●

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# 32<sup>nd</sup> APS Annual Convention



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Fred Kavli Keynote Address

**Ways to Think About the Brain**

**György Buzsáki**

*New York University, School of Medicine*

Buzsáki is known for many breakthrough “firsts”. His most influential work, the two-stage model of memory trace consolidation, revealed precisely how new information is reinforced while we sleep. His groundbreaking findings and advances in methodologies have earned him a host of honors, including the prestigious Brain Prize in 2011.



Presidential Symposium

**Visceral Politics**

**Lisa Feldman Barrett (Chair)**

*Northeastern University*

APS President Lisa Feldman Barrett shifted the paradigm when she found evidence that emotions are constructed, in the moment, from a combination of environmental context, bodily sensory information, and our past experiences. She was honored with the prestigious Guggenheim Fellowship in 2019.

**Sinan K. Aral**

*Massachusetts Institute of Technology*

**Eran Halperin**

*The Hebrew University of Jerusalem, Israel*

**Manos Tsakiris**

*Royal Holloway, University of London, United Kingdom*

**Jeanne L. Tsai**

*Stanford University*

**Hanna Rosin (Discussant)**

*NPR*

**Alix Spiegel (Discussant)**

*NPR*



Bring the Family Address

**Becoming Human: How (and How Early) Do Infants Link Language and Cognition?**

**Sandra R. Waxman**

*Northwestern University*

Waxman explores how we form some of our most profoundly fundamental concepts, such as what it means to be alive. She received the renowned Guggenheim Fellowship in 2007.



Saturday Keynote Address

**Jennifer L. Eberhardt**

*Stanford University*

Eberhardt examines racial bias and its consequences, particularly the ways in which bias expresses itself outside of our conscious awareness. In 2014 she received the illustrious MacArthur Fellowship – often referred to as the “Genius Grant.”

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- A current mailing address, telephone number, and e-mail address for the nominee.

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### PRIOR WINNERS

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2019 Kent Berridge  
& Terry Robinson

# Future Directions for Current Directions

APS Fellow Robert L. Goldstone will begin a 4-year term as Editor of *Current Directions in Psychological Science* on January 1, 2020. Goldstone is Distinguished Professor and Chancellor's Professor, Psychological and Brain Sciences, at Indiana University Bloomington, where he directs the Percepts and Concepts Laboratory. His research focuses on concept learning and representation, perceptual learning, collective behavior, and computational modeling of human cognition. He has served in editorial roles with many other journals, including the post of Executive Editor of *Cognitive Science*. He received the Troland Research Award from the National Academy of Sciences in 2004 and was elected to the American Academy of Arts and Sciences in 2016. Goldstone recently answered some questions about his plans as the journal's editor.

**Current Directions is prized as a showcase for the latest developments across the full spectrum of psychological science. What are the challenges in trying to keep tabs on such a diverse field?**

There's no way that any individual psychologist can hope to stay abreast of all of the exciting developments in the many-tentacled life form that psychological science has become. One of my strategies for coping with psychology's multidirectional growth will be to attend broad conferences like the APS Annual Convention and meetings of the American Association for the Advancement of Science, Society for Research in Child Development, British Psychological Society, Society for Experimental Social Psychology, American Educational Research Association, Cognitive Science Society, European Federation of Psychologists' Associations, and International Congress of Infant Studies and noting researchers there who have a knack for communicating their research to a general audience. Perusing databases of national grants awarded and institutional schedules of psychology colloquia offer other ways of finding researchers adept at making research broadly accessible.

Even with these strategies, the tool I'll rely on most heavily is crowdsourcing. Continuing a tradition for *Current Directions*, we will have an advisory board charged with the task of identifying the most exciting developments and research efforts in their areas. I am grateful that the following scholars with exceptional taste in research have agreed to serve on our advisory board: Karen Adolph (New York University), Woo-Young Ahn (Seoul National University), Paul Bloom (Yale University), Naomi Ellemers (Utrecht University), Lisa Feldman Barrett (Northeastern University), Morton Ann Gernsbacher (University of Wisconsin), Harold Pashler (University of California at San Diego), and Suparna Rajaram (Stony Brook University). A new element to *Current Directions'* editorial board for 2020 will be associate editors—scholars who act as advisory board members and also have agreed to handle some manuscripts in areas of psychology where I have conspicuous knowledge gaps. The first four associate editors in *Current Directions'* history will be Marlene Behrmann (Carnegie Mellon University), Amy Needham (Vanderbilt University), Teresa Treat (University of Iowa), and Piotr Winkielman (University of California at San Diego).



**Rob Goldstone**, Incoming Editor of *Current Directions in Psychological Science*.

**Some of *Current Directions'* most memorable and popular issues have been its special issues—past topics have included *Psychology and the Law*, *the Teenage Brain*, and *Cognition in Dogs*. Can you give us a preview of some of the special issue topics you're considering?**

The goal of a special issue vehicle would be to create cross-article connections and increase the visibility of individual articles by packaging them together as part of a larger "movement." Some possible topics to consider exploring are bilingualism, new treatments for self-harm, neural prostheses, messaging campaigns for changing people's long-term energy-use patterns, children's learning from old and new media sources, influences of social media on motivation, causes and effects of changes in eating patterns, trust in information sources, sense of belonging and

age, factors contributing to suicide rate increases, prospects for “mind reading” with new neuroimaging technologies, life purpose in an era of increasing robotic labor, crowdsourcing as a citizen science approach to psychology, and what theories of human learning can learn from machine learning and vice versa. One special issue I would like to pursue soon would explore how the many new devices that are measuring, logging, analyzing, and assessing our behavior end up influencing our psychology. Citizens of the modern technological world are all living extremely “well measured” lives, courtesy of technologies such as Facebook, Fitbit, sleep monitors, Google Scholar, Apple’s Health app, Strava, Twitter, GPS, 23andMe, Luminosity, PatientsLikeMe, Spotify, and Amazon. Like it or not, we are all participating in a large-scale social experiment on the effects of technologies whose rapid development has outstripped our understanding of their consequences. I would like *Current Directions* to be part of a discussion on how these technologies should best be used, and whether they are being developed in a way that promotes the public good.

### Recognizing that *Current Directions* articles are largely invited, what advice do you have for authors who want to propose topics for your consideration?

I am an avid reader of *Current Directions*, and greatly appreciate its most typical format, in which a whole program of cutting-edge research that has been carried over many years is distilled into an easy-to-understand review by the authors of the research themselves. I have found many of the articles appearing in the journal not only to pay big informational dividends for relatively small investments of reading time, but also to inspire me to dig deeper into literatures about which I originally knew nothing. My discussions with students and colleagues suggest that my experience is common. Appreciating this typical-use scenario helps guide authors who would write for us. Although *Current Directions* readers are bright and motivated, they should not be expected to know the jargon or background theories in a topic. Authors need to think more about how to communicate their ideas most effectively to a broader audience than they do when writing for a specialty journal. This means keeping attention focused on the big picture and concentrating on ideas, methods, results, messages, and theories that can be exported to others working in different areas.

### As you know, *Current Directions* is an important resource in the classroom. How will that influence your decisions with regard to topics and articles that you want to publish?

Given the broadly accessible way in which *Current Directions* articles are written, they are often much more appropriate for both undergraduate and graduate classes than articles appearing in *Nature*, *Science*, and *PNAS*. Turning this unique role into an educational opportunity requires attention both to what students want to know and what teachers want to tell them. These are not always the same thing. Interviewing undergraduate students about the origins of their interest in psychology often reveals motivations like, “I’m curious about why my friend is always so angry” and “I notice that I act in very different ways at parties, family dinners, and school, and wonder why.” While these are great questions, they are unlikely to be directly convertible into *Current Directions* treatments without a larger theoretical framing. The most compelling articles for students will be those that connect with natural curiosities that people have about themselves but also organize and inform those curiosities into coherent and deep theories that require a systematic inquiry.

This focus on theoretical insight distinguishes *Current Directions* from many journalistic treatments of psychology. *Current Directions* articles are written by the scientists participating in research themselves. The huge advantage that this brings is that the articles are being prepared by scientists who intimately know the relevant theories, results, and literature. The scientists selected to write articles will have a proven track record of communicating to a broad audience and will have found metaphors, analogies, models, visualizations, and organizational structures that they have devised over the years to effectively convey difficult concepts. Most of us have had the frustrating experience of reading media reports that oversimplify a scientific result to the point of misrepresentation or simply get fundamental facts and ideas wrong. By having scientists who are working on the “front lines” write the articles themselves, such inaccuracies can be dramatically reduced. In this age of echo chambers and the spread of misinformation on social media, having informational sources that can be trusted is a public good worth treasuring and supporting. ●

#### SOUND BITE

*“People sometimes say, are you studying religion. I say no, secular humanism ... It’s the science of morality, how does morality emerge, just the way you would look at how do children understand mathematics and their numbers concept, or how they understand how astronomy works. Religions have their moral codes, but we are looking at something more specific.”*

APS Fellow **Melanie Killen**, University of Maryland, College Park, explaining her research on social cognitive development, on the podcast Super Awesome Science Show. ([globalnews.ca/author/super-awesome-science-show/](http://globalnews.ca/author/super-awesome-science-show/))

## APS Award Address

# Beyond Words

*Babies Don't Learn Language Just By Listening, Janet F. Werker Explains*

**F**rom the moment they're born, infants possess a remarkable capacity to absorb language in all its complexity. They prefer to listen to speech versus other sounds, and to watch the faces of people as they talk, over anything else in their field of vision.

APS William James Fellow Janet F. Werker has spent her career studying how babies develop this capacity for language so quickly. Her work demonstrates that language acquisition is actually a multisensory process.

"Perception provides the point of entry into native language," Werker said during her May 2019 award address at the APS Annual Convention in Washington, DC. "It's the first kind of information that babies get about their native language, and it progressively builds on the organization that's already in place. So we not only have an evolutionary capacity for acquiring human language, we also start experiencing it quite early."

In fact, that experience begins before birth, says Werker, a professor at the University of British Columbia. Babies are first exposed to language in the uterus, where they pick up the rhythmic properties of their mothers' speech.

"We now know as young as 28 weeks gestation there are particular circuits that are close to those used in the adult brain for discriminating speech-sound contrasts," she says.

That primes infants for sensitivity to human speech as soon as they're born, and as they mature, their attention to the languages they hear every day increases.

"At birth a baby is prepared to learn any of the world's languages with already a little bit of specialization for the language heard in utero," she said during her address. "By 5 or 6 months of age, they're showing stronger preference and attunement—like for vowels, for the rhythmical properties—to the native language, and by 12 months they've become real experts at perceiving the native language."

Infants' capacity to learn the properties of other languages aren't completely closed off by this period, Werker notes, but picking up on these distinctions will only become more difficult over time.

### Sound Discrimination

This process is manifested in part by newborns' remarkable capacity for phonetic discernment, even when hearing speech that they're not exposed to everyday, Werker says. In experiments that track where babies turn their heads when they detect a sound change, results have shown that children in their first months of life can detect subtle differences in consonant sounds—an ability that diminishes over time if they grow up in a monolingual household.



**Janet F. Werker's** lab has shown how infants use visual cues to develop a perception of language.

Werker's lab has shown this in studies involving Hindi, which has a consonant system that is significantly richer than that of English. For example, an English *d* has just one sound, while the Hindi *d* has two—one produced with the tongue at the back of the teeth and the other with the tip of tongue at the roof of the mouth. As adults, native English-speakers have difficulty hearing that distinction, but 6- to 8-month old babies in English-speaking environments have no trouble discriminating between the two sounds. Babies developing in Hindi-speaking households maintain and even strengthen that ability as they grow, while native English-speaking children lose it.

Werker has also discovered a sensorimotor aspect of this ability, particularly at the point when babies start trying to imitate the speech that they hear. In a 2015 experiment, 6-month-old babies' gazes were measured using eye-tracking technology as they listened to the two Hindi *d* sounds while they had teething toys in their mouths. One type of teether restricted the infants from moving their tongues. Babies sucking on those tongue-restricting toys were not able to distinguish the two Hindi *d* sounds, whereas those who were free to use their tongues could tell the difference. The findings suggest that oral motor move-



ments play a role in speech perception.

Maturation also plays a crucial role. Werker and her colleagues have studied babies born up to 3 months premature who were exposed to un-muted speech much earlier than babies born on or around their due date. They wondered whether, as a result of that early exposure, the premature infants' acute sensitivity to speech-sound distinctions (e.g., Hindi vs. English consonant sounds) faded at an earlier developmental stage. Instead, they found that the infants born 3 months prematurely began attuning to the sound of their native language at around 12-15 months—the same gestational age as children who were carried to term but a later chronological age. This suggests that the effect of experience on phonetic discrimination is dependent on maturation rather than when infants start hearing unfiltered speech sounds.

## Seeing Language

Language perception seems to extend beyond sound to the visual cues of speech as well. Werker's lab demonstrated this in an experiment involving three groups of infants (ages 4, 6, and 8 months) from monolingual English homes and two groups of infants (ages 6 and 8 months) from bilingual French-English homes. They showed each group silent video clips of three bilingual French-English speakers who recited sentences first in English or French and then switched to the other language.

The researchers found that 6-month-old babies from both bilingual French-English and monolingual English homes watched the video clips for a significantly longer period if the speaker switched languages, suggesting that they could distinguish between the languages visually. But by 8 months, only babies from a bilingual French-English home were able to tell the languages apart using visual cues.

In fact, living and working in Vancouver has given Werker ample opportunity to explore how cultural context shapes babies' experiences with language. The Canadian city is home to a large Asian population, and many infants in that group grow up in bilingual environments. Experiments with infants in Vancouver have given Werker a window into the cultural cues that influence language perception and acquisition. In a recently published study, Werker and her colleague Lillian May played English-learning White infants sentences in both English and Cantonese and showed them pictures of White people or of people of Asian descent. They found that when the children were hearing Cantonese, they looked more at the Asian faces than when they were hearing English. But when they heard English, they looked at both White and Asian faces equally, indicating they already understood that only Asians were likely to speak both Cantonese and English.

Werker's work has also discovered a link between specific in utero experiences and language perception. That research has centered on the role that maternal depression during pregnancy can play in the timing of an infant's language development. The studies have followed pregnant women experiencing depression, some being treated with antidepressants (specifically serotonin reuptake inhibitors) and others receiving no pharmacological

treatment, along with expectant mothers with no symptoms of depression. Werker and colleagues have examined indicators such as the heart rates of unborn babies when they're exposed to language. They also examined the babies' language development at 6 and 10 months of age, using methods ranging from eye tracking to fMRI scans. They discovered that the infants of mothers treated with antidepressants stopped discriminating the sounds and sights of their native language at a younger age than the babies of depressed mothers who had received no pharmacological treatment.

Werker's lab is following up with many of these children to see whether these correlations have lasting consequences for their language development.

Werker notes that this research has significant implications for language learning in children with disabilities, including hearing and visual impairments that prevent them from being exposed to the cues that typically drive language growth. ●

-Scott Sleek

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Watch Janet Werker's award address at [psychologicalscience.org/observer/beyond-words](https://psychologicalscience.org/observer/beyond-words).



# Why Your Understanding of Collectivism Is Probably Wrong

By Thomas Talhelm

Imagine you've won a 2-week, all-expenses-paid trip to a faraway country. You don't know where you're going, but they tell you it's a collectivistic culture. What images come to mind?

Are the people warm and caring? Are they helping and cooperative? Do they feel close to their friends and family?

If that's your intuition, you're not alone. It was the intuition tucked away in my brain when I moved to Beijing. Many PhD-holding cultural psychologists have it, too. It's built into our measures.

## A Simple Task: Measuring Collectivism

In the '90s, cultural psychologists, most of whom were based in North America and Europe, designed surveys to measure collectivism across cultures (e.g., Singelis, 1994). They wrote statements that collectivists should agree with:

- "I feel good when I cooperate with others."
- "I like sharing little things with my neighbors."

After the scales were written, the next step was to make sure they were reliable. In short time, the surveys passed tests of statistical reliability. People who agreed with "I feel good when I cooperate with others" also tended to share things with their neighbors. So far so good.

Armed with reliable tests, researchers set out to study cultures across the Pacific Ocean. They started by documenting differences in collectivism that experts were pretty sure were there (e.g., Heine, Lehman, Peng, & Greenholtz, 2002). Given what researchers already knew, Japan and China *should* be more collectivistic than America and Western Europe, they thought.

## Cultural Psychology's Open Secret

Within 20 years, researchers had completed enough studies that they could put them all together and meta-analyze them. What they found seemed plain wrong.

America, land of the cowboy, was more collectivistic than Japan (Oyserman, Coon, & Kimmelmeier, 2002). What about the Philippines and Tanzania? Americans were more collectivistic than people from both of those countries. Attempts to find reliable differences between East and West were no different (statistically) than flipping a coin (Heine et al., 2002).

Perhaps the data were right and people's expectations were wrong — maybe Japan and China aren't actually collectivistic. This explanation is particularly tempting 20 years later, after China's meteoric economic growth.



## The Fault in Our Microscopes

Yet most of the reactions avoided that tack. Instead, researchers suggested it was a problem of self-report methodology — after all, there's evidence to suggest that people just aren't very good at making accurate self-reports.

For example, researchers produced good evidence that people in Japan implicitly compare themselves with other (presumably collectivistic) Japanese people, which lowers their estimation of their own collectivism (Heine, Lehman, Peng, & Greenholtz, 2002).

Other researchers pinpointed the problem in how people use scales (e.g., Schimmack, Oishi, & Diener, 2005). The idea was that people in some cultures just tend to agree more — they're more acquiescent. They'll agree with "I often 'do my own thing'" and "To me, pleasure is spending time with others," even though researchers designed the two statements to measure two opposite attitudes. To solve this problem, researchers would need to adjust their analyses, statistically controlling for how much people tend to agree.

Still others said the problem was that the wordings are too abstract. Doing "my own thing" could mean wearing red shoes for a high schooler in Shanghai but could mean living alone for 30 years for a New Yorker. To fix this, researchers said the solution was to write scales about concrete scenarios (Peng, Nisbett, & Wong, 1997).

What all of these responses had in common was that they diagnosed the problem as residing in the measurement tool — the problem was in our microscopes. If we could fix our microscopes, we could get to the truth.

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**Thomas Talhelm** is an associate professor of behavioral science and William Ladany Faculty Scholar at the University of Chicago Booth School of Business.

## Maybe the Problem Is Us

But there's another thing these explanations have in common: They're about our microscopes, not our concepts. And it's problems with our concepts that recent evidence is pointing to.

Scattered hints were already there for researchers who looked in the right places. One hint was in the writings of a Japanese anthropologist who spent time living in rice-farming villages (Yoshida, 1984). In the village, tight ties and shared irrigation water created both harmony and conflict. The harmony was needed to keep the water flowing to the fields, but the harmony existed partly to obscure the conflict. "Tensions lie below the surface, feelings run deep, grudges persist, but the surface of relationship is managed to exhibit harmony."

Another hint could be found far away in Ghana. There in West Africa, a psychologist documented widespread "enemysp" (Adams, 2005). Compared with individualistic Americans, people in Ghana were much more likely to believe that their friends were secretly plotting against them. One local book warned that your most intimate friends may be "actually at the helm plotting your downfall" (Kyei & Schreckebach, 1975).

## Pieces That Don't Fit

And evidence continues to accumulate, suggesting that these are not rare exceptions to collectivism but rather a common feature of collectivism itself. In a study just published in the *Proceedings of the National Academy of Sciences*, my colleagues and I found that people in collectivistic China were more likely than Americans to be vigilant toward fellow in-group members (Liu, Morris, Talhelm, & Yang, 2019). Participants read about, for example, an eager coworker who offered to help them look over an important work project and then wrote about what might happen next. Some people worried that the coworker would be up to no good: "The friend also 'accidentally' threw some of the pages into the trash . . . His friend did not want to see [him] be successful and be promoted."

This worried vigilance colored 38% of responses from participants in China versus just 16% of responses from those in the United States.

And this vigilance exists despite the fact that Chinese participants rated coworkers as more of a family, with more of a shared identity, than American participants did. People in China were indeed more collectivistic, but that collectivist tendency didn't entail trust.

The emerging theory is not that this tension exists *despite* collectivism; rather, this tension exists *because* of collectivism. The tight social ties of collectivism creates this tension.

## The Vigilance of Rice

Of course, there are many other differences between China and the United States. For one, China scores higher on measures of corruption — data available from Transparency International (n.d.). China also endured the Cultural Revolution, which had the effect of pitting neighbors against neighbors and left lasting influences on people's willingness to trust others (Wang, 2017). These alternative explanations fit nicely.

To dig deeper into these possible explanations, the authors of the vigilance study have also compared regions within China. Within the same national political system, Han China is split into two major cultural regions. In the south, people have farmed paddy rice for generations. In the north, wheat was the dominant crop. Rice farmers had to coordinate irrigation networks and muster twice the amount of labor per hectare that wheat farmers did (Talhelm & Oishi, 2018). Rice was, therefore, a more collective crop.

To this day, people in rice areas show more hallmarks of collectivism than people in wheat areas (Talhelm et al., 2014). And in these collectivistic rice regions, people were more vigilant toward their peers than people in wheat areas. The differences weren't in the national political system; instead, they fell along the geographical boundaries of collectivism. See *Figure 1*.

## De-Idealizing Collectivism

The emerging picture of collectivism is less warm and fuzzy, more nuanced and complicated. And, as it turns out, this picture was already hidden in the early collectivism scales.

Tucked in among the warm-fuzzy items that didn't "work," there were also items that did work. The items that worked mostly asked about duties and responsibilities to specific people. For example, my recent research has found that people in collectivistic cultures are more likely to agree that "We should keep our aging parents with us at home." See *Figure 2*.

And although people living in collectivistic cultures report less intimacy with their friends, they are also more likely to think that they should stick together through tough times (Liu et al., 2019). When I asked people to imagine a friend advising them to break up with a new boyfriend, Americans tended to say they'd find more supportive friends. In China, people tended to think these friends *were* being supportive. Collectivism often values things other than warmth and feeling good.

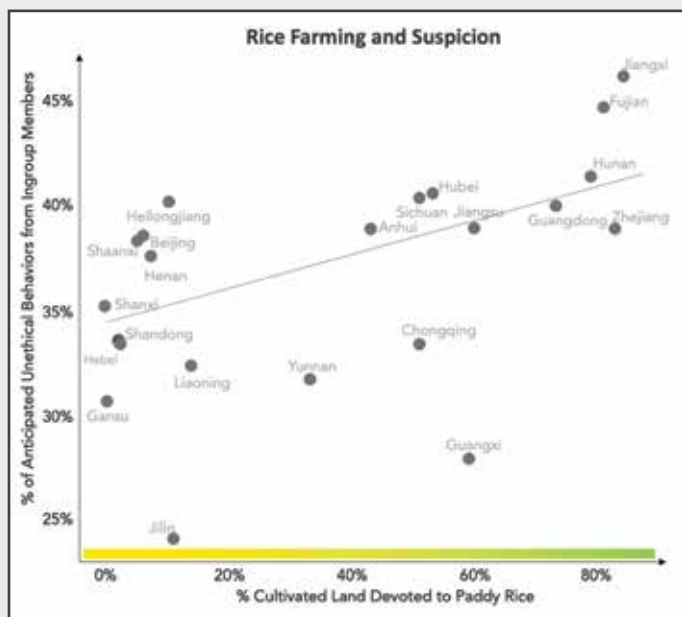
The emerging picture of collectivism is more complicated and, I think, realistic. If this vision is correct, it suggests that the answer to cultural psychology's open secret lies more in asking the right questions than in throwing out self-reports. ●

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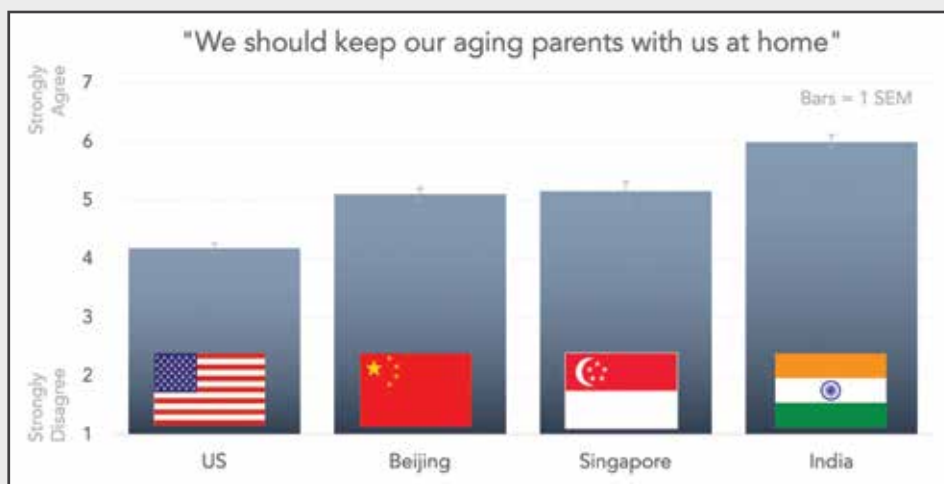
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Figure 1



The chart shows that in areas of China where rice farming is widespread — and coordination and networking more necessary — people are more suspicious of their peers compared to areas where rice farming is less extensive. This reflects the distrust that people of China can harbor toward one another despite their collectivist tendencies.

Figure 2



Recent research shows that the more collectivist a culture tends to be, the more people feel a duty to take in their aging parents.

# METASCIENCE

*THE SCIENCE OF DOING SCIENCE*

**T**he field of metascience has gained increasing momentum in recent years as concerns about research reproducibility have fueled a larger vision of how the lens of science can be directed toward the scientific process itself. *Metascience*, also known as *metaresearch* or the science of science, attempts to use quantifiable scientific methods to elucidate how science works and why it sometimes fails.

**By Jonathan Schooler**

Metascience has its roots in the philosophy of science and the study of scientific methods. However, it is distinguished from the former by its reliance on quantitative analysis and from the latter by its broad focus on the general factors that contribute to all aspects of the scientific process. Metascience also draws on the more narrowly defined fields of journalology, which studies the academic publishing process, and scientometrics, which uses bibliographic data in scientific publications to understand the impact of research articles.

### Coming Together to Study Science

In September, a symposium on metascience ([metascience2019.org](http://metascience2019.org)), funded by the Fetzer Franklin Fund and held at Stanford University, brought together nearly 500 attendees to help consolidate the field. The symposium included over 50 speakers from a remarkable variety of scientific disciplines, including psychology, philosophy, biology, sociology, network science, economics informatics, quantitative methodology, history, statistics, political science, medicine, business, and chemical and biological engineering. I organized the event with APS Fellows Brian Nosek (University of Virginia) and Jon Krosnick at Stanford, psychological scientist Leif D. Nelson of University of California, Berkeley, and Fetzer Franklin Fund director Jan Walleczek. Among the speakers were APS President Lisa Feldman Barrett (Northeastern University), APS Past Board Member Simine Vazire (University of California, Davis), an APS William James Fellow. The symposium also included three discussion panels involving journalists, representatives of assorted funding agencies, and scientists who have been critical of some aspects of the so-called replicability crisis.

The meeting addressed pressing questions surrounding the issue of scientific reproducibility including: “What is replication and its impact and value?” and “How are statistics, methods, and measurement practices affecting our capacity to identify robust findings?” However, it broadened the discussion to address a host of other aspects of the scientific process, such as “How do scientists generate ideas?” “How do scientists interpret and treat evidence?” and “What are the cultures and norms of science?” By contextualizing issues of reproducibility within the larger framework of investigating the scientific process, the metascience meeting illustrated how science is not so much in crisis as it is taking on the broader mantle of understanding and refining the scientific method.

The Stanford metascience meeting demonstrated the fundamentally interdisciplinary nature of the field. As metascientific studies have shown, interdisciplinary efforts sometimes build bridges and other times fall between the cracks. But the meeting illustrated how scientists across domains, united by shared interests, can converse about the common elements underpinning the scientific process. Although researchers seem largely in agreement regarding the value of metascience, they nevertheless have significantly disparate assessments of some of the pressing questions that metascience faces. For example, whereas some view reproducibility problems as in dire need of rectification, others see them as within the bounds of accept-



In many respects, metascience involves the psychology of scientists themselves. Both the psychological assets and liabilities of scientists are central to how science is carried out. ”

ability and, in most cases, naturally self-correcting.

In all this, the centrality of psychological science is unmistakable. Clearly some of our field’s role has stemmed from the challenges that psychological science itself has faced. Problems in replication, notorious examples of fraud, and published evidence for improbable claims have all contributed to psychological scientists’ motivation to take metascience head on. Such challenges have provided impetus for psychological scientists to foster open science registration, engage in large-scale replication projects, and develop approaches for understanding how scientists can unwittingly report questionable findings.

### The Psychology of Scientists

In many respects, metascience entails understanding the psychology of scientists themselves. Both the psychological assets and liabilities of scientists are central to how science is carried out. For example, deciphering the process underpinning creativity is central to understanding how scientific ideas are generated, as my colleagues APS Fellow Shelly L. Gable and Elizabeth A. Hopper (UC, Santa Barbara) recently demonstrated in a study that indicated that writers and physicists are more likely to have ideas that overcome impasses while mind-wandering.

Conceptualizing human reasoning is critical to delineating the scientific method, APS William James Fellow John Anderson (Carnegie Mellon University) and APS Fellow





For better or worse, the metascience genie is out of the bottle... It seems certain that new generations of scientists will face greater scrutiny while also benefiting from a deeper understanding of the scientific process.”

Christian D. Schunn (University of Pittsburgh) pointed out 20 years ago. Science educator Anton E. Lawson said that human memory has to be deciphered to understand how scientists accumulate knowledge and develop scientific theories. Psychological processes also contribute to many of the challenges that scientists face. Researchers such as APS William James Fellow Anthony Greenwald (University of Washington) have talked about confirmation bias influencing scientists' tendency to selectively report evidence that supports their hypotheses. Greenwald also found evidence of implicit bias contributing to scientists' decisions on which colleagues' work to cite in their own published research. Indeed, scores of other psychological factors — ranging from how individuals respond to rewards to how dominance hierarchies are arranged — are likely to play key roles in the unfolding of science. If the psychology of scientists influences how science is carried out, then it stands to reason that psychological science will be central to metascience.

## Metascience Meets the Mainstream

One criticism of the metascience meeting involved its subtitle: “the emerging field of research on the scientific process.” Some viewed this characterization as overlooking the many lines of work on this general topic that have been carried out for decades by people such as Stanford physician-researcher John P. A. Ioannidis. Although it is certainly true that research that could be characterized as metascience has been conducted for years, the consolidation and centrality of this field is arguably a recent development. Whereas specialized scientists such as Ioannidis have been discussing problems with scientific reproducibility for some time, the mainstream research community has only recently taken note of this challenge only recently. Furthermore, while independent lines of work have been carried out across disciplines, the consolidation of these areas into an overarching field has been limited. Thus, although it might be misleading to characterize the field of metascience as “emerging,” it certainly is consolidating and gaining momentum as never before.

The increasing role of metascience in science holds both great promise and some risk. Already its influence can be seen in the growing proportion of studies that are preregistered, as well as many journals' adoption of badges for preregistration and the sharing of data and materials. In addition, many scientists now understand how the previously common practice of combing through a new data set to find a “good story” and then reframing the results to tell that story can potentially lead to erroneous conclusions. The growing salience of metascience in the field is in many respects like holding a mirror up to science and the scientists who conduct it. On the one hand, exposure to a mirror is known to enhance conscientiousness, and indeed it seems likely that the emergence of metascientific concerns may be encouraging scientists to be more disciplined in the way they conduct their research. However, mirrors can also make people self-conscious, and it seems plausible that scrutiny of the scientific process could (at least sometimes) stifle scientific creativity and risk-taking.

This is, of course, a metascientific hypothesis that itself might be profitably explored, for example, by evaluating the impact of preregistration on the creativity and risk-taking of scientists. Unquestionably, when metascience is used as a platform for making attacks on the credibility of researchers whose work has failed to be replicated, both science in general and metascience in particular are bound to suffer indignities.

For better or worse, the metascience genie is out of the bottle. The zeitgeist is shifting. As metascience takes on an increasingly central role in science, it remains to be seen what discoveries it will make and what impact it will have. Nevertheless, it seems certain that new generations of scientists

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APS Fellow **Jonathan Schooler** is a Professor of Psychological and Brain Sciences at the University of California, Santa Barbara. His research on human cognition explores topics such as how fluctuations in people's awareness of their experience mediate mind-wandering and how exposing individuals to philosophical positions alters their behavior. His research interests in metascience include understanding why effects sizes often decline over time, and how greater transparency in scientific reporting might address this issue.

will face greater scrutiny while also benefiting from a deeper understanding of the scientific process. ●

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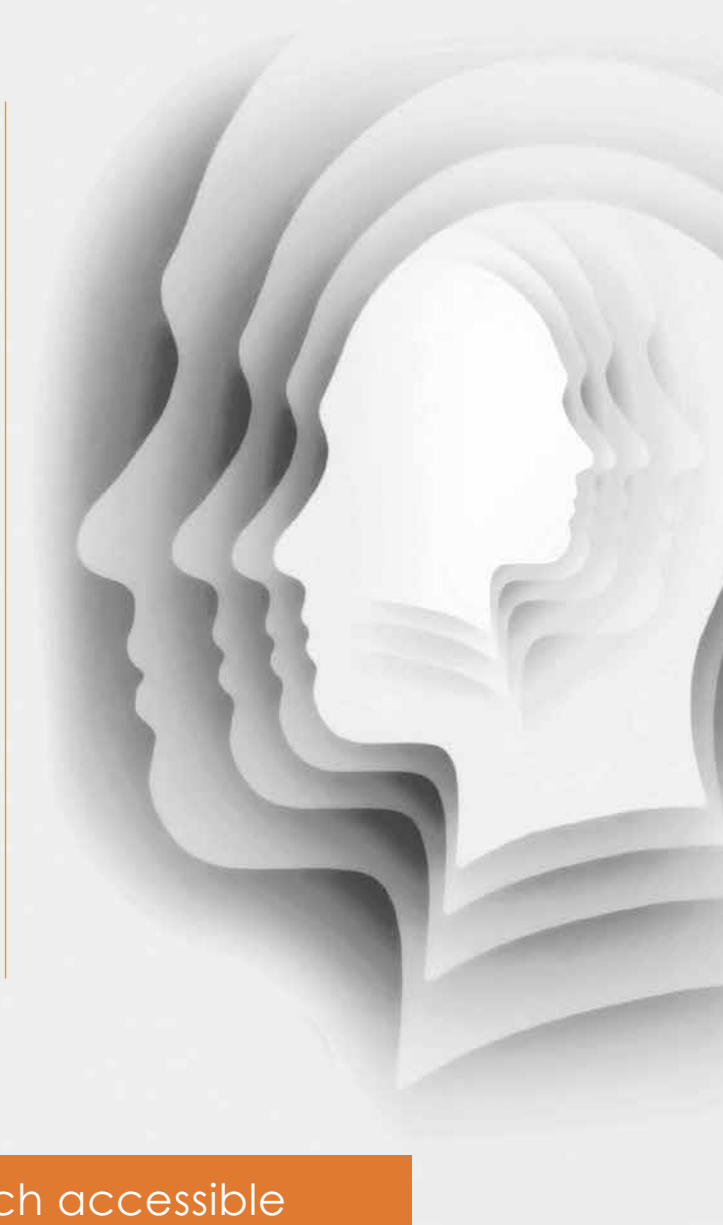
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Science and Craft of Teaching Psychological Science*

# Carol Dweck on How Growth Mindsets Can Bear Fruit in the Classroom

Several summers ago, a colleague sent Carol S. Dweck, a professor at Stanford University whose research has defined the field of mindset psychology, a photo of her 5-month-old nephew beaming with joy as he turned on a computer for the first time.

“It struck me: That’s what we were all like. We were all once that excited about learning something new,” Dweck said during her APS-David Myers Distinguished Lecture on the Science and Craft of Teaching Psychological Science at the 2019 APS Annual Convention in Washington, D.C.

However, when they are older, she continued, an alarming number of students report being overwhelmed by anxiety and depression to the point that it makes it difficult to function, much less achieve their academic potential. This can lead students to seek desperate solutions, but mindset science can play a role in helping to spark students’ love of learning again, said Dweck, a recipient of the APS James McKeen Cattell Fellow Award, the William James Fellow Award, and the APS Mentor Award.

There are two theories of intelligence, referred to simply as mindsets, that students can have about their intellectual abilities, although no one has purely one or the other, she said. Individuals with more of a fixed mindset believe that their intellectual abilities are simply fixed. They tend to approach learning with the goal of looking smart, and they often shy away from challenges because they believe that having to work hard at something or making mistakes means they don’t have high ability. Those with more of a growth mindset, on the other hand, believe that abilities can be developed—they are more likely to see effort as something that propels learning and to see setbacks as opportunities to build new skills.

These divergent mindsets are also reflected in how individuals process mistakes on a neurological level. In a study of 25 undergraduate students, Jason S. Moser (Michigan State University) and colleagues tasked participants with rapidly identifying the center letter in a string of similar text (e.g. “M” vs. “N”) while monitoring activity of the anterior cingulate cortex (ACC) and related brain areas associated with cognitive control of behavior, via electroencephalography. The students also completed a scale designed to measure fixed and growth mindsets.

Over the course of 480 trials, participants with growth mindsets demonstrated greater error positivity and greater electrical activity in the ACC and related brain regions associated with attending to mistakes compared with those with fixed mindsets. This boost in Pe was also associated with greater posterror accuracy, suggesting that these participants were processing errors



Growth mindsets are far more likely to take root with students when their school’s institutional culture supports challenge-seeking, **Carol Dweck** says.

more deeply, allowing them to make corrections immediately.

“A growth mind-set leads to an increased likelihood of learning from mistakes,” Moser and colleagues wrote in *Psychological Science*.

## Changing Students’ Point of View

Even mindsets themselves aren’t fixed — multisession, in-person interventions have been found to help those who are struggling academically, Dweck said. However, the time and resources required by this “boutique remedy” can make it difficult to scale, creating a gap that Dweck and colleagues aimed to fill by moving the intervention online during their National Study of Learning Mindsets.

The study followed a nationally representative sample of 12,000 ninth-grade students from 65 US schools as they made the transition to high school. Those in the intervention condition participated in a 45-minute online session designed to counter the belief that intelligence is fixed and that effort or mistakes indicate lack of ability. The students then summarized what they had read in their own words and advised a hypothetical student



on how to apply these findings to his or her own education. The session in the control condition focused more generally on brain function during learning.

Students who received the intervention reported a reduction in fixed mindset beliefs compared with those in the control group. This was also accompanied by an increase in GPA for lower achieving students and an increase in advanced math course enrollment in the following year across achievement levels.

Even when students engaged with the intervention, however, a growth mindset was far more likely to take root when their school's institutional culture, and their teachers and peers in particular, were supportive of challenge seeking as well, Dweck said.

## Mindset in Context

Mindset isn't just about what students bring to the table: Teachers' mindsets make a difference, too.

In a longitudinal study of 150 science, technology, engineering, and math (STEM) professors and their 15,000 students, Elizabeth A. Canning (Washington State University), APS Fellow Mary C. Murphy (Indiana University), and colleagues found that classrooms led by professors who believed ability is a fixed attribute had racial achievement gaps up to twice as large as courses taught by faculty with a growth mindset. On the flip side, racial minority students in classes taught by growth-mindset professors significantly outperformed minority students in fixed-mindset classrooms.

These same students reported being less motivated in fixed-mindset classrooms and thought these professors were less likely to emphasize learning and development. Students did not find fixed-mindset classrooms to be more difficult or time-consuming, however.

It's possible that fixed-mindset beliefs may cause cultural stereotypes — including the idea that White and Asian students are more “naturally gifted” in STEM than Black, Latino, and Native American students — to become more salient, hindering student performance. Canning and colleagues write in *Science Advances*. Because older White men are stereotypically depicted as “gatekeepers of science,” fixed-mindset beliefs may be more threatening coming from them, the authors write. However, fixed-mindset beliefs were found to be just as damaging regardless of professor identity. Educators' race, gender, teaching experience, and tenure status had little to no relationship with a classroom's racial achievement gap when taking mindset beliefs into account.

“Faculty mindset beliefs predicted student achievement and motivation above and beyond any other faculty characteristic,” Canning and colleagues wrote.

The question, then, Dweck continued, is how to create environments that emphasize this kind of growth and improvement, a guiding principle of her freshman seminar course at Stanford.

## Student Contributions

Dweck said she begins her freshman seminar at Stanford by acknowledging how daunting the beginning of college can be.

At the same time, she tries to give students a new orientation toward school.

“I say ‘today you're quitting your old job and you're starting your new job,’” Dweck recounts.

Their old job was getting as many As as possible and acing the achievement test to get into college, she continues. Now, their job is to use the university's resources to become the people they want to be—the people who will make their contributions to the world.

The rest of the course's readings, critiques, and research projects are designed to help them develop a growth mindset that they can use in service of this contribution — a more outwardly directed goal than individual “purpose” or “passion,” Dweck said. The assignments ask students to examine what triggers them to revert to a fixed mindset, to go outside their comfort zone in their academic and personal lives, and to use what they've learned about growth mindsets to mentor an important person in their life that they think is being held back by a fixed mindset.

Every few weeks, Dweck also sets aside class time for a discussion about what students are struggling with, an activity that often expands to fill the entire class session. At first, she was concerned this meant she wasn't teaching the material enough, but the students — in line with researchers' findings about student social norms — said they were learning an incredible amount by listening to one another. ●

-Kim Armstrong

## Recommended Reading

- Canning, E. A., Muenks, K., Green, D. J., & Murphy, M. C. (2019). STEM faculty who believe ability is fixed have larger racial achievement gaps and inspire less student motivation in their classes. *Science Advances*, 5(2), Article eaau4734
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Watch Carol Dweck's lecture at [psychologicalscience.org/observer/dweck-growth-mindsets](https://psychologicalscience.org/observer/dweck-growth-mindsets).

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*Edited by C. Nathan DeWall and David G. Myers*

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## The Benefits of Humble Pie

*By C. Nathan DeWall*

**Van Tongeren, D. R., Davis, D. E., Hook, J. N., & vanOyen Witvliet, C. (2019). Humility. *Current Directions in Psychological Science*, 28, 465-468. <https://doi.org/10.1177/0963721419850153>**

**T**a-Nehisi Coates has every reason to brag. He grew up learning to weather adversity in Baltimore's Mondawmin neighborhood. Police brutality, murder, and the crack epidemic were parts of daily life. Coates overcame these obstacles to earn acceptance to Howard University, write influential magazine articles and bestselling books, and testify before the US Congress. At age 40, he received a MacArthur Foundation "Genius Grant." But you will never hear Coates boast. He shies away from describing himself as famous or well-regarded. "I have my limitations," he said in a recent interview, "and I'm okay with that" (Gross & Miller, 2019).

Is Coates's humility linked to his success? According to APS Rising Star Daryl Van Tongeren and colleagues (2019), humility underpins professional success, supportive relationships, and well-being. Humble people form bonds that endure hardships, which may explain why humility predicts better physical and mental health (Exline & Geyer, 2004; Van Tongeren, Green, Davis, Hook, & Hulseley, 2016). When relationship conflicts inevitably arise, humility works as a lubricant to reduce relationship friction (Davis et al., 2013; Van Tongeren, Davis, & Hook, 2014). Hence, students may benefit when you encourage them to learn about and discuss humility.

What is humility? People often think of humility as thinking less of yourself. A closer definition, based on psychological science, is "thinking of yourself less." Van Tongeren and colleagues

argue that humility has an *intrapersonal* component (accurate self-view) and an *interpersonal* component (being other-oriented). Like Coates, humble people know their strengths and weaknesses, which makes them better equipped to select and solve certain challenges. Humble pie is a dish often served with company, as humble people build long-lasting and supportive relationships. This was true of Coates, who formed a close bond with his first editor and remained loyal to the magazine that hired him rather than accepting competing job offers.

To bring this cutting-edge research into the classroom, instructors can ask their students to complete the following activity.

### The Presidential Humility Activity

#### Slide #1

Instructions: This activity is about **humility**. Humility means that you have accurate awareness of your strengths and weaknesses. Humble people are also other-oriented rather than self-oriented. In this activity, you will use your laptop, tablet, or smartphone to gain information about two former US presidents so that you could complete a questionnaire about them. The items come from a validated humility scale (Davis et al., 2011).

#### Slide #2

Spend the next 5 minutes online learning as much as you can about former U.S. President **Abraham Lincoln**.

Discuss your search results with a class partner. What did you learn?

#### Slide #3

On the basis of your knowledge, search results, and partner discussion, please complete the following questions using the following scale:

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APS Fellow **C. Nathan DeWall** is a professor of psychology at the University of Kentucky. His research interests include social acceptance and rejection, self-control, and aggression. DeWall can be contacted at [nathan.dewall@uky.edu](mailto:nathan.dewall@uky.edu).



# Teaching Sleep to the Sleep-Deprived

By David G. Myers

Blake, M. J., Latham, M. D., Blake, L. M., & Allen, N. B. (2019). Adolescent-sleep-intervention research: Current state and future Directions. *Current Directions in Psychological Science*. <https://doi.org/10.1177/0963721419850169>

**A**re you or your students lethargic, accident-prone, sickly, gaining weight, unfocused, forgetful, uncreative, or depressed?

If so, there is good news. Psychologists have confirmed a simple treatment for all these conditions — one that increases concentration, improves mood, enhances energy, boosts memory, moderates hunger, strengthens immune functioning, and reduces accident risk. Moreover, the treatment can be self-administered, it feels good, and it's free!

I speak, of course, of sleep, nature's natural remedy for many of the assorted ills of sleep-deprived adolescents and adults.

## The Adolescent Sleep-Loss Epidemic

For today's adolescents, sleep deprivation is prevalent, reports Matthew Blake, Melissa Latham, Laura Blake, and Nicholas Allen (2019). Despite needing 9 hours of sleep a night, adolescents average less than 8 hours on school nights, and more than a third report difficulty falling asleep. As sleep expert James Maas noted in our correspondence, "Most teens are walking zombies, for whom just one more hour of sleep would improve their energy, alertness, grades, and athletic performance."

Given the well-publicized and commonly experienced effects of sleep loss, one wonders: Why do so many teens follow self-defeating sleep schedules?

To engage students in thinking about sleep research and its implications for their lives, instructors might invite small groups to ponder two questions:

1. Do (or did) they and their adolescent friends experience sleep deprivation? Hands up, who here has experienced an all-nighter? How many of you are tired today? How does that sleep loss affect you? Students could also be invited to respond to James Maas and Rebecca Robins' (2010) sleep quiz, with such items as "I often need an alarm clock to wake up at the appropriate time" and "I often fall asleep watching TV?"
2. Why do so many adolescents experience less than optimal sleep? Perhaps your students will recognize influences identified by Blake et al.:

- Diminished parental control
- Expanded social and work engagements
- Increased caffeine or energy-drink consumption
- Extended time-draining screen time and
- Age-related lengthening of circadian rhythm (which perhaps explains why college dorms are alive at midnight while retirement center hallways are noiseless after 9 p.m.)

## Possible Remedies

We all know that cognitive-behavior therapy (CBT) is a go-to treatment for depression. Blake and colleagues explain that CBT interventions have also been shown to improve sleep and associated mental health for adolescents as well as for adults (see also Blake & Allen, 2019). A combination of sleep-hygiene instruction, reduced presleep hyperarousal, relaxation and/or mindfulness training, altered light exposure, and changed attitudes about sleep have produced "significant improvements" in sleep and have also reduced anxiety, depression, and other physical, social, and academic problems. Moreover, thanks to wearable monitoring devices and smartphone applications, a new era of objective sleep research has arrived.

So, might some effective ingredients of sleep-boosting interventions be scaled up from face-to-face therapy to entire classrooms? The challenge, Nick Allen notes in our correspondence, is that knowledge and attitudes can be changed, but "*behavior change is hard*." One can *know* the good — the health-promoting benefits of controlled eating, aerobic exercise, and replenishing sleep, or the harm from smoking, vaping, and excess screen time — without *doing* the good.

*This puzzling attitude-behavior discrepancy has been noted by sages across the ages — from St. Paul ("For I do not do the good I want, but the evil I do not want is what I do") to Goethe ("Thinking is easy, acting difficult, and to put one's thoughts into action, the most difficult thing in the world") to Robert Abelson's (1972) summary of many social psychological experiments ("We are ... very good at finding reasons for what we do, but not very good at doing what we find reasons for").*

Yet there are, methinks, four reasons for hope.

First, social psychologists have found that specific, relevant attitudes can predict both intended and actual behaviors. Attitudes toward condoms predict condom use (Albarracín, Johnson, Fishbein, & Muellerleile, 2001), and attitudes toward recycling (but not general attitudes toward environmental issues) predict intention to recycle, which predicts actual recycling (Nigbur, Lyons, & Uzzell, 2010; Oskamp, 1991). Ergo, effective persua-

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APS Fellow **David G. Myers** is a professor of psychology at Hope College. His scientific writing has appeared in three dozen academic periodicals, and he has authored or coauthored 17 books, including *Psychology* (11th ed.), *Exploring Psychology* (9th ed.), and *Social Psychology* (12th ed.). Myers can be contacted via his website at [davidmyers.org](http://davidmyers.org).

sion will target attitudes toward specific sleep practices, such as eschewing electronic screens (with their daylight spectrum light) in the hour before bed.

Second, people can improve their self-control by forming “beneficial habits” (Galla & Duckworth, 2015). To experiment, we can start small — going to bed 15 minutes earlier for three nights. If there is something we or our students would like to make a permanent part of our lives — to run before dinner, drink more water, go to bed earlier — we can experiment by doing it daily for 2 months—by which point it will likely start to become automatic, something we do without thinking and would find it hard not to do (Lally, Van Jaarsveld, Potts, & Wardle, 2010). New sleep attitudes will help, but practicing new sleep behaviors will help more. New sleep attitudes are especially likely after “motivational interviewing” that engages students in thinking through the costs and benefits of more sleep and then setting their own specific and realistic goals.

Third, you and your students can brainstorm ways we could manage our sleep situation. We could, for example, change school start times. Blake et al. note that Australian high schools start, on average, 47 minutes later than U.S. high schools and that Australian adolescents average (voilà!) 47 minutes more sleep (Short et al., 2013). Or, as individuals, we could have our phones cue our intention to sleep—by buzzing us 30 minutes before our planned bedtime.

Finally, Matthew Blake, Nick Allen, and their Australian and American colleagues offer—for those who would like to implement a comprehensive adolescent sleep intervention—free online resources. A search for “Sleep SENSE Workbook and Facilitator’s Manual” will take you there. ●

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# Meta-Analyses: To Do or Not to Do

By Michael King

**M**eta-analysis is the statistical procedure for aggregating and analyzing multiple data sets on a specific topic to answer one or more questions. Meta-analyses are designed to synthesize data across studies and provide statistical evidence for a specific effect, or lack thereof. The evidence from a meta-analysis is typically stronger than any single study or literature review. Further, meta-analyses can test why effects might vary across the data sets by conducting moderator analyses.

You might be asking yourself, “Should I conduct a meta-analysis?” It’s a big question. I’ll share the pros and cons I learned from conducting my own (King, Katz, Thompson, & Macnamara, 2019).

The idea of publishing a meta-analysis can be very attractive. Well-done meta-analyses are almost a guaranteed publication, and you don’t have to worry about programming an experiment or recruiting participants and collecting their data. All you have to do is conduct a literature review that you would be doing regardless, copy over the previous results, and run a program to meta-analyze all of the data, right? Not exactly.

Conducting a meta-analysis is a long, meticulous process that may take months or even years to complete. It requires extreme attention to detail and tenacity. There are many roadblocks and issues that can arise during every step of meta-analysis that can make this process extremely frustrating. I will go through the process of conducting a meta-analysis and include some tips for overcoming these potential roadblocks based on my own experiences.

## 1. Framing a Question

Before you begin a meta-analysis, you first must know what question you want to answer. You should conduct a literature review on your topic of interest, see if there is a gap in the literature, determine whether or not a meta-analysis is actually needed, frame a question, and ask whether there are potential moderating variables. When you frame your question, it is critical to be as specific as possible; you do not want to make the mistake of posing a vague question. Being vague may result in an even lengthier literature-search stage.

For example, in our meta-analysis on spatial reasoning ability in twins (King et al., 2019), we framed our question in a way that

made the search more manageable. We were interested in the extent to which spatial reasoning skills are determined by genetic factors and environmental factors. We decided the best way to determine this in a meta-analysis was to specifically look at the twin-study literature. We also decided that age, sex, and the type of spatial-reasoning measure used were potential moderating variables. Thus, we framed our question as, “What are the genetic and environmental contributions of spatial reasoning ability in twin studies, and do these contributions differ depending on age, sex, or type of spatial-reasoning test?” If the question was framed as “To what extent are spatial skills determined by genetic factors?”, then our literature search may have included not only twin studies, but also DNA studies, chromosome studies, and any other type of study investigating genetic contributions. If you are considering conducting a meta-analysis and find that your research question is rather broad or overly ambitious, you may want to narrow the scope of your question.

## 2. Completing the Search

This step in conducting a meta-analysis is perhaps the most frustrating and time-consuming. However, with proper planning and organization, lots of headaches may be avoided. Before you begin the search process, it is vital to have a search plan in place. A well-built search strategy is the basis of the meta-analysis and will be reported in your pre-registration as well as the Method section of your manuscript. The search strategy determines which studies you will evaluate and assess for eligibility and inclusion.

An important step in this process is determining what your search terms will be. They need to be specific enough to keep you from sifting through an endless number of papers, but broad enough to ensure you don’t miss relevant studies. In King et al. (2019), the search terms included *twin*, *genetic*, *heritability*, *spatial reasoning*, and *spatial ability* (p. 67). By including all of these terms, we decreased the likelihood of missing out on a paper because the authors used different terminology. Once you have your search terms set and have determined your inclusion and exclusion criteria (more on this soon), it is time to start the search. This can be a tedious process, and it’s easy to lose track of where you left off. Stay organized, make lots of notes, and be persistent. Use the PRISMA guide (<http://www.prisma-statement.org/PRISMAStatement/>) to help organize and track your search (Moher, Liberati, Tetzlaff, Altman, & The PRISMA Group, 2009). It is easy to be discouraged or exhausted by doing the same search every day for weeks or even months. It may help to bring a colleague in on your study. Many hands make light work.

---

**Michael King** is a fifth-year PhD candidate at Case Western Reserve University. His research focuses on the cognitive and perceptual factors that influence human performance, such as memory, attention, and intelligence. His current research is focused on visual search and how attentional demands affect working memory capacity during search.



### 3. Screening and Coding

Before conducting the search, it is crucial to determine your inclusion and exclusion criteria. In the King et al. (2019) example, we set our criteria so that each study needed to:

“be a twin study design; include data for same sex twin pairs; include a measure of spatial ability; measure heritability; report an effect size reflecting the genetic influence on spatial reasoning or enough information to compute this effect size; report the methods and results in English; and include only human participants without known disorders or disabilities” (p. 67).

Criteria such as “report the methods and results in English” may be something you wouldn’t think of until papers you can’t decipher have appeared in your search.

Screening the many potential papers to see if they meet your inclusion criteria can be exhausting and time-consuming. Once you have determined the papers that will be included in your meta-analysis, you have to organize information and code certain variables. Make sure to note the page where you found each piece of information for later reference. This part can be less straightforward than expected because every study reports things a little bit differently.

### 4. Running Analyses

Once the search is complete, and all of the data is organized in a spreadsheet, it is time to run the actual meta-analysis. The R programming language has packages available to run analyses for both fixed and random effects models, and it is free to use. Many free online resources can help you learn R (Harrer, Cuijpers, Furukawa, & Ebert, 2019). However, if you do not possess these skills, this would be another good time to bring in a collaborator to be on the study with you. Excel is another software option

(Neyeloff, Fuchs, & Moreira, 2012).

You’ll need to learn about the decisions that go into conducting the analyses as well (e.g., selecting the type of model, adjusting for dependent samples, deciding which publication bias analyses to run).

### 5. Writing the Paper

You’re finally there. Know there is a good chance all this careful work has paid off.

So should you conduct a meta-analysis? Again, it is a big question. Take time to do your research, consult with colleagues, and take a hard look at your schedule for the next year. It takes a lot of time and effort, but your work will be appreciated and respected by the scientific community. ●

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# ANNOUNCEMENTS

Send items to [apsobserver@psychologicalscience.org](mailto:apsobserver@psychologicalscience.org)

## GRANTS

### Student Grant Competition Funding

Take advantage of this great opportunity to win \$500 in funding for your research! The Student Grant Competition is held each year to support research in its early development stages (e.g. purchasing research materials, data collection expenses). Proposals from all areas of psychological science are welcome.

**Submissions Due:** November 15, 2019

For more information, visit [psychologicalscience.org/members/grants-awards-and-symposia/student-grant-competition](http://psychologicalscience.org/members/grants-awards-and-symposia/student-grant-competition) or contact Kelsey Moty at [apssc.graduate@psychologicalscience.org](mailto:apssc.graduate@psychologicalscience.org).

### James McKeen Cattell Fund Sabbatical Support

The James McKeen Cattell Fund provides support to supplement the regular sabbatical allowance provided by the recipients' home institutions.

**Applications Due:** January 15, 2020.

For more information, see the ad on p.8 or visit [cattell.duke.edu](http://cattell.duke.edu).

### New from APS: Psychological Science and Entrepreneurship Poster Award at APS 2020

The Psychological Science and Entrepreneurship Poster Award will recognize the contributions of students and early-career scientists conducting research at the intersection of psychological science and entrepreneurship. Apply for the award when submitting your poster for the 2020 APS Annual Convention in Chicago.

**Submission Deadline:** January 31, 2020

For more information, visit: [psychologicalscience.org/publications/observer/obsonline/coming-soon-psychological-science-and-entrepreneurship-poster-award-at-aps-2020.html](http://psychologicalscience.org/publications/observer/obsonline/coming-soon-psychological-science-and-entrepreneurship-poster-award-at-aps-2020.html)

### 2020 RAND Summer Institute

The 27th Annual RAND Summer Institute will be held July 6-9, 2020, in Santa Monica, CA.

The RAND Summer Institute will consist of two conferences addressing critical issues facing our aging population: Mini-Medical School for Social Scientists; and a Workshop on the Demography, Economics, Psychology, and Epidemiology of Aging. Interested researchers can apply for financial support covering travel and accommodations.

**Application Deadline:** March 16, 2020

Visit RAND's website for more information and the application form: [rand.org/well-being/social-and-behavioral-policy/centers/aging/rsi.html](http://rand.org/well-being/social-and-behavioral-policy/centers/aging/rsi.html).

### January and February 2020 NSF Grant Submission Deadlines

Apply today to NSF programs that support psychological science.

View application deadlines for 2020 on the APS website.

Visit [psychologicalscience.org/policy/january-and-february-2020-nsf-grant-submission-deadlines.html](http://psychologicalscience.org/policy/january-and-february-2020-nsf-grant-submission-deadlines.html).

## MEETINGS

### 32nd APS Annual Convention

May 21–24, 2020

Chicago, Illinois

[psychologicalscience.org/conventions](http://psychologicalscience.org/conventions)

### 4th International Convention of Psychological Science

March 25–27, 2021

Brussels, Belgium

[psychologicalscience.org/conventions](http://psychologicalscience.org/conventions)

### 2019 Behavior, Energy & Climate Change Conference

November 17–20, 2019

Sacramento, California

[beccconference.org](http://beccconference.org)

### 42nd Annual National Institute on the Teaching of Psychology

January 3–6, 2020

St. Pete Beach, Florida

[nitop.org/](http://nitop.org/)

### 2020 Cognitive Aging Conference

April 16–19, 2020

Atlanta, Georgia

[cac.gatech.edu](http://cac.gatech.edu)

### International Society for the Study of Behavioural Development 2020 Conference

June 21–25, 2020

Rhodes Island, Greece

[issbd2020.org](http://issbd2020.org)

### Southeast Ecological Community Psychology Conference

November 15–16, 2019

Columbia, South Carolina

[southeastco2019.weebly.com](http://southeastco2019.weebly.com)



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# NAP TRACKER

*A pioneer in studying specific learning and memory profiles in atypical development, University of Arizona professor **Jamie Edgin** is uncovering the link between poor sleep and learning for children with Down syndrome.*

## **What originally led you to your general interest in sleep and memory in children, in particular children with Down syndrome and autism?**

In the early 2000s, I received my PhD training from Bruce Pennington at the University of Denver, who studied cognition in developmental disorders. Pennington's lab allowed me to conduct research and publish on the neuropsychological profiles across a number of intellectual and developmental disabilities, including Down syndrome, Williams syndrome, ADHD, and autism. When I began my work at the University of Arizona, the merging of that background and our sleep-science programs at the U of A really motivated me to further pursue the ways that sleep disturbance may affect learning and cognition in developmental disorders broadly. Surprisingly, even though sleep disturbances are highly prevalent in developmental disorders, the research in this area is scant. That is what we are hoping to change.

## **What do you consider your most important or surprising finding in this research?**

In 2018, my lab published a paper suggesting that the timing of sleep in relation to new learning is really important. Recent studies from my lab and others have shown that young typical children benefit from naps—and need them—to retain memories, and napping right after learning is the most beneficial. However, in Down syndrome, sleeping right after learning had the opposite effect—children lost new knowledge from poor sleep quality during those naps. This suggests that memory impairment is not universal in Down syndrome, and it depends on how and when children learn.

## **What important assessment tools have you developed and employed in your work?**

Working with developmental disabilities requires the careful use of measures of cognition and memory that have been validated for specific populations. We have validated and designed new assessments to take up this task, including a battery of iPad assessments of memory function, funded by the National Institutes of Health, and eye-tracking measures. We use a variety of methodologies to understand brain function during sleep, including electroencephalographic measures and movement monitoring.



**Jamie Edgin**  
Photo by Bevin Dunn

## **What new lines of research are you pursuing?**

Given the substantial sleep disturbances in autism, we are starting new studies to understand how sleep may affect memory and learning in this group. Because previous studies of autism have had limited numbers of participants, we are designing a multi-site international trial of those effects. Further, my collaborators and I are conducting studies testing memory intervention techniques through behavioral, pharmacological, and electromagnetic stimulation protocols (i.e., transcranial magnetic stimulation).

## **What long-term clinical outcomes would you like to see as a result of your findings?**

Some of our work has motivated early screening for sleep disorders in Down syndrome, but many children with developmental disorders still go unscreened. Sleep disturbance often remains untreated in children and adults in the general population. I would like to see routine early and lifelong screening by doctors for these conditions. Further, many active clinical trials aim to change cognitive or behavioral function in developmental disorders, but there is little recognition that poor sleep may confound the results of those trials. How and when we administer drugs in treatment trials is critical, and sleep quality must be considered. ●



Read the full interview online at  
[psychologicalscience.org/observer/  
nap-tracker](https://psychologicalscience.org/observer/nap-tracker).

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