

# Observer

An abstract graphic consisting of various colored circles (blue, green, orange, yellow, dark blue) connected by thin lines of the same colors. The lines and circles are scattered across the page, with some larger circles and lines forming a more prominent structure on the right side.

## Collective Emotions

Exploring the alignment of joy, sadness, anger, and more

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- Sensory technologies and psychological science
- The case for getting more entrepreneurial
- Randy Engle reflects on *Current Directions*

# Observer

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## FEATURES



### Collective Emotions

Exploring the alignment of joy, sadness, anger, and more

From team sports to social media, shared emotions and perceptions of social support can enhance social belonging and encourage prosocial behavior. But they don't always bring out the best in groups. Scientists look at the psychological processes that allow us to experience emotions together.

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The National Institutes of Health Center for Scientific Review is encouraging scientists to help improve the peer-review process for promising research initiatives in need of federal funding.

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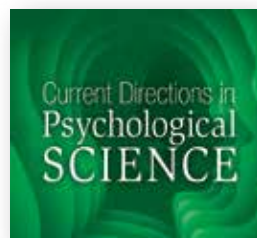
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## Teaching Current Directions in Psychological Science

"Psychological Science's Contribution to a Sustainable Future"  
by **David G. Myers**

"Going Green: the Cognitive Benefits of Nature"  
by **Michael Scullin and Cindi May**



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2019 Kent Berridge  
& Terry Robinson

# The Gift of Discovery

For many of us, December is a month of festivity and gift giving, so it's time to muse about what would make the perfect gift for a psychological scientist (other than tenure, or your paper on the cover of *Nature*). My pick would be a new scientific tool — the sort that extends what our eyes, ears, and brains can observe, creating opportunities to ask new questions. What better gift to yourself than a means to make discoveries?

Tools have a central place in the history of our science. In the 19<sup>th</sup> century, psychology was transformed into a full-fledged empirical science by importing tools from neurology and physiology. These tools helped our predecessors measure changes in heart rate, fashion reaction-time experiments, and observe behaviors in patients with brain lesions. Intrepid investigators could then search for the natural basis of mental categories that describe various types of knowing (cognition), feeling (emotions), and action (volition).

Since that heady time, psychological science has been continually enriched by periodic infusions of contraptions and computations from other disciplines. When I started my career, structural equation modeling was just coming into its own, functional MRI was peeking over the horizon, optogenetics didn't even exist, and the web was barely a glimmer on our 13-inch CRT monitors. Fast-forward 25 years, and these miracles of technology are part of our standard operating toolbox. As that toolbox expands, so do the boundaries of what we can discover.

It's worth remembering, though, that tools can obscure as easily as they can reveal. For example, our field includes a diversity of views on what a mind is and how it's implemented by the brain and body. Tools can silently amplify a scientist's deeply held beliefs as readily as they can provide unintuitive revelations.

A prime example is one of the newest additions to the psychologist's toolbox: machine learning. This powerful family of techniques from artificial intelligence (AI) lets us make decisions and infer outcomes by training a computer model on one set of observations, identifying patterns, and generalizing to a new set of observations. The promise of machine learning (or, depending whom you ask, its hype)



**Lisa Feldman Barrett**  
APS President

lies in its supposed objectivity, the possibility of removing the human mind from the equation.

Strictly speaking, machine learning is not completely new to us. Regression analysis is a simple type of machine learning for making inferences from examples. Also, machine learning has been around for years in computer science and has seeped into every domain of life. Search engines, for example, use machine learning to fill in your query faster than you can type it, because they've learned from billions of previous searches to predict with eerie accuracy what people are looking for.

In psychology, we apply machine learning to classify images, identify preferences, and search for biomarkers. Usually we assume that our models are discovering something true in the natural world that does not depend on our own thoughts and beliefs . . . but are we?

I'll show you what I mean with a toy example. Suppose we want to distinguish preferences for cake from those for cookies. (What's not to love about both, particularly if they are made with chocolate, I know, but bear with me.) In phase one of our imaginary study, we use our intuitions about cakes and cookies to collect thousands of photos of delectable baked goods from Google Images: gooey chocolate chip cookies, slices of buttery pound cake, luscious chocolate cheesecake, and other yummy delights. To be on the safe side, we ask hordes of participants to confirm our stimulus selection by explicitly labeling each photograph as "cake" or "cookie."

In phase two, we ask even more participants to rate the depicted cakes and cookies on how appetizing they are, with questions like, "How much would you enjoy eating this?" or

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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).

Psychological science has been continually enriched by periodic infusions of contraptions and computations from other disciplines ... As that toolbox expands, so do the boundaries of what we can discover.

“How tasty is this?” We crowdsource the rating task using Amazon’s Mechanical Turk, and data collection is finished within a few weeks. Then we use the responses to train a supervised machine-learning algorithm to classify “love of cakes” and “love of cookies.” If we are successful, we have a machine-learning system that distinguishes two different sentiments with high accuracy. That means we can apply the resulting system to classify new samples. We can generate pretty graphs showing how the data clusters beautifully into categories that reflect preferences for cakes and cookies. We can even scan participants’ brains as they make their ratings, applying machine learning to find patterns of brain activity. And voilà, we have discovered the biomarkers for “love of cake” and “love of cookies.”

So where’s the controversy?

This style of empirical approach has many issues we could discuss, to be sure, but here we’ll focus on just one: We assumed from the beginning that cookies and cakes are distinct categories. This assumption guided our stimulus section, our

study design, and the data we collected. And lo and behold, the results of our supervised machine-learning analysis are consistent with the two categories we *stipulated* at the start. Our common-sense ideas became encoded in the machine-learning model during training.

What if we had sampled a wider variety of desserts — would these same two categories have emerged? Perhaps the cake/cookie distinction is more like a continuum, with (say) a classic chocolate chip cookie on one end and a devil’s food cake on the other. But what about brownies — are they cookies or cakes? How about a chocolate cookie bar, or a madeleine? What about minidonuts or coconut macaroons, for god’s sake?

Similarly, what if we had let the machine-learning algorithm infer categories instead of using the “cake” and “cookie” labels we provided (a technique called *unsupervised machine learning*)? Would we have instead discovered categories other than “cake” and “cookie,” such as “vanilla” and “butterscotch,” or a “craving for desserts with ripples” and “craving for desserts with shiny surfaces”? (Unsupervised machine learning is not really a solution on its own, however, because it can only cluster on the data that we feed it.)

Our study, by failing to consider that they might be situated in context, also assumed that preferences for cookies and cakes are immutable categories. Maybe some people prefer cookies during the day and cake at night. Perhaps some people decline dessert when they feel full, while others are ready to devour chocolate under any circumstances.

Sophisticated tools do not protect us from embedding our assumptions about the world and ourselves in our stimuli, our experimental designs, and our theoretical inferences — especially tools that may give the appearance of objectivity. This point might seem obvious for our toy example of cakes versus cookies, but how about anger versus fear? Perception versus memory? Neurological versus social pain? Vision versus audition? Male versus female? Bias in the training data is just one of many issues that can lead us to seeming discoveries about the nature of the mind and behavior that unknowingly reify our own beliefs. In psychology, this larger problem is called naive realism — the belief that the world is as it appears to you. William James, in 1890, called it “the psychologist’s fallacy.” In computer science, whole fields of study have emerged, such as ethical AI and machine-learning fairness, to reduce this sort of bias. As psychological scientists, we know to keep our biases in check, and machine learning is a new domain for us to strengthen those skills.

So this holiday season, treat yourself to a new scientific tool and pursue the thrill of discovery. After you read the operating instructions, but before you power up the tool, take a moment to remember that *what* we observe depends, in large part, on *how* we observe.

And then have a piece of cake. ●



## Not Dead Yet: A Reply on Behalf of the Zombies

Hi APS members. I'm a zombie on the list of "Zombie Ideas" discussed in the October 2019 issue of the *APS Observer*. I appreciate the opportunity to make a case for my continued existence, and I hope you'll hold off on beheading me while you hear me out.

Zombies (a.k.a. theories) are complex creatures. As with the other examples listed in the article, the description of me contained multiple distinct propositions, with additional propositions implied. For each zombie idea, the article invokes evidence that appears to refute one or two particular propositions (not always the stated ones), and concludes that the whole zombie must die. That seems premature.

First, part wrong does not equal all wrong when we're talking about a complex, multiproposition theory. Second, I'm just one of a family of related zombies/theories, each with somewhat different features. When the data suggest one proposition is seriously flawed, it's important to ask whether that proposition is a single family member's toe, or a life-giving organ common to all. In my case (basic/discrete emotion approaches to facial expression), the proposition you acknowledged to be *true* is not only shared by my whole family — but it's our heart.

Moreover, the data on which we have to base these life-or-death decisions are often weak. Weak data do not invalidate the entire theory; it just means you need additional kinds of data to test the propositions. Different methodologies have different strengths and limitations, and in many of the cases mentioned, they produce conflicting results. That seems like a questionable basis for executing someone.

Given all this, killing me now serves no purpose. I'm not here for you to kill or reprieve; I'm here to get you to ask questions. Test each part of me to see whether and how it works. Properly specified, some of your propositions will prove right, others wrong, and yet others in the ballpark but in need of adjustment.

From time to time, it is important to step back and look at all the evidence, not necessarily to decide whether the zombie should live or die, but to see what parts of me still require study.

Something to consider: If people hold on to so-called zombie ideas, maybe it's because there's something useful about them; they pass a real-life "smell test." That doesn't mean scientists should endorse the popular view uncritically, but rather that it's worth asking carefully what about the idea is so compelling, and which parts of it might be right as well as which are wrong (McGuire, 2013). If I'm still walking, it's because my heart is still beating. I'm not dead, I'm just changing, and with time I'll be an even better version of me. ●

*APS Fellow Michelle "Lani" Shiota is an associate professor of psychology at Arizona State University.*

### References

- Barrett, L. F. (2019). Zombie ideas. *APS Observer*, 32(8).
- McGuire, W. J. (2013). An additional future for psychological science. *Perspectives on Psychological Science*, 8, 414–423.



## Correction

In the November 2019 issue of the *Observer*, the name of **Jon Krosnick** (Stanford University) was misspelled in the cover feature, "Metascience: The Science of Doing Science." In addition, Nobel Laureate **Daniel Kahneman** was incorrectly listed as a participant in a metascience symposium that was referenced in the feature. The *Observer* regrets the errors. ●

### SOUND BITE

"We found that persistent cannabis use from age 18 to 38 was associated with declines in IQ, and this decline in IQ was concentrated among adolescent-onset persistent cannabis users."

Psychological scientist **Madeline Meier**, Arizona State University, testifying October 23 before the US Senate Caucus on International Narcotics Control about her longitudinal research on the effects of cannabis use.

## Lee Ross Shares the Evolution of His Signature Work



APS Fellow Lee Ross

APS William James Fellow **Lee Ross** jokes that the scientific term ascribed to him, *Ross's fundamental attribution error*, sounds as if he's the one who made the error.

More than 40 years ago, the Stanford University social psychologist coined the term to describe the way in which we overlook the situational factors that may contribute to a person's behaviors, attributing them instead to individual characteristics. He now says the *truly* fundamental attribution error is "the illusion of objectivity — that I have a sense that what I see is the way it really is."

Ross spoke at length about his research on human inference, judgment, and decision-making in the latest installment of the APS video series "Inside the Psychologist's Studio." Interviewed by his former student, Swarthmore College associate psychology professor Andrew Ward, Ross discussed some of his other groundbreaking research on errors and biases in judgment, which include:

- belief perseverance — maintaining a belief despite new, contradictory information;
- the hostile-media effect, in which partisans from opposing sides of an issue view the same media coverage as biased against them; and
- reactive devaluation, in which we devalue an idea if it originates from an antagonist.

Ross also discussed his three decades of initiatives to apply his research to citizen diplomacy and conflict resolution in the Middle East, Northern Ireland, and other parts of the world. This includes his instrumental role in forming the Stanford Center on International Conflict and Negotiation, an interdisciplinary research community focused on the study of conflict resolution and peacebuilding. ●



The video is available on the APS website at [psychologicalscience.org/observer/psych-studio-ross](https://psychologicalscience.org/observer/psych-studio-ross).

## Barbara Tversky Speaks on Language and Learning in Beijing



Barbara Tversky (top row, fourth from right) with students from Tsinghua University

In October, APS Immediate Past-President **Barbara Tversky** (Teachers College, Columbia University, and Stanford University) visited Beijing, China to give a keynote address on knowledge representations and natural language processing at a Sino-German Symposium hosted by the computer science department at Tsinghua University. Tversky also visited Peking University during this trip.

Pictured above, beginning in the top row, fourth from left: **Stella Christie**, a professor of psychology; **Yang Liu**, a postdoc and former graduate student of Tversky's at Columbia Teachers College; APS Immediate-Past President **Barbara Tversky**; and **Yu Zhang**, a professor of education, along with Tsinghua University graduate students shortly after a joint talk on education and psychology. ●

## THE APS METHODOLOGY CENTER

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## National Academy of Medicine Elects APS Fellow Ted Abel



Ted Abel

APS Fellow **Ted Abel** of the University of Iowa (UI) has been elected to the National Academy of Medicine (NAM). Abel is recognized for his work on the interplay of sleep and memory formation and storage as well as the molecular basis of neurodevelopmental and psychiatric disorders, including autism.

Abel is professor and chair of UI's Department of Neuroscience and Pharmacology and Roy J. and Lucille A. Carver College of Medicine. He is director of the Iowa Neuroscience Institute at UI. He has coauthored more than 200 scientific papers, and his research has been supported by grants from the National Institutes of Health, the Defense Advanced Research Projects Agency of the US Department of Defense, the Simons Foundation, the Department of the Army, the National Science Foundation, the Human Frontiers Science Program, the Whitehall Foundation, the Brain and Behavior Research Foundation, and the David and Lucile Packard Foundation.

APS Member **Peter A. Ubel** (Duke University), an MD whose research on health-care decision-making has revealed the unconscious and irrational forces that influence patients' and physicians' choices, is also an electee.

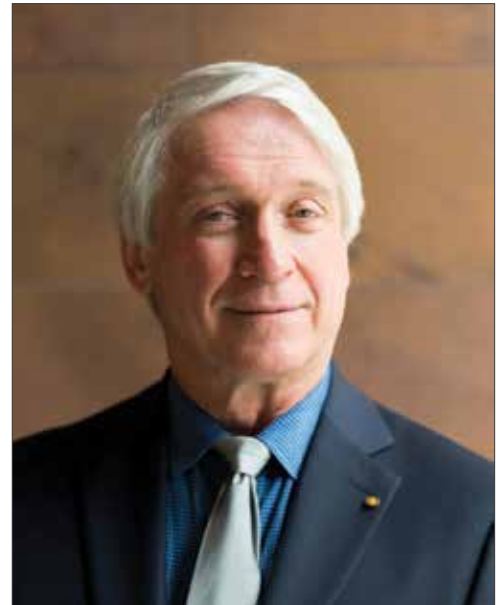
Election to the NAM is considered one of the highest honors in the fields of health and medicine and recognizes individuals who have demonstrated outstanding professional achievement and commitment to service. This year, the NAM elected 90 national and 10 international members. New members are elected by current members. ●

## Hinshaw Receives Ruane Prize for ADHD Research

APS James McKeen Cattell Fellow **Stephen P. Hinshaw** has received the 2019 Ruane Prize for Outstanding Achievement in Child and Adolescent Psychiatry Research for his work on the developmental psychopathology of attention-deficit/hyperactivity disorder (ADHD). The Ruane Prize, awarded by the Brain and Behavior Research Foundation, is one of the most prestigious prizes for research on neuropsychiatric disorders in children and adolescents and includes a cash award of \$50,000.

Hinshaw, a professor of child and adolescent psychology at the University of California's San Francisco and Berkeley campuses, has made transformative contributions to our understanding of both biological and contextual risk factors and interventions for ADHD in girls and women. Since the 1990s, his Girls with ADHD Longitudinal Study has followed 140 individuals diagnosed with ADHD during childhood. This work has revealed the long-term trajectory of the disorder and its potential interventions, as well as the role of family influence, peer rejection, and early trauma.

Hinshaw is codirector of the UCSF-UC Berkeley Schwab Dyslexia and Cognitive Diversity Center. He has authored more than 325 publications and 14 books, including *Another Kind of Madness: A Journey Through the Stigma and Hope of Mental Illness*, an autobiographical look at the need to break the silence surrounding mental illness. He received the APS James McKeen Cattell Award in 2016 and currently serves on the *Psychological Science in the Public Interest* editorial board. ●



Stephen P. Hinshaw

Learn more about Hinshaw's research by watching his APS James McKeen Cattell Fellow Award Address at [psychologicalscience.org/r/adhd](http://psychologicalscience.org/r/adhd).

## US Congress Cautions NIH on Clinical Trials Policies

### Senate to NIH: Work with the Basic Research Community

The US Senate has instructed the National Institutes of Health (NIH) to acknowledge the basic behavioral science community's opposition to recent controversial policy announcements and to collaborate with the community before issuing further changes.

For the past several years, APS, other organizations, and individual scientists have opposed a series of NIH policy changes that classify basic research with humans as clinical trials and introduce new requirements for scientists conducting basic research with human subjects. APS has led efforts to inform Congress about the adverse impact these policy changes have had on the behavioral science community. (Recently, NIH further delayed implementation of some clinical trials requirements that were set to affect basic behavioral research. [psychologicalscience.org/policy/nih-clinical-trials-requirements.html](https://psychologicalscience.org/policy/nih-clinical-trials-requirements.html))

It appears that these policy changes are on lawmakers' minds still. The Senate has issued its fiscal year 2020 appropriations bill for Labor, Health and Human Services, Education, and Related Agencies, which is the subcommittee that funds NIH. The report associated with this bill instructs NIH to work with the behavioral science community in developing future policies that affect these fields.

"The Committee understands NIH received comments opposing the [definition of basic research with humans as clinical trials] from members of the basic science research community, as well as current and former members of NIH advisory councils," the report reads.

The report says that while the Senate supports efforts to increase transparency in scientific research, it believes that NIH should consider cost effective and viable options to meet that goal. APS's position is that the recent NIH policy changes — including a new policy that calls for basic scientists to report their research on ClinicalTrials.gov, a site designed for true clinical trials and not basic science — do not meet this shared goal.

Referenced in the report is the opposition of current and former members of NIH advisory councils to the policy changes. This opposition was conveyed by a letter, headed

by APS Fellows Gregory A. Miller (University of California, Los Angeles) and Terrie E. Moffitt (Duke University) and coordinated by APS to NIH Director Francis Collins, in which 35 current and past members of NIH advisory councils expressed their opposition to the changes.

APS will continue to work with Congress so that policymakers are aware of the negative repercussions of NIH's ongoing policy changes. ●

*The full text of the Senate report related to clinical trials and basic research with human subjects is included below.*

*Clinical Trials Policy.* — The Committee has followed NIH's efforts to improve transparency and stewardship of all clinical trials, including those trials that are basic science experiments involving human participants. The Committee supports NIH's recent announcement to delay the implementation of certain registering and reporting requirements for basic experimental studies with humans. The Committee understands NIH received comments opposing the 2014 (and now Common Rule) definition from members of the basic science research community, as well as current and former members of NIH advisory councils. While the Committee supports efforts to increase transparency and improve oversight of clinical trials, it also seeks to ensure any changes are necessary to meet those goals, including considering existing viable, cost effective alternatives. The Committee urges NIH to continue its efforts, including working with the basic research community, to achieve a balanced registration and reporting strategy that meets the interests of study participants, investigators, and taxpayers. NIH is directed to report to the Committee no less than 60 days prior to moving forward with any new proposals for registering basic experimental studies with humans as clinical trials.

#### QUOTE OF NOTE

*"To the extent that failures are being ignored, to the extent that we actually tune out rather than tune in, then there is no learning whatsoever from failures."*

APS Fellow **Ayelet Fishbach**, University of Chicago Booth School of Business, on a study that showed people learn less from their failures than from their successes. Fishbach and coauthor Lauren Eskreis-Winkler published their findings in *Psychological Science*.

## NIH Center Strives for Fair Review of Grant Applications

By Kristin Kramer

### New to NIH?

NIH has two levels of review for grant applications. The first level is conducted by a scientific review group (also called a panel or study section) and assesses the overall scientific impact of the proposal. The second level is conducted by the advisory council of the funding institute to which the proposal is assigned. A two-letter code in the grant number indicates the funding institute to which the proposal is assigned. For example, 1 R01 MH 123456 is assigned to the National Institute of Mental Health. The funding institute bases a funding decision largely on the first level of review but also takes into account their research priorities.

### What is CSR's role?

The Center for Scientific Review (CSR) is one of the 27 institutes and centers of NIH. Unlike most of the institutes and centers, CSR does not fund grants. The focus is solely on the first level of review. All grant applications to NIH are received by CSR. CSR then refers those applications to scientific review groups. Approximately 75% of grant proposals submitted to NIH are reviewed by groups convened by CSR.

### What (and who) is a study section?

Grant proposals might be reviewed in a standing study section or in a special emphasis panel. Standing study sections are review groups that recur every review cycle, 3 times per year, and have a slate of members who are extensively vetted and typically serve a 4-year term. Standing study sections depend primarily on the members, but scientific review officers recruit additional reviewers each meeting (called ad hoc or temporary members) as needed to ensure proper expertise to evaluate the proposals. Special emphasis panels are review groups that do not have a set list of members. The list of reviewers for a particular review group (roster) is usually published at least 30 days before the meeting. The list of members of a standing panel is always available at CSR's website ([public.csr.nih.gov/StudySections](http://public.csr.nih.gov/StudySections)).

**Kristin Kramer** is the director of the Office of Communications and Outreach at the Center for Scientific Review (CSR). Her research at the University of Memphis focused on the plasticity of neuroendocrine systems and social behavior in animal models.

The Center for Scientific Review (CSR) has a singular mission — to see that grant applications to the National Institutes of Health (NIH) receive fair, independent, expert, and timely reviews, free from inappropriate influences, so NIH can fund the most promising research. CSR receives and refers all NIH grant applications and performs the first level of review for approximately 75% of them, amounting to review of more than 62,000 grant applications per year and involving more than 18,000 unique reviewers. CSR does this with less than 0.4% of the \$39.3 billion NIH budget. Because identifying the most promising research is crucial to NIH's mission, CSR regularly evaluates the peer-review process and implements improvements informed by data and input from the scientific community.

CSR is seeking broad engagement with the scientific community to more quickly make improvements and respond to problems. CSR hears from the scientific community through multiple avenues. The members of the CSR Advisory Council provide advice to the director of CSR on all matters related to its mission on the basis of their experience as investigators and reviewers. They act as a conduit for input from the broader scientific community. Traditionally the council has comprised full professors and previous study section chairs but, to broaden stakeholder input, the council was recently expanded to include an assistant professor and more junior ad hoc participants.

Another way in which CSR has been able to broaden perspectives in peer review is to include early career scientists in the review process. The Early Career Reviewer Program began in 2011 to provide early career scientists with experience to improve their ability to write a competitive grant application and to broaden and diversify CSR's pool of well-trained reviewers. A CSR Advisory Council working group, made up of members of the council as well as members of the broader scientific community, recently reevaluated the Early Career Reviewer Program and recommended changes in criteria and expanded reach and support of early-career scientists.

CSR's efforts to broaden perspectives in peer review go beyond the Early Career Reviewer Program. Primary efforts involve diversifying review panels in terms of gender, race and ethnicity, professional rank, and institution size. In recruiting members of standing panels, the emphasis is on expertise established through funding and publications instead of academic rank. Accordingly, scientific review officers are recruiting more assistant and associate professors to serve as members of standing panels. CSR will also seek recommendations of reviewers from scientific societies through an online form that is under development.

In addition to advice from CSR Advisory Council, CSR is using social media and a new Review Matters blog ([csr.nih.gov/reviewmatters/](http://csr.nih.gov/reviewmatters/)) to engage with the broader scientific community. Comments from these streams give CSR a direct way to communicate with stakeholders. A recent policy change to allow Scientific Review Officers to release summary statements for not-discussed applications first, instead of following those for all discussed applications, was motivated by comments on Twitter (@CSRpeerreview).

CSR also seeks input from the scientific community in decisions about the scientific scope of study sections. In 2019, CSR implemented the Evaluating Panel Quality in Review process, or ENQUIRE, a data-driven process intended to evaluate both the scope of panels and the quality of the review process in each. Among the study sections of potential interest to psychological scientists evaluated in the Healthcare Delivery and Patient Management ENQUIRE group were Behavioral Medicine: Interventions and Outcomes and Psychosocial Risk and Disease Prevention. The Functional Neuroscience ENQUIRE group that was evaluated in 2019 included the study sections Language and Communication; Neuroendocrinology; Neuroimmunology; Rhythms and Sleep; Neurobiology of Learning and Memory; Cognition and Perception; and Mechanisms of Sensory Perceptual, and Cognitive Processes. All of these review proposals using human subjects.

## Why is it important to use a rigorous process to determine scientific scope of study sections?

For standing study sections, raw overall impact scores are assigned a percentile on the basis of that study section's scores over the last three review cycles. Funding institutes and centers perform a second level of review and their advisory councils make funding decisions. Although the research priorities of the funding institute bear on funding decisions, the outcome of the first level of review is a major factor. Because an application's assigned percentile is based on the scoring behavior of the particular study section, and because only the top 10% to 15% are likely to be funded, grouping of scientific topics is important.

## How should you prepare to write a grant application?

Identify a likely funding institute and contact a program officer there before you go beyond developing specific aims. Because the priorities of the funding institute are important in the second level of review, make sure your research goals fit the institute's priorities. You can find a program officer by using NIH RePORTER ([projectreporter.nih.gov/reporter.cfm](http://projectreporter.nih.gov/reporter.cfm)) and using the Matchmaker function to find funded proposals on similar topics.

After confirming that your goals fit the priorities of a funding institute, construct your proposal with the help of a successful model. Ask your colleagues who have been successful in competing for NIH awards if you may see their funded proposal and use it as a guide. NIAID also has posted copies of funded proposals ([niaid.nih.gov/grants-contracts/sample-applications](http://niaid.nih.gov/grants-contracts/sample-applications)).

Aim to finish your proposal well in advance of the grant deadline. This will give you time to get feedback from colleagues. Submit your proposal to [grants.gov](http://grants.gov) in advance of the deadline so that you can check your submission for errors and omissions. You can correct problems but only if you are able to submit the final version before the deadline. Submitting materials to address omissions or errors are not allowed.

## Does CSR consider requests for a particular study section?

Yes, requests can be made using the Assignment Request Form. Requests are optional. CSR will examine the specific aims and the research strategy to find the best fitting scientific review group. Descriptions of study sections ([public.csr.nih.gov/StudySections](http://public.csr.nih.gov/StudySections)) are also posted.

## How can you figure out what panel to request?

Use CSR's Assisted Referral Tool ([art.csr.nih.gov/ART/selection.jsp](http://art.csr.nih.gov/ART/selection.jsp)). Second, you can log onto NIH RePorter and use the Matchmaker function to see similar funded applications and where they were reviewed. Third, contact a program officer or SRO for advice.

## How can you gain review experience?

If you are an early-career scientist who has not yet successfully competed for an R01 or R01-equivalent grant, you might be eligible for the CSR Early Career Reviewer Program ([public.csr.nih.gov/ForReviewers/BecomeAReviewer/ECR](http://public.csr.nih.gov/ForReviewers/BecomeAReviewer/ECR)).

The ENQUIRE process proceeds with the establishment of a panel of external scientists who have a broad interest in the topic area; those with a vested interest in a particular study section are avoided to ensure a broad view of the field. External panels determine how best to group the various topic areas and to consider emerging areas of science. The process has been most effective when the external panel has been asked to think outside the confines of the current organization. Following input from the external panel, an internal panel composed of NIH staff from CSR and from the funding institutes and centers involved focuses on the review process and examines factors such as whether the panel members as a whole are involved in discussions of applications versus a sole focus on the comments of assigned reviewers.

The most important way that CSR receives input from the scientific community is through scientists' role as peer reviewers. NIH depends on scientists to give their time to serve on panels. Although scientists should undertake review service as a responsibility, there are many rewards. Review meetings provide opportunities to network with colleagues; meet scientists in related fields, possibly leading to new collaborations; see emerging science; and see first-hand how NIH policies are implemented.

Peer review depends not only on the generosity of scientists who serve as reviewers but also on their integrity. NIH and CSR have recently raised awareness of the importance of integrity and confidentiality in the peer-review process; an accurate

The ENQUIRE process proceeds with the establishment of a panel of external scientists who have a broad interest in the topic area... External panels determine how best to group the various topic areas and to consider emerging areas of science.

assessment of grant proposals relies on the ability of reviewers to speak freely without concern that the confidentiality of the peer-review meeting will be broken. CSR has taken multiple actions to address this ranging from increasing reporting avenues, increasing awareness among investigators and reviewers, developing online integrity-training modules, and working with NIH to investigate allegations and respond with appropriate consequences ranging from deferral of applications to pursuing government-wide suspension and disbarment. ●

## Reinventing Introductory Psychology

APS presents a series of science-focused lesson plans to help psychology instructors expose and correct the myths and misconceptions that students bring to the classroom.

[www.psychologicalscience.org/r/reinventing](http://www.psychologicalscience.org/r/reinventing)

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PSYCHOLOGICAL SCIENCE





# New Directions After *Current Directions*

*After a decade serving as Editor of Current Directions in Psychological Science, APS Fellow Randall Engle (Georgia Institute of Technology) is handing off the baton (to Rob Goldstone of Indiana University Bloomington). The Observer asked Engle, who goes by Randy, to share his reflections on the challenges and accomplishments he reached while editing the publication, and how its influence has spread into classrooms and across the world.*

## **What are some of the challenges of editing a journal that covers the full range of psychological science and is written for a broad audience?**

As an introductory psychology teacher my whole career, I like all the areas of psychological science. But I certainly can't follow the new work in all areas, so I relied on the members of the Advisory Board to recommend authors. I tried to have a diverse membership on the Board, representing different areas of the field and a variety of roles. In addition to asking the Board, I also searched for potential authors at conferences, invited recommendations from other journal editors, and reached out to textbook authors who survey their field while preparing for book revisions. I have always thought that a great conference talk or great colloquium makes for a great *Current Directions* paper.

## **Current Directions became significantly more international during your tenure. How did you accomplish that?**

It was my goal from the very beginning to make the journal more international — I said so in my application for the job. I invited international scholars to be members of the Advisory Board and encouraged the American members to seek out international authors.

## **You put together several memorable and highly popular special issues on a range of topics. Are there any favorites for you?**

That's like asking me who is my favorite child. I enjoyed all of them a great deal, and I think they served to focus the field on cutting-edge topics and in a venue that aspires to make papers accessible to a very diverse audience — including nonpsychologists.

## **Integrative science is where we're seeing some of the most exciting advances, both within psychological science and in conjunction with other fields. What are some of the most promising areas for integration? Are there**



**Randy Engle** says his primary goal as Editor of *Current Directions in Psychological Science* was to publish papers his friends and neighbors outside academia could appreciate.

## **particular challenges for publishing articles on integrative topics in Current Directions?**

Our goal is to publish papers that can be read and appreciated by good psych undergrads and by educated nonpsychologists. Our papers are limited to 2,000 words with fewer than 40 references. Those criteria make it tough to be very integrative.

## **The journal is widely used in classrooms, even becoming the basis for the popular Observer series "Teaching Current Directions." How did you incorporate this aspect of the journal's mission in your editorial decisions?**

Undergrad education has always been very important to me, regardless of my administrative role or the demands of my research. So I look at every article from the standpoint of whether I might use it in my own class. My primary goal as editor has been to publish papers my friends and neighbors outside of the university could appreciate. I always advise authors to have a freshman edit their paper for them, to make sure it is accessible to that broad audience. The "Teaching *Current Directions*" columns are a great complement to the journal. I was always flattered when someone at a conference

I was always flattered when someone at a conference would recognize my name and comment, "Oh, you edit *Current Directions*. I love that journal."

would recognize my name and comment, "Oh, you edit *Current Directions*. I love that journal."

**What would you say were some of the significant changes and trends in our field that occurred during your tenure? How did you address those in the journal?**

First, the field is much more international now. Psychology has been one of the most popular majors in America for many

years, but more and more that is becoming true in China and India. That also means that a great deal more research is coming out of those parts of the world. I added a member of the Advisory Board from Taiwan several years ago, and I expect that members from China will be added soon. Other big changes are, of course, the increase in neuroscience-related areas and the emerging importance of behavioral genetics and behavioral economics. I think *Current Directions* can play a huge role in bringing to light the emergence of new areas to the field.

**What's next for you now that you're passing the baton to a new editor?**

I will be 73 in December, but I don't foresee retiring just yet. I am heavily involved in my science. I do work on individual differences in cognitive control as mediated by differences in working memory capacity, fluid intelligence, and ability to control attention. My work has been funded by the Air Force and is currently funded by the Navy. Recently, the Office of Naval Research (ONR) asked me to do a project on whether we could improve the predictive validity of the Armed Services Vocational Battery (ASVAB), the test used by all the military branches to assign recruits to jobs. We just finished a lab-based study in which our attention-control tasks added over 20% to the ability of the ASVAB to predict performance on a multitasking proxy for work. We are beginning an assessment with pilot and air-traffic-control trainees to see whether attention control measures help predict success in training.

There are two interesting aspects to this work that are rather striking to me. One, someone at ONR told me that if we found the same improvement in predictive validity with real recruits in real jobs, it would save the American taxpayers \$500 million EVERY year. Second is a strong suggestion that basic measures of attention control and working memory capacity bring you this improvement in selection while also decreasing adverse impact. Our measures of basic cognitive components are quite simple but nevertheless demanding. ●

**QUOTE OF NOTE**

*"People make decisions in this way: There's what they want to decide, and they look for reasons to believe what they want to believe or decide anyway. They look for reasons to reject the things they don't want."*

APS Fellow **Gary Brase**, Kansas State University, on his research on sustainability decisions, in the university's student newspaper *The Collegian*.

## APS Award Address

# Psychological Science Meets Sensory Technology

**T**hink of sensory technology — wearables, virtual assistants, virtual reality, and more — and engineers, programmers, and computer scientists often come to mind. But the rise of these devices also means a new horizon of possibilities for psychological scientists, according to APS James McKeen Cattell Fellow and longtime APS Treasurer Roberta L. Klatzky.

Sensory technology not only can help us to appreciate the world by stimulating our sensory systems in new ways, but also can be used to advance psychological research, said Klatzky, a professor of psychology and human-computer interaction at Carnegie Mellon University, during her May 2019 award address at the APS Annual Convention in Washington, DC.

“We can look at behavior in environments that we could never actually create in reality, through virtual reality,” she said. “We can measure behavior with great precision — kinematics, dynamics, gaze behavior . . . even physiological reactions.”

Through collaborations with engineers, medical doctors, and other experts, Klatzky has developed and improved devices to enhance cognitive function, compensate for sensory-motor loss, teach, and entertain. These include a robotic rehabilitation game for stroke patients and a reading device for children that simulates activity in a story, such as the feeling of rain.

Psychological scientists bring a unique understanding of the human user to these partnerships, Klatzky said, helping engineers to pinpoint how their technology can be most effective while uncovering new perspectives.

### “Glitches in Perception” Can Improve Stroke Rehabilitation

In many situations, our senses do not transfer information as smoothly as expected, Klatzky said. These “errors” can be capitalized on to design sensory technologies that benefit a range of individuals, including patients recovering from strokes.

Klatzky, Susan Lederman (Queen’s University, Canada), and Jack Loomis (University of California, Santa Barbara) studied one such error in perception by tasking participants with identifying raised-line graphics of objects, such as a key or a hammer, by touch. To the researchers’ surprise, they couldn’t.

In another study, participants had trouble identifying an object when looking at only a part of it through a narrow aperture. This inability to describe what one is touching or partially seeing suggests that sensory perception “doesn’t feed into a mind’s eye where objects are easily recognized,” said Klatzky.

A related error in perception is the “just noticeable differ-



**Roberta L. Klatzky** has worked with engineers, medical doctors, and other experts to develop and improve devices to enhance cognitive function, teach, entertain, and compensate for sensory-motor loss.

ence” — such as when it takes a shift of multiple decibels for humans to notice a change in audio volume. Through PhD research with Bambi Brewer at Carnegie Mellon University, Klatzky applied knowledge of this perceptual error in a robotic rehabilitation hangman game. Throughout the game, stroke patients had to choose letters by moving their fingers to control a robot. As the game went on, patients with extension problems had to move their fingers further apart, and those with flexion



Watch Roberta L. Klatzky's award address at [psychologicalscience.org/observer/science-meets-sensory](https://psychologicalscience.org/observer/science-meets-sensory).



Wherever possible, move a task to the perceptual system, because cognition is much more taxing to our systems than perceiving.”

— APS James McKeen Cattell  
Fellow Roberta L. Klatzky

problems had to move their fingers closer together — yet they didn't realize they were exerting more effort. After 6 weeks of this, patients showed measurable functional improvements.

“People were willing to work way beyond what they originally defined as their functional limitations,” said Klatzky. “This is a great way to exploit the inadequacies or the failures or the glitches in perception.”

### Perceiving Your Next Move

Many researchers have long assumed that actions fall into the domain of either perception or cognition. But some cognitive actions — which are typically demanding on mental resources — can become part of perception, Klatzky said. Expert chess players, for example, can perceive their next move in a game rather than thinking or planning for it, according to research by APS William James Fellow Herbert Simon and William Chase (Carnegie Mellon University).

“Wherever possible, move a task to the perceptual system, because cognition is much more taxing to our systems than

*The APS James McKeen Cattell Fellow Award recognizes APS members for a lifetime of outstanding contributions to the area of applied psychological research. Learn more about the award, past recipients, and nomination information at [psychologicalscience.org/observer/awards-and-honors](http://psychologicalscience.org/observer/awards-and-honors).*

perceiving,” said Klatzky. This implies that sensory technology could be beneficially engineered to “off-load” a task from cognition to perception.

A device for vision-guided surgery that projects ultrasound images onto patients' bodies to guide surgeons' incisions puts this principle into practice.

“[I]t becomes a perceptually guided action rather than a cognitively guided action,” Klatzky said. “That worked very well to improve accuracy, cognitive load, and a bunch of other factors in the task.”

### “Do Not Touch”

The sensory system is critical in guiding decision-making and action, Klatzky explained.

“Perception is just the doorway, but if you control the doorway, you control what gets through it,” she said.

For example, people's first instinct upon seeing a novel object is often to touch it. This is why museums need signs that say “please do not touch” or why pregnant women sometimes complain of total strangers approaching them to touch their bellies, said Klatzky.

Perception leads to representation, and that “is the doorway to everything else . . . action, and further upstream, aesthetic appreciation, higher meaning, inference, extrapolation,” Klatzky said.

Research by Klatzky and Joann Peck (University of Wisconsin, Madison) found that study participants were induced by the appearance of perfume bottles to want to touch them and that this tendency was greater for participants who scored higher on a scale measuring their intrinsic desire to touch objects. The effects suggest that visually inviting touch-ability could be a component of product design.

### Of Snowball Fights and Robot Hugs

Klatzky's research has contributed to a variety of sensory technologies. One such device is an electronic reader designed by Disney that uses tactile sensations to improve children's reading comprehension and memory. Children put their hands in the Mickey Mouse gloves included with the device, allowing them to feel simulations of actions in the book such as the sensation of rain drops on their hands when they read about a storm in a jungle.

A “Force Jacket” vest, also designed by Disney, allows people to feel the impact of a snowball in a snowball fight, the slither of a snake across their body, or a transformation into a muscular hero through air compartments that inflate to exert pressure across the chest.

Klatzky's undergraduate students at Carnegie Mellon have also built a soft robot to collect data on whether a robot hug could ever replicate the real thing.

“I hope that more widgets come my way, because it's endlessly fascinating to do this,” Klatzky said. ●

— Elaine Meyer is a freelance writer based in Chicago.

# Fixing the Replication Crisis: The Need to Understand Human Psychology

By Dorothy Bishop

Leading researchers are sharing their views on psychological science and metascience — the use of scientific methodology to study science itself — in a series in the Observer. Follow the series online at [psychologicalscience.org/topics/metascience](http://psychologicalscience.org/topics/metascience).

In the past 15 years, there has been enormous progress in documenting problems with the credibility of research findings, not just in our own field but also in many areas of science. Metascience studies have helped us quantify the extent of the problem and have begun to shed light on the underlying causes. We need to move now to a focus on fixing the problems rather than just illustrating them. But can this be done?

Many of the problems currently under discussion have been known for decades. For instance, in 1976, Michael Mahoney wrote a book called *Scientist as Subject: The Psychological Imperative*, in which he discussed the bias that reviewers show toward their favored ideas. He gave evidence from an experiment in which he asked 75 reviewers to referee journal articles that were identical except for the results, which could be positive, null, or mixed. He found that reviewers were biased against results that did not support their theoretical position. As a consequence, he proposed a new approach to journal reviewing that anticipated by some 30 years the idea of a Registered Report, arguing that “manuscripts should be evaluated solely on the basis of their relevance and their methodology. Given that they ask an important question in an experimentally meaningful way, and they should be published — regardless of their results.” (Mahoney, p. 105) Yet his demonstration of bias and his suggested solution were overlooked, and we continue to see strong evidence of publication bias in our journals. Many editors are reluctant to accept null results, regardless of how well-designed a study is.

In a similar vein, Jacob Cohen’s (1969) exhortation to do adequately powered studies remains largely ignored.

Why do these problems with scientific practice persist, and why aren’t we doing more to solve them?

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APS Fellow **Dorothy Bishop** is Professor of Developmental Neuropsychology and Wellcome Trust Principal Research Fellow at the University of Oxford. Her research focuses on the nature and causes of language impairments in children.

We continue to see strong evidence of publication bias in journals. Many editors are reluctant to accept null results, regardless of how well-designed a study is.

Most responses to this question focus on either training or incentives. Those who advocate training posit that people do bad science because they confuse it with good science. If we train them better, they will improve. Others point out that people are led astray by skewed incentives regardless of training. Rewarding scientists for publishing in high-impact journals and acquiring large amounts of grant income will lead people to chase these proxy indicators of good science in a way that can corrupt the scientific process.

I agree that training and incentives are important issues to tackle if we want to have a hope of improving science, but I think we need also to take into account a third factor: human cognitive biases. Misunderstanding of statistics, and the incentive structure that has evolved, have their roots in human cognition. As I discuss



## Scientific thinking is not natural for humans: To be good scientists, we often have to actively inhibit our normal ways of thinking.

in a recent article (Bishop, 2019), scientific thinking is not natural for humans: To be good scientists, we often have to actively inhibit our normal ways of thinking. Amos Tversky and Daniel Kahneman's (1971) article on "belief in the law of small numbers" illustrated how bad we are at appreciating the impact of sampling error on estimates based on small numbers. This, I think, explains why we can keep explaining power analysis to researchers, and why they will continue to not take it seriously. *p*-hacking reflects a different aspect of statistical misunderstanding: On the one hand, there is a failure to appreciate that a *p* value cannot be interpreted out of context (de Groot, 2014), but I would argue that there is the added tendency to regard errors of omission as less serious than errors of commission (Haidt & Baron, 1996).

Thus, failing to report null results, even though they are an essential part of the context of interpretation of a *p* value, is regarded as far less serious than tweaking a *p* value to push it into significance. I term this "moral asymmetry," and I propose that it also plays a role in publication bias (where failing to report null findings is seen as innocuous) and the equally serious though less-documented tendency for citation bias (i.e., writing reviews that simply omit evidence that does not fit).

A final cognitive bias relates to our need for narrative to structure events. This was noted by Bartlett (1932) in his writings on "reconstructive remembering": our tendency to filter information in perception and memory to fit our existing schemata. Bartlett emphasised the beneficial consequences: We avoid information overload and can focus on what is meaningful. Science would not advance at all if we just had mountains of unstructured data: We need to make sense of observations and use our theoretical understanding to guide our interpretation. But this reconstructive tendency has a negative side. It leads us to ignore facts that don't fit and to present our research as if it told a much neater story than is usually the case.

Overall, I suggest that no amount of training in statistics or exhortations to behave differently will be effective in tackling the replication crisis unless we understand the cognitive basis of the biases that lead us astray. Fortunately, as psychological scientists, we are well-placed to do this, given our rich history of research on human cognition. ●

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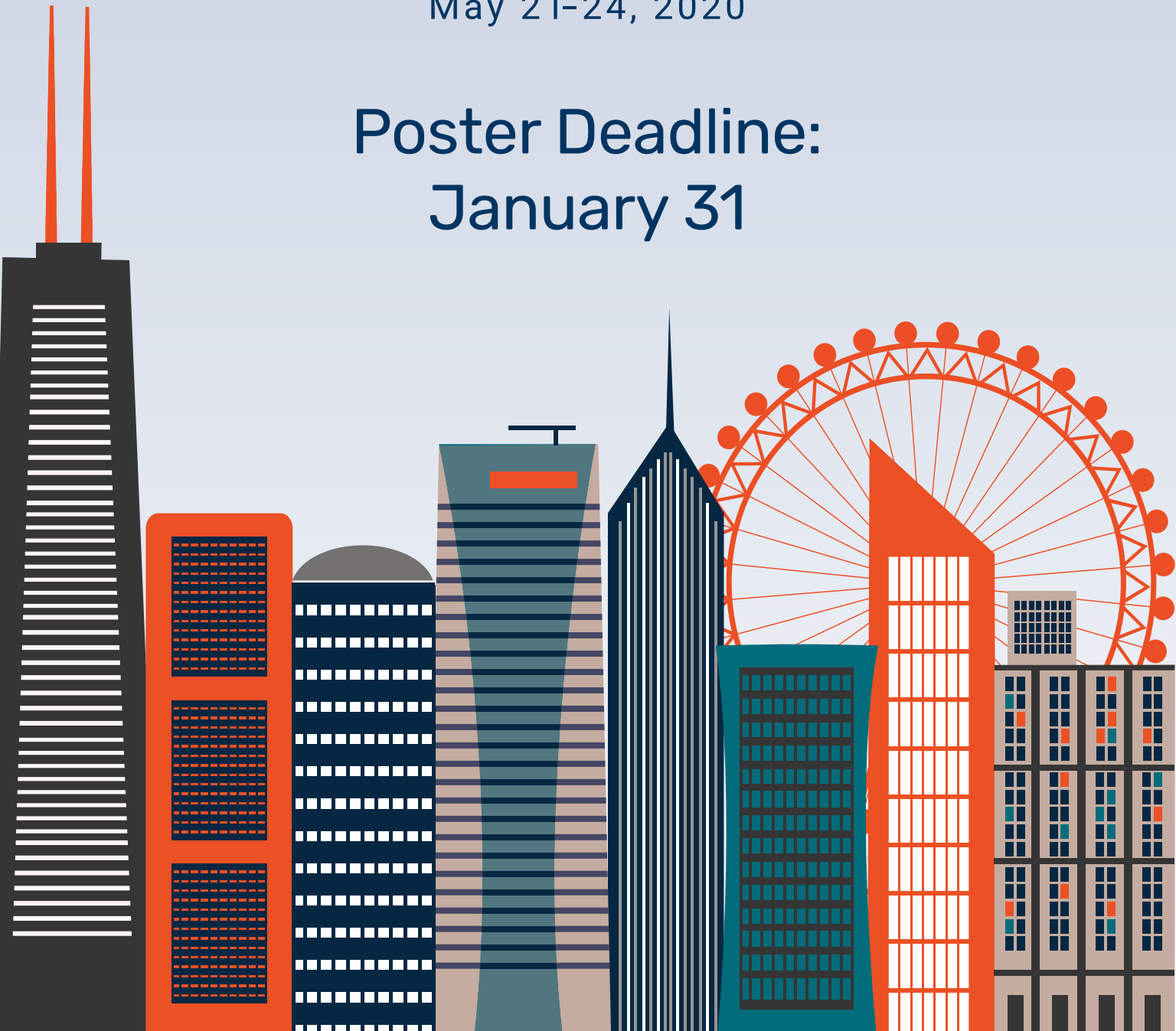
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*New York University, School of Medicine*

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**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.”



Presidential Symposium  
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**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.

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*Massachusetts Institute of Technology*

**Eran Halperin**

*The Hebrew University of Jerusalem, Israel*

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*Royal Holloway, University of London, United Kingdom*

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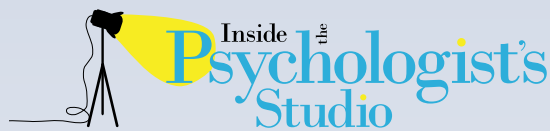
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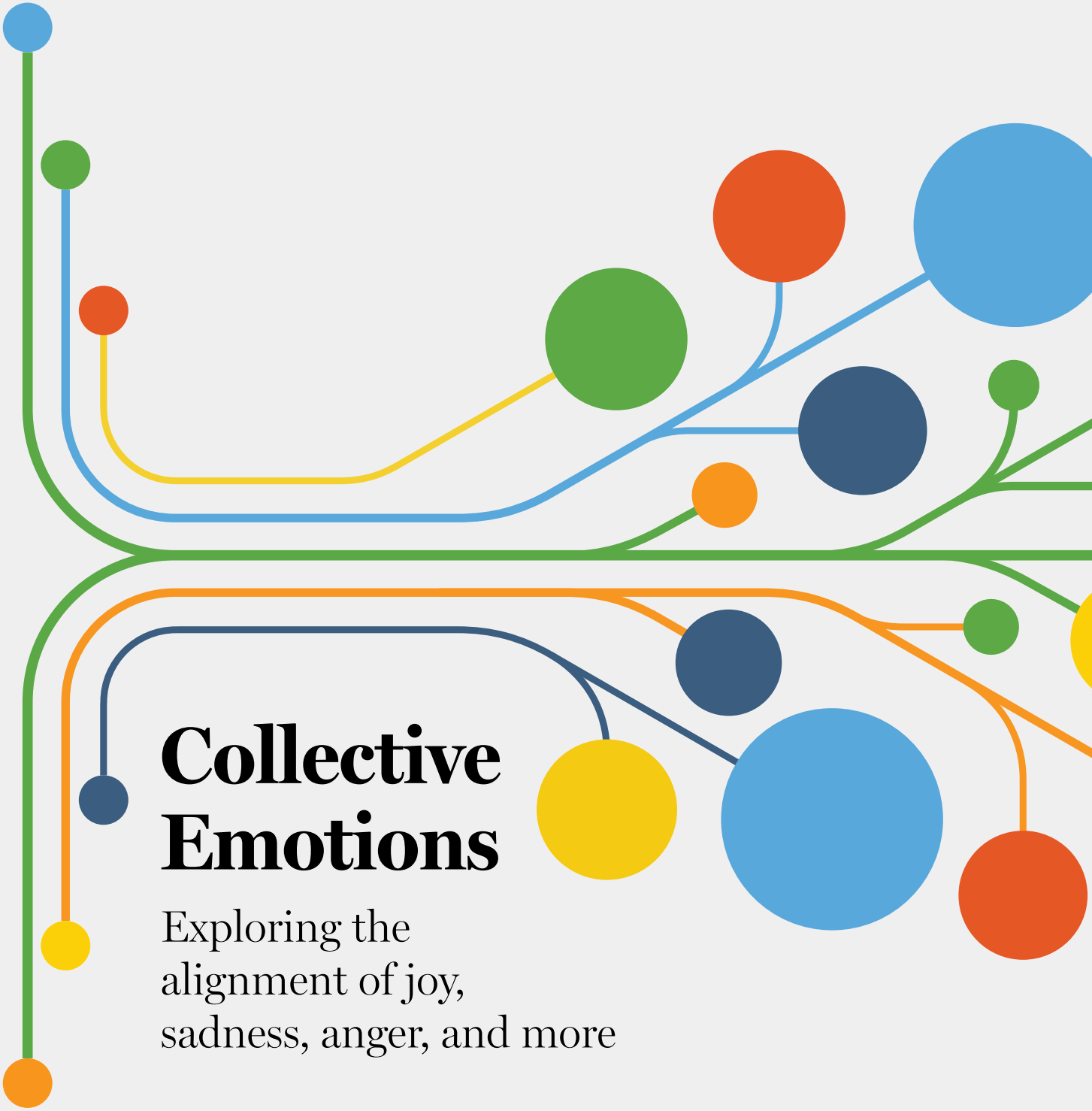
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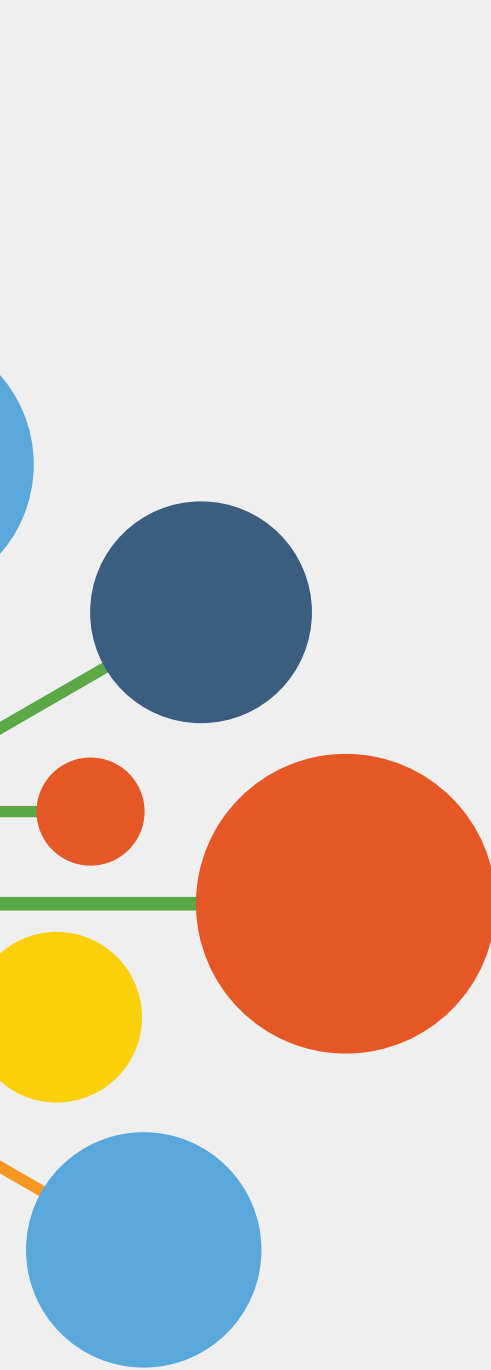
*Columbia University*



# Collective Emotions

Exploring the alignment of joy, sadness, anger, and more

By Alexandra Michel



**W**hether through religious rituals, concerts, or protests, synchrony with others through movement, behavior, and collective emotions often brings us together. Current research suggests strikingly similar psychosocial effects resulting from a variety of interpersonal and collective conditions. APS Fellow Bernard Rimé, an emeritus professor of psychology at the Université Catholique de Louvain in Belgium, has drawn on theories from sociology — as well as psychological science — to investigate the processes that allow us to experience this blurring of individual boundaries across so many contexts.

In 1893, the French sociologist Émile Durkheim published his theory of collective consciousness, describing how within each individual there exist two forms of consciousness: an individual consciousness, which emphasizes our individuality and distinctiveness, and the collective consciousness, which includes the shared values, ideas, and beliefs that are common within our entire group or society.

Drawing on these sociological theories, Rimé proposes that experiences of synchrony and collective emotion induce in individuals a shift between two parallel cognitive “modes.”

The executive “individual” mode, which is well-documented by empirical psychology, underlies purposeful behaviors and engages executive functions such as attention control, goal setting, cognitive flexibility, and information processing. The “communal” mode, which has been largely neglected by psychological science, Rimé argues, involves our long-standing attachment ties to family members, friends, community, and society as well as the socially shared cultural knowledge derived from these relationships.

In everyday life, the executive “individual” mode prevails. When people experience synchrony or collective emotions, however, a condition occurs that Rimé describes as alignment. When this happens, the effortful functions of the executive mode are disengaged, allowing the communal mode to come to the fore. As in attachment contact settings, the self-other distinction then vanishes and the person experiences feelings of openness, inclusion, and prosociality.

Rimé’s research has consistently found that individuals react to events by communicating and sharing their emotions with others — generating shared collective knowledge. This social sharing of emotions has been linked to increased social belonging, positive affect, and prosocial attitude. Rimé and colleagues have studied the phenomenon of social sharing across many traumatic events, including the Rwandan genocide and the 2004 terrorist attacks in Madrid.

In a 2019 paper published in *Psychological Science*, Rimé and coauthor David Garcia (Medical University of Vienna, Austria) analyzed a set of data collected from 62,114 Twitter users after the Paris terrorist attacks of November 2015. Garcia and Rimé observed that in the months after the attack, individuals who participated more intensely in social sharing also expressed higher rates of prosocial behavior and positive affect in their social-media activity on Twitter.

By engaging in collective emotions through social media, individuals were able to synchronize their thoughts and emotions,



"In team sports, and group physical activity more generally, the social and the physiological are functionally and inextricably interlinked. Movement, emotion, and performance bind together at the individual level, but also at the collective level."

— Emma Cohen,  
University of Oxford  
Institute of Cognitive  
& Evolutionary  
Anthropology

stimulating a sense of social belonging and shared beliefs.

"In line with a central tenet of Durkheim's model, these effects were mediated by participants' perceived emotional synchrony with other people," Garcia and Rimé write. "Our findings support the conclusion that collective emotions after a disaster are associated with higher solidarity, revealing the social resilience of a community."

### Fitter with Friends

Team sports and group physical activity is proving to be a rich area for studying the impact of shared emotion and social support on the body.

"In team sports, and group physical activity more generally, the social and the physiological are functionally and inextricably interlinked," explains Emma Cohen, a professor of cognitive anthropology. "Movement, emotion, and performance bind together at the individual level, but also at the collective level."

At the Social Body Lab at the University of Oxford's Institute of Cognitive & Evolutionary Anthropology, Cohen and colleagues investigate the interactions between social, physiological, and psychological phenomena with a focus on how group exercise and movement strengthen social bonding and even physical performance.

"It appears that social support not only influences emotions — both positively and negatively — but also physiological functioning," she explains. Across several studies, Cohen and her colleagues have found evidence that exercising as a group increases perceptions of social bonding and support, ultimately buffering stress responses during physical activity.

In a 2009 study published in *Biology Letters*, Cohen and colleagues tested the pain thresholds of the University of Oxford's world-class rowing team as they exercised on rowing machines either solo or as a group. The study found that in the group condition, the pain threshold increased to double what it was in the solo condition.

Cohen and colleagues are currently interested in pursuing the idea that perceived social support acts as a buffer toward the stress response in exercise, potentially leading to improvements in performance. This suggests that the social support sparked by collective movement or offered by family, friends, and fans may act as a powerful top-down mechanism for modulating muscle performance and fatigue.

"Performance in exercise is not regulated wholly in response to things like muscle fatigue or cardiovascular activity in delivering blood to the muscles," Cohen explains, "Pain and fatigue are part of a whole feedback system that includes information from outside the person as well as inside the body."

In another study looking at players from the University of Oxford rugby club, Cohen and colleagues again found that synchronous movements can have a positive impact on exercise performance. In this study, rugby players completed warm-ups together either synchronously, using beats on headphones, or nonsynchronously before embarking on a challenging sprint. The group that warmed up synchronously shaved a significant amount of time off their sprints compared with those who warmed up nonsynchronously.

Although Cohen's lab primarily explores the evolutionary, social, and psychological aspects of group movement and exercise, she is also interested in investigating the potential for symbolic culture to cue social support, and the consequences of this for psychophysiological functioning. People's ability to draw social support from cultural objects or symbols such as mementos, flags, anthems, architecture, and even local accents likely constitutes an evolutionarily novel and unique form of social buffering, potentially guiding patterns of cultural evolution.

### More Than Emotional Contagion

French social psychologist Gustave Le Bon carried out some of the earliest work focusing on collective emotion. In his 1895 book *The Crowd: A Study of the Popular Mind*, Le Bon describes how behavior can shift as individuals amass together into groups.

Le Bon and other early-20th-century social theorists generally viewed the phenomena of collective emotion in an unfavorable light, explains Dan Zahavi, a professor of philosophy with joint appointments at the University of Copenhagen and University of Oxford. They largely viewed the psychology

of crowds as driven by violent and extreme sentiments, impulsiveness, and the absence of critical judgment. Collective emotions arose out of processes like emotional contagion and involuntary imitation — never by reasoning, Zahavi said during an Integrative Science Symposium at the 2019 International Convention of Psychological Science (ICPS) in Paris.

Whereas Le Bon thought that the group behavior demonstrated by crowds reduced men to animals, research and theory from contemporary social neuroscience and psychology have found that the ability to engage in complex group behaviors is unique to humans and is fundamental to many of our higher order cognitive abilities. When comparing the behavior of human toddlers with that of chimpanzees, APS Fellow Michael Tomasello (Duke University) found that great apes share many intentional skills with human toddlers but do not experience the kind of collective intentionality that allows humans to cooperate and share psychological states with each other.

Humans share minds and emotions in a number of different ways, Zahavi continued, far beyond the such low-level processes as imitation and contagion fueled by the “mob” or an anonymous crowd. Shared emotions are fundamental to many different group experiences. For example, when watching a soccer game on TV, you might share the elation of a victory along with the winning players even though you have never met them, simply because you identify with the team or country they are playing for. And if you are one of the players, the shared joy you feel with the other players as a result of winning after months of preparation is again quite different.

“If we want to assess and understand the role of collective emotions in cooperation and conflict, it’s not sufficient simply to focus on the low-level process of contagion,” Zahavi explained. “We need to appeal to other more complicated processes related to group identification and socially mediated forms of self-consciousness.”

## Conflicting Emotion

Shared emotions don’t always bring out the best in groups: They are part of the fuel for hatred and large-scale violence in war and intergroup conflict as well. Emerging research has demonstrated the importance of collective emotional processes in the dynamics of intractable conflict and intergroup violence.

Over the past several years, Eran Halperin’s research has focused on emotion regulation and collective emotion in the context of intractable conflict in Israel and Palestine. He has explored the potential of emotion regulation as a tool for conflict resolution.

“Group-level emotions are very, very powerful predictors of policy support,” said Halperin, a professor of psychology at the Hebrew University of Jerusalem in Israel. “By helping people to regulate their negative collective or group-level emotions, we can actually promote change.”

In a 2013 study published in *Psychological Science*, Halperin and colleagues found that emotion regulation strategies “can influence intergroup emotions, not just intrapersonal ones, and that emotion regulation can shape political as well as affective reactions.”

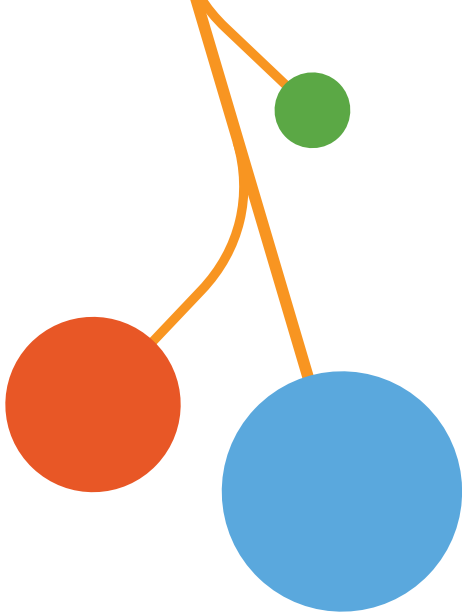
“Group-level emotions are very, very powerful predictors of policy support... By helping people to regulate their negative collective or group-level emotions, we can actually promote change.”

— Eran Halperin,  
Hebrew University of Jerusalem

In a lab study, Halperin and colleagues found that Jewish Israeli participants assigned to a cognitive reappraisal condition were less supportive of aggressive policies and more supportive of conciliatory policies compared with participants in the control condition. These findings were then replicated outside the lab in response to a real event, the Palestinian bid for United Nations recognition in 2011. Emotion regulation training continued to influence participants’ approach to the conflict as long as 5 months later.

“If you want to predict Israelis’ or Palestinians’ support for very tough political compromises in the context of their conflict, then you should go beyond studying ideologies and interests and values to understand their emotions toward their own group and other groups,” said Halperin.

Changing people’s core appraisals of other groups (e.g., the other group is evil by nature and incapable of change) can reduce collective hatred towards out-groups, leading to increased support for meaningful political compromises. In a longitudinal field experiment, Halperin and colleagues found that even 6 months



after 508 Jewish Israelis took part in reappraisal workshops focusing on groups' ability to change, participants adopted more hopeful and conciliatory attitudes. Importantly, participants maintained these changes over a 6-month period of increasing intergroup tension and conflict in the region.

"It's not just that we can downregulate people's anger or hatred in the context of intractable conflict," Halperin concluded. "We also show that by regulating people or downregulating people's anger or hatred we can increase their support for compromises."

## Social Contagion, Social Media

Social media has provided researchers with new opportunities and new methods to study collective emotions across large groups of people in real time.

Political sociologist and journalist Paolo Gerbaudo, a senior lecturer in digital culture and society at King's College London, has been researching how social and political psychology can explain the power of collective emotions in mobilizing political movements, particularly in relation to the recent rise in far-right populist movements.

Gerbaudo used Matteo Salvini, former Minister of the Interior of Italy, as an example of far-right political leaders' success in catalyzing collective emotions through social media. Salvini's highly effective social-media presence, largely organized on Facebook, has been described as typifying the new hateful politics of the far right by targeting often marginalized groups such as migrants and refugees, women, and the LGBTQ community.

"Although his posts are often decried for rousing the worst instincts of social-media followers on Facebook, if you look closely you will see that the emotional content of the far right is far more emotionally complex than just negative emotions and hate," Gerbaudo said.

Facebook holds huge methodological potential for the study of emotion because "reactions" (which allow posters to tag

content with the emotional reactions Like, Love, Haha, Wow, Sad, and Angry) are built into the platform itself, Gerbaudo continues. For example, a simple analysis of Salvini's Facebook page shows that two emotional reactions dominate among social-media followers: Angry and Haha.

"Hate often goes hand in hand with more positive emotions that are there to drive the kind of sense of belonging to the community," Gerbaudo explained.

Although there is often a very strong focus on negative emotions and attacking perceived adversaries, this identification of the "other" also creates a self-affirming community social bond among Salvini's followers. Right-wing leaders have been very effective at using social media to create social bonds within their online groups; content often evokes positive emotional responses by celebrating the success of perceived in-group members.

"It is not simply that Facebook posts by Salvini and the likes are inciting or communicating hate — it's that they are also triggering hate," Gerbaudo said.

Social-media-savvy leaders like Salvini often use formulaic elements to design their content in a manner that invites followers to engage in derision and jeering against opponents. This interactive emotional mobilization is designed to elicit emotional responses that intensify users' emotions. For example, making Facebook posts with questions at the end to solicit comments. Gerbaudo often finds that the comments are far more radical than the initial post, and the deeper one dives into the comments, the more radical they become.

"A lot of what we see on social media has to do with the catalyzing and triggering of individual emotions and their transformation into collective emotions," Gerbaudo notes. In this context, social media has a role of funneling emotions — bringing together individuals and intensifying these emotions so that a critical mass is reached that can then have electoral consequences. ●

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— **Alexandra Michel is a freelance writer based in Baltimore.**



# It's Time for Psychological Science to Become More Entrepreneurial

*By Robert A. Baron*

**T**here are few things in life that almost everyone agrees are “good,” and entrepreneurship is one of them. Federal, state, and local governments, politicians of every persuasion, the media, and people in general share the belief that entrepreneurship offers many important benefits: It generates new jobs, contributes to economic growth (and thus tax revenues), and is often a source of new products and services that make life better and more convenient. Imagine living in a world that had no smart phones, GPS, photocopiers, online shopping, or even wheeled luggage. All of these modern conveniences have roots in the ideas and actions of entrepreneurs.

State and local governments try to persuade entrepreneurs to locate companies in their regions by offering tax breaks and funds to build needed facilities. Universities, too, have sought to increase entrepreneurship by launching well-equipped start-up centers where students can work on their ideas free of charge and with support from faculty. Universities also run business-plan competitions in which the winners receive substantial cash awards, in addition to access to individuals or companies who can provide financial support for their ideas.

Going further, many universities have created departments of entrepreneurship, located primarily in schools of management or business. These departments have the same responsibilities as other departments: teaching courses (undergraduate, graduate), providing service to the university, and conducting and publishing research that adds to knowledge in their field.

The existence of these departments raises three interrelated questions:

- What knowledge do they seek?

- How can that knowledge be acquired?
- How can that knowledge be used?

Answering the first and last questions is fairly straightforward. With regard to the knowledge sought, all fields, from physics to philosophy, have basic questions they seek to answer. For the field of entrepreneurship, one such question is why some entrepreneurs succeed while most fail. As for how that knowledge can be used, it can be incorporated into courses to provide future entrepreneurs with the help they need. Helping them succeed is, in fact, a crucial goal of the field of entrepreneurship.

The middle question — how that knowledge can be acquired — is somewhat more complex. Several approaches have been used in entrepreneurship research. One involves asking successful entrepreneurs about their experiences; presumably, the information and insights provided by people who have “been there, done that” can be revealing. But the fact that individuals often do not know why they acted as they did or what factors influenced their outcomes casts doubt on this approach.

The good news is that there is another approach: conducting systematic research on entrepreneurship using the methods of psychological science. The knowledge provided by this burgeoning academic research enterprise is increasing our understanding of entrepreneurs and entrepreneurship, and it is presenting a variety of opportunities for greater participation of psychological scientists from across our diverse field.

To that end, let's go back to the question of why some entrepreneurs succeed while most fail. Answering this question involves, logically, efforts to identify the variables that play a role in these contrasting outcomes. What skills, knowledge, personal characteristics, motives, goals, and cognitive assets do successful entrepreneurs possess, or possess to a greater degree than unsuccessful ones? All these variables relate to individual

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**Robert A. Baron** is Regents Professor and Professor of Entrepreneurship, Emeritus, Oklahoma State University.

**APS is accepting submissions for the new Psychological Science and Entrepreneurship Poster Award for students and emerging scholars conducting research at the intersection of psychological science and entrepreneurship. This award is supported by the Ewing Marion Kauffman Foundation. To learn more, visit [psychologicalscience.org/entrepreneur](http://psychologicalscience.org/entrepreneur).**

**Industrial and organizational psychologists have conducted research for many years in large, established companies. Potentially, much could also be gained from research in startup companies.**

entrepreneurs, without whom there is no entrepreneurship. As this fact gains recognition, interest in psychological science as a source of information about these variables has increased — albeit slowly, given that many researchers in this area were trained in economics or branches of sociology and are thus unfamiliar with the knowledge acquired by psychology.

One reason I began studying entrepreneurship was that I believed the field could benefit greatly by drawing on research conducted by psychologists. I had been an entrepreneur myself, so I could view it from the inside as well as the outside as a researcher. The result was that I became an “importer” of psychological science, bringing its findings, theories, and methods into the field of entrepreneurship. In this, I drew on areas of research well known to psychological scientists: social processes, counterfactual thinking, the role of cognition in recognizing opportunities for new products or services, affect, self-regulation, self-efficacy, and even social categorization — the “us versus them” effect. Many other researchers in entrepreneurship have done this too, making psychological research an important source of knowledge for entrepreneurship research and theory overall.

Clearly, entrepreneurship has benefitted by using information gathered by psychological scientists. But there also are several important ways in which psychological science, too, can benefit from developing closer connections with the field of entrepreneurship. These benefits fall into two categories: research and financial.

On the research side, psychological scientists working with entrepreneurship researchers can test their theories, findings, and methods in new environments and with new populations. Industrial and organizational (I/O) psychologists have conducted research for many years in large, established companies. Potentially, much could also be gained from research in startup companies.

Further, entrepreneurs are a fascinating and unique population. Many leave secure jobs with relatively high pay and excellent benefits to found new companies. They realize that the odds are

against them — 80% of entrepreneurial companies disappear within 3 years — yet they are willing to work long hours, often with little financial benefit. Why? Psychological science can help answer that question in ways that can help aspiring entrepreneurs succeed.

Cognitive psychologists, for example, might gain new insights into decision making and the process through which individuals recognize opportunities. My research, and that of other researchers on this topic, indicates that pattern recognition — “connecting the dots” between seemingly unrelated concepts, events, or situations — plays a role, and I’m sure that cognitive psychologists could provide additional insights concerning this issue.

Social psychologists, in turn, could gain greater understanding of prosocial behavior by studying “social entrepreneurs,” who do not seek personal wealth but aim to solve important problems such as malnutrition, disease, and poverty. They could also explore why individuals donate to entrepreneurs through crowdfunding sites such as Kickstarter and GoFundMe — in some cases generating millions of dollars in contributions.

Similarly, developmental psychologists could explore the factors in entrepreneurs’ lives that influence them to choose this risky career path. Possibilities might include exposure to social models (my grandfather and two uncles were entrepreneurs), experiences of success for expressing creativity, and even genetic factors.

Besides gaining access to a wide range of useful data, studying entrepreneurs is an opportunity for psychology researchers themselves to be, well, entrepreneurial. Departments of entrepreneurship are generously funded by their universities, state or local governments, and — perhaps most important — donors. These gifts are often substantial, amounting to millions or even tens of millions of dollars, and provide funds for travel, equipment, and large data sets. One of my former PhD students, for example, needed \$10,000 to obtain data necessary for his dissertation research. These funds were readily available to him from the endowed chair I held (which had a large budget) and department resources.

By building ties with the field of entrepreneurship and working closely with faculty in departments of entrepreneurship, psychological scientists may also be able to obtain support for their own work — for instance, funding for equipment or travel to relevant conventions. Such collaboration could also reduce teaching responsibilities through integrative courses taught by faculty in both departments and could open the path to new and different sources of funding.

Overall, the central thought I hope to communicate to my psychology colleagues is that it is time to become more entrepreneurial — to recognize the benefits of studying entrepreneurship and to build bridges to the thriving research enterprise in this exciting and integrative area of study. In a sense, the field of entrepreneurship research has already done its part. It is now up to psychological science to make this relationship reciprocal, perhaps by following the advice of one famous entrepreneur, Walt Disney, who said, “The way to get started is to quit talking and begin doing.” ●

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

For more information, see the ad on p.21 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)

### January and February 2020 NSF Grant Submission Deadlines

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### 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).

### Multinomial Processing Tree Modeling Workshop

A Multinomial Processing Tree (MPT) Modeling preconference workshop will run March 21 to March 22, 2020 at the 62nd Conference of Experimental Psychologists in Jena, Germany. The two-day workshop will provide a systematic and application-oriented overview of the basics and the most recent developments in MPT modeling.

For more information, visit [teap2020.dryfta.com/79-program/87-pre-conference-workshop](http://teap2020.dryfta.com/79-program/87-pre-conference-workshop).

This workshop is supported by the William K. & Katherine W. Estes Fund, a fund jointly overseen by APS and the Psychonomic Society to support summer schools and workshops offering training in mathematical and computational modeling.

## 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)

### 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

Island of Rhodes, Greece

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

### 2020 Society for Affective Science Conference

April 23–25, 2020

San Francisco, California

[society-for-affective-science.org/](http://society-for-affective-science.org/)

### Biennial International Seminar on the Teaching of Psychological Science

July 13–17, 2020

Paris, France

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## Minds for Business

A BLOG ON THE SCIENCE OF WORK AND LEADERSHIP

[www.psychologicalscience.org/minds](http://www.psychologicalscience.org/minds)

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

Teaching *Current Directions in Psychological Science* offers advice and guidance about teaching a particular area of research or topic covered in this peer-reviewed APS bimonthly journal, which features reviews covering all of scientific psychology and its applications. Visit this column online for supplementary components, including classroom activities and demonstrations:

[www.psychologicalscience.org/publications/teaching-current-directions](http://www.psychologicalscience.org/publications/teaching-current-directions).

## Psychological Science's Contribution to a Sustainable Future

*By David G. Myers*

Eom, K., Papadakis, V., Sherman, D., & Kim, H. (2019).

**The psychology of proenvironmental support: In search of global solutions for a global problem.** *Current Directions in Psychological Science*, 28, 490–495. <https://doi.org/10.1177/0963721419854099>

**S**paceship Earth faces the looming threat of global destruction:

- *Greenhouse gases are increasing*, with 45% more CO<sub>2</sub> in the atmosphere than before the Industrial Revolution.
- *Sea and air temperatures are rising*, with annual global temperatures on the rise and record highs outnumbering record lows by 6 to 1.
- *Plant and animal species are migrating* toward the poles and higher elevations.
- *Ice and snow packs are melting*, and Arctic and Greenland ice is noticeably shrinking.
- *The seas are rising*, as residents of Arctic villages, southeastern US coastal cities, and South Asian islands know well.
- *Extreme weather is increasing*, and heat waves, drought, fires, hurricanes, and floods are becoming more intense.

And climate change has only begun, making these trends mere harbingers of a future that likely will entail increased human death, displacement, trauma, and conflict.

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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).

So, ask Kimin Eom (Singapore Management University) and Viki Papadakis, David Sherman, and Heejung Kim (University of California, Santa Barbara), what contribution can psychological science make to our understanding of proenvironmental action and policy support?

Their research explores person–culture interactions — and, specifically, the contexts in which people's actions in support of a healthy and sustainable environment are more driven by external social norms or by internal beliefs and attitudes. They note three ways in which our social identities matter:

*Cultural individualism vs. collectivism.* In individualistic contexts such as the US, personally held concerns about the environment predict purchases of environment-friendly products and support for green policies. In collectivistic contexts such as Japan, prevalent norms more often guide behavior.

*Socioeconomic status (SES).* In high-SES contexts, personal beliefs about climate change predict support for proenvironmental policies and donations to such causes. Low-SES contexts reduce individual autonomy and control. Survival more often entails collaboration and coordination with others and responsiveness to social norms.

*Religion.* Nonreligious people tend to value self-expression, which increases the influence of their personal awareness and concerns about the environment. Among those who are highly religious, divine moral mandates matter more, such as (in Christianity) the obligation to serve as stewards of a God-given planet.

Ergo, say Eom and colleagues, effective persuasion strategies may differ depending on the context. In individualistic, high-SES, or nonreligious contexts, persuasion involves targeting individuals — by changing or activating their awareness and attitudes. In collectivist, low SES, or religious contexts, it involves targeting social expectations — by changing or activating environmentally supportive norms.

These insights can be added to the growing list of psychological tools for shaping public opinion and action. Can your students brainstorm additional persuasion tactics — perhaps when challenged to imagine how they might influence an environmentally sustainable behavior of their choice, such as eating less beef or driving less? Here, for example, are other psychological principles for climate educators (adapted from Myers & Twenge, 2019):

- *Connect your message to your audience's values.* For a conservative audience, emphasize restoring the environment to how it used to be, and protecting national security by diminishing dependence on foreign oil.
- *Use credible communicators.* Messages may be better received from sources the audience can trust and respect. (Who might this be in your campus context?)
- *Think local.* Although climate change is global, people respond more strongly to threats that affect them personally — droughts in one place, fire risk, floods, or sea rise in another. (What are your local concerns?)
- *Make communications vivid and memorable.* Harness the power of the availability heuristic with dramatic examples. Make messages concrete: “The Earth has a fever.”
- *Nudge people by using “green defaults.”* Program thermostats to return to energy-saving settings until temporarily reset. Have room lights turn off in the absence of human motion.
- *Frame risks and solutions effectively.* Explain CO<sub>2</sub> as a “heat-trapping blanket.” Propose a “carbon offset” rather than a “carbon tax.”
- *Create incentives.* What we reward, we get more of (as in carpool lanes and solar power rebates), and what we punish, we get less of (as when shifting taxes to carbon consumption).
- *Encourage postmaterialist values that support human flourishing.* Educate people to understand why materialism fails to satisfy and to define quality of life in more relational and spiritual terms.

A persuasion exercise also could be adapted to other issues that students may care about, such as encouraging vaccination, creating a more welcoming climate for LGBTQ students, or campaigning for a candidate. In her Introduction to Psychology course, fellow columnist Cindi May engages students “in a service learning project in which they work in groups to select and advocate for an issue of their choosing. They have to develop an advocacy plan based on psychological principles, implement the plan, and then create a report that explains/justifies their techniques and discusses their success (or failure).” ●

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Visit David G. Myers at his blog “Talk Psych” ([www.talkpsych.com](http://www.talkpsych.com)).



## DID YOU KNOW?

The APS website offers collections of research on related topics, including

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- Decision-Making
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- Overconfidence
- Pseudoscience
- Studying and Learning

See all of the available topics at [psychologicalscience.org/topics/research-topics](http://psychologicalscience.org/topics/research-topics)

# Going Green: The Cognitive Benefits of Nature

By Michael Scullin and Cindi May

Schertz, K. E., & Berman, M. G. (2019). Understanding nature and its cognitive benefits. *Current Directions in Psychological Science*, 28(5), 496–502. <https://doi.org/10.1177/0963721419854100>

**M**icrosoft Founder Bill Gates is famous for innovating solutions to complex problems. Unlike some business people, his insights do not always arise in cubicles, board rooms, or office spaces. Instead, Gates relishes in taking “think weeks” at his lake house and working on problems while walking through the area’s wooded trails. As told in the 2019 Netflix documentary *Inside Bill’s Brain* (Silberberg, Stott, & Guggenheim), Gates does “his best thinking while he’s walking . . . it helps him somehow to organize his brain.” Scientists agree that walking and other aerobic activities benefit cognition, but is there potentially something additive about walking in a nature setting?

Kathryn Schertz and Marc Berman (2019) argue that exposure to nature — via active walking or passive viewing — benefits cognition. Indeed, mountains of correlational and experimental data support their claim that nature specifically benefits working memory and controlled attention. Some impressive findings include the following:

Walking for 50 minutes through an arboretum improved attention task performance relative to walking for 50 minutes through downtown. Season didn’t matter: A stroll in freezing weather improved attention as much as a stroll on a warm day (Berman, Jonides, & Kaplan, 2008).

Working memory developed faster over 12 months in children ( $N = 2,593$ ) who had greater green space around their schools (as quantified by satellite imagery), even after controlling for individual and neighborhood-level socioeconomic status (Dadvand et al., 2015).

Attention task performance was greater in public-housing residents who were randomly assigned to live in buildings with greater surrounding green space (Kuo & Sullivan, 2001).

A walk in the woods is not always an option, particularly for people living in urban areas or those with mobility issues. Fortunately, the cognitive and affective benefits of nature

can be observed within minutes from the seat of your chair. Use this 3-minute “Picture Viewing” activity with students: <https://tinyurl.com/NatureActivity>. Students will first view pictures of urban environments, followed by mood and alertness ratings. Then they will repeat the activity with pictures of nature environments (or, download the activity and randomly assign students to conditions). Mood and alertness ratings will increase following viewing nature pictures (Berman et al., 2008), listening to nature sounds (Van Hedger et al., 2019), or watching the documentary *Planet Earth* (Zelenski, Dopko, & Capaldi, 2015).

After the activity, engage your students in scientific reasoning about designing experiments on nature. For example, in small groups have students answer these questions:

- How can “nature” be operationally defined?
- Which third variables may contribute to nature-cognition associations?
- What is an appropriate control group in an experiment on nature exposure?



In the “Green Space Challenge,” students take a 50-minute walk through green space as a way to translate their learning into their everyday lives.

APS Fellow **Cindi May** is a professor of psychology at the College of Charleston. Her research explores ways to enhance memory and cognitive functioning for older adults and individuals with intellectual disabilities. May can be contacted at [mayc@cofc.edu](mailto:mayc@cofc.edu).

**Michael Scullin** is an assistant professor of psychology and neuroscience at Baylor University. His research investigates the interplay of sleep, cognition, and aging, with the overarching goal of translating psychological science into real world benefits. In 2017, he was named an APS Rising Star. Scullin can be contacted at [michael\\_scullin@baylor.edu](mailto:michael_scullin@baylor.edu).

After some initial brainstorming, help guide students by suggesting they consider how a computer would classify pictures as urban versus nature environments. By taking a reductionist approach, researchers have identified that nature images are characterized by an abundance of nonstraight edges, by minimal color saturation, and by low hue variability (Berman et al., 2014). As an example, think of nature scenery in terms of roundness (mostly nonstraight edges), color similarity (mainly green hue), and realistic paleness (minimal color saturation).

While the reductionist approach can define components of “nature,” and mechanisms by which nature may be pleasing, whether perceiving these features alone benefits cognition remains an open question. Put the question to your students — ask them to theorize *why* exposure to nature environments benefits cognition. Is it classical conditioning (positive experiences), a shift to an atypical context (devoid of work), or better air quality? After generating some theoretical explanations, compare students’ responses to leading theories in the field:

- **Stress-Reduction Theory:** Exposure to nature produces a positive mood response, alleviating the individual of stressors that impair cognition (Ulrich, 1983).
- **Attention-Restoration Theory:** Involuntary, “soft fascination” with the perceptual features of nature — without any requirement to effortfully reorient attention — allows top-down attention systems a chance to replenish (Kaplan, 1995).
- **Prospect-Refuge Theory:** Because of evolutionary shaping, only natural landscapes with greater prospect (clear field of view) and greater refuge (more places to hide) will be aesthetically pleasing and attentionally restorative (Appleton, 1975).

As a final activity, challenge your students to translate their learning into their everyday lives with the “Green Exercise Challenge.” Nudge them to take a 50-minute walk through green space on campus or along a hiking trail by offering a microincentive on the next quiz (Sundstrom, Hardin, & Shaffer, 2016). If you are on a transportation-limited urban campus, you might suggest that students walk on a treadmill while watching free “nature walk” videos (e.g.: <https://tinyurl.com/WalkNature>). Encourage students to take the walk without distractions (i.e., leave the cell phone at home), because solitude boosts creative insight and problem solving (Kaufman & Gregoire, 2015). Just like Bill Gates. At the beginning of the next class, invite students to share their experiences, reflecting on how their experience fits with stress-reduction theory, attention-restoration theory, and prospect-refuge theory.

Winter is coming, but nature walks are beneficial across all seasons. So let’s all take a page from Bill Gates’ nature playbook. This season, go ahead and face unafraid all of

those cognitive plans that you’ve made. Take a walk in a winter wonderland. ●

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# Writing an NIH F31: Tips for Students in the Psychological Sciences

By Joshua Fox-Fuller

**T**he Ruth L. Kirschstein National Research Service Award (NRSA) provides predoctoral students mentored research training during their dissertation research. Commonly called the “F31,” the predoctoral NRSA gives awardees a monthly stipend (approximately \$25,000 per year, pretax), support for tuition and fees (60% coverage, up to \$16,000 per year), and funds for training-related costs (\$4,200 per year). In fiscal year 2018, the National Institutes of Health (NIH) received 2,673 F31 applications, and 699 received an award ([report.nih.gov/success\\_rates/](https://report.nih.gov/success_rates/)). The proportion of funded F31s over the last 5 years hovers between 20% and 30% for most institutes at NIH.

Writing an F31 application — like writing any grant application — is a mental and emotional odyssey. You may feel overwhelmed and unsure where to begin. As someone who recently received an F31 16 months after I submitted my first application, I aim to provide tips from my experience in applying. In particular, the tips are geared toward students in psychological science; several excellent resources already exist about the general process of writing an F31 application, but psychology-specific F31 advice is sparse. The following recommendations could also reasonably be applied to applications for other grants and awards.

## 1. Learn about the research priorities of your funding institute at NIH

NIH institutes have certain high-priority research areas, sometimes referred to as “strategic directions.” For example, my F31 award is funded by the National Institute on Aging, which has an explicit priority to accelerate research on Alzheimer’s disease and its related disorders. Strategic directions make a larger pool of money available for grants related to those priorities. Your F31 does not necessarily need to align with the strategic directions of an institute, but special directions may align with

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**Joshua Fox-Fuller** is a third-year doctoral student in clinical psychology at Boston University, specializing in neuropsychology. His research focuses on enhancing the early detection of Alzheimer’s disease (AD), and he recently received an F31 award from the National Institute of Aging to study working memory dysfunction in preclinical AD. He can be reached at [jtfuller@bu.edu](mailto:jtfuller@bu.edu) or followed on Twitter at [@joshfoxfuller](https://twitter.com/joshfoxfuller).

gaps in the literature that could be the focus of your doctoral training, and writing an F31 application with special directions in mind may bolster your chances of receiving funding.

## 2. Identify the audience of your grant, and write your application with these people in mind

The F31, like other NIH grants, is reviewed in study sections composed of a few dozen scientists who are unified by a broad research area (e.g., behavioral neuroscience). A list of study sections for F awards and previous rosters for the study sections can be viewed online at [public.csr.nih.gov/StudySections/Fellowship](https://public.csr.nih.gov/StudySections/Fellowship). Reviewers of your F31 application may be knowledgeable in your field, but they may not have a full understanding of the nuanced aspects of your proposal. Few if any reviewers in your study section may be trained in psychology; in my case, most reviewers in the study section had backgrounds in neuroscience, biology, or chemistry. Assembling a team of friends and other students to read drafts of your application can help ensure that your proposal is as clear as it can be before you send it in for review.

## 3. Set a reasonable research scope and timeline

The F31 is a great mechanism to support dissertation-stage research, but the scope of the proposal needs to be realistically achievable. Some research ideas, such as recruiting 100 people to undergo a neuroimaging protocol, might be great training opportunities but are unrealistic given the small amount of funding and timeline of the F31 (usually a maximum of 3 years). There is a caveat, however. If you want training in using cutting-edge or expensive tools, you can ask your mentors to propose the use of the tools under the umbrella of their research programs. Maybe your mentor has an ongoing study that collects data that is unrelated to the primary outcome of the study that you are interested in helping gather and analyze. That could be part of your F31 application. Conversely, your mentor may have no large grants at the moment, or current studies in your lab could be winding down. In this case, identifying a co-mentor with whom you can train (i.e., a collaborator of your mentor) may be advisable; working with a co-mentor can expand your training opportunities and networking circles.



#### 4. Understand the F31 application timeline, and appreciate the exercise of grant writing

When thinking about writing an F31, the timeline of writing, submission, review, and (potential) revision is important to consider. From initial drafting of the research plan to receiving funding, the process of getting an F31 can easily take a year or 2. After writing my F31 application the first time, I learned that my proposal was not scored (i.e., in the bottom 50% of all applications) and not discussed at the study section. I wanted to give up on the ideas I had generated all together and forgo resubmission. I am glad my comentors encouraged me to look at the comments, revise my grant application to address all the concerns the reviewers raised, and resubmit 6 months later. At the time of resubmission, I was entering a stressful second year of my clinical psychology doctoral program, so my dissertation research was the furthest thing from my mind. Now, however, I am grateful that I have a plan for my dissertation solidified and have the bonus of funding to support me in the development of various technical skills that would have otherwise been outside the scope of my doctoral program curriculum (e.g., neuroimaging, advanced statistical analysis). Even if I had not received funding after resubmission, I still would have had my dissertation idea formed and I could have reused parts of the F31 application to draft other grant and fellowship applications. The exercise is good regardless of the outcome.

During the early years of doctoral training, you may feel that writing an F31 application is too large or overwhelming an endeavor. However, it is never too early to start learning how to write grants. Grant writing is a critical and abstract skill that is crucial for success in academia, but it's typically

not well-covered in doctoral training. I encourage you, just as I would now encourage myself nearly 2 years ago, to take the first step to developing grant writing skills by talking to your mentors about writing an application for an F31 or other grant. ●

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AN APS BLOG ON THE SCIENCE OF WHAT'S DRIVING BEHAVIOR

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**Elizabeth Spelke**, Harvard University, *The Wall Street Journal*, October 11, 2019: The Ultimate Learning Machines.

**Linda A. Teplin**, Northwestern University, National Academies of Sciences, Engineering, and Medicine, October 29, 2019: Juvenile Justice — Moving From Punishment to Hope and Healing.

**Nim Tottenham**, Columbia University, *The Wall Street Journal*, October 24, 2019: Parents Need to Help Their Children Take Risks.

 **Paul A. M. Van Lange**, Vrije Universiteit Amsterdam, The Netherlands, *Scientific American*: October 15, 2019, Latitude Adjustment: Distance From the Equator Shapes Our Thinking.

**Daniel Willingham**, University of Virginia, *The Atlantic*, September 19, 2019: Why Some People Become Lifelong Readers.

**Wendy Wood**, University of Southern California, *Behavioral Scientist*, October 14, 2019: Good Habits, Bad Habits: A Conversation With Wendy Wood.

## Parents Need to Help Their Children Take Risks



With rates of teenage pregnancy, drug use, and even car accidents on the downturn, life for many adolescents seems less risky than ever — so why is anxiety still on the rise? APS Fellow **Alison Gopnik** reports on research by APS Fellow **Nim Tottenham** suggesting that, contrary to concerns about “helicopter parenting,” a parent’s presence can help condition toddlers to develop a taste for taking on challenging situations.

The Wall Street Journal

October 24, 2019

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## ALABAMA

### The University of Alabama at Birmingham

### Chair, Department of Psychology

The College of Arts and Sciences at the University of Alabama at Birmingham (UAB) seeks an innovative and visionary leader to Chair the Department of Psychology. The Department includes 26 full-time faculty, 85 graduate students in its three doctoral programs (Behavioral Neuroscience, Lifespan Developmental, and Medical/Clinical), and 1200 undergraduate majors. The Department has excellent research facilities and a long history of success in obtaining extramural research funding, which annually exceeds \$10M. UAB has a strong culture of collaboration across departments and disciplines in which the Department of Psychology actively participates through jointly-sponsored academic programs and multidisciplinary research centers. The Department enjoys the benefits of UAB's standing as an international center for biomedical health research and education. See the department website for more information: [uab.edu/cas/psychology](http://uab.edu/cas/psychology). The successful candidate will be an accomplished scholar with administrative experience, a history of external research funding, and vision to lead a department that emphasizes excellence in research, graduate and undergraduate education, and community outreach. A doctoral degree in psychology or a closely-related field is required and professional accomplishments consistent with appointment at the full professor level is expected. With over 22,000 students and 2,900 full-time faculty members, UAB ranks in the top 20 public universities in the United States for federal research funding and is the major teaching-research university in the state. Times Higher Education has ranked UAB No. 1 young U.S. University for two years in a row, top 10 worldwide. UAB and the Department of Psychology share a strong commitment to diversity at all levels and the University ranks in the top ten nationally for international student diversity, with over one hundred countries represented on campus. Birmingham is the largest city in Alabama and offers a vibrant cultural community, excellent restaurants, and a wide array of recreational opportunities.

Please apply online through the following link: [uab.peopleadmin.com/postings/5501](http://uab.peopleadmin.com/postings/5501) Along with your application you will need to submit your CV, a vision and leadership statement, and contact information for three professional references. Questions may be directed to Yogesh Vohra, Ph.D., Professor and Associate Dean, Psychology Search Chair, [ykvohra@uab.edu](mailto:ykvohra@uab.edu). Review of applications will begin immediately and continue until the position is filled. UAB is an Equal Opportunity/Affirmative Action Employer committed to fostering a diverse, equitable and family-friendly environment in which all faculty and staff can excel and achieve work/life balance irrespective of race, national origin, age, genetic or family medical history, gender, faith, gender identity and expression as well as sexual orientation. UAB also encourages applications from individuals with disabilities and veterans. A pre-employment background investigation is performed on candidates selected for employment.

## INDIANA

### Indiana University-Bloomington

### The Department of Psychological & Brain Sciences, Visiting Assistant Professor

The Department of Psychological and Brain Sciences is seeking to fill one position for a visiting assistant professor to teach undergraduate courses in the areas of Introductory, Cognitive, Social, Developmental, or Neuroscience. Position will begin August 2020. The ideal candidate will be an experienced instructor at the college level with an interest in adding value to the undergraduate program. This will be a 1 year appointment, renewable for one additional year. The teaching load is five courses a year. Applicants should have an advanced degree, at the time of appointment (a PhD in Psychology or related field is preferred), and documented teaching experience. Applicants should submit a letter of application that includes a statement of teaching philosophy and experience, evidence of teaching effectiveness, a curriculum vita, and have three letters of recommendation. Interested candidates should review the application requirements and submit their application at [indiana.peopleadmin.com/postings/8615](http://indiana.peopleadmin.com/postings/8615). Questions regarding the position or application process can be directed to: Cheryl Crees, Assistant to the Chair, ATTN: Instructor Search, Department of Psychological and Brain Sciences, 1101 E. 10th Street, Bloomington, IN 47405-7007 or [chcrees@indiana.edu](mailto:chcrees@indiana.edu). Visiting Assistant Professor applications received by January 10, 2020 will receive full consideration. However, the search will remain open until a suitable candidate is found. Information about the department and the university is available at [psych.indiana.edu](http://psych.indiana.edu). The College of Arts and Sciences is committed to building and supporting a diverse, inclusive, and equitable community of students and scholars.

### The Department of Psychological & Brain Sciences, Full-Time Teaching Faculty Lecturer

Position will begin August 2020. The area of expertise within psychological and brain science is open. We especially welcome candidates who add diversity to the department, are deeply committed to evidence-based pedagogy and innovative methods, and could provide instruction in developmental, cognitive, or social psychology, with experience in modern neuroscience methods in one or more of these areas. The ideal candidate will be an experienced instructor at the college level with an interest in adding value to the undergraduate program. Rank is open. For junior candidates, the initial contract period is for three years, with reappointment annually and decision for promotion to Senior Lecturer and long-term contract made in the sixth year. The teaching load is five courses a year. Applicants should have an advanced degree (a PhD in Psychology or Neuroscience is preferred), and documented teaching experience. Applicants should submit a letter of application that includes a statement of teaching philosophy and experience, evidence of teaching effectiveness, a diversity, equity, and inclusion statement, a curriculum vita, and have three letters of recommendation submitted on their behalf. Interested candidates should review the application requirements and submit their application at [indiana.peopleadmin.com/postings/8620](http://indiana.peopleadmin.com/postings/8620). Questions regarding the position or application process can be directed to: Cheryl Crees, Assistant to the Chair, ATTN: Lecturer Search, Department of Psychological and Brain Sciences, 1101 E. 10th Street, Bloomington, IN 47405-7007 or [chcrees@indiana.edu](mailto:chcrees@indiana.edu). Lecturer applications received by January 10, 2020 will receive full consideration. However, the search will remain open until a suitable candidate is found. Information about the department and the university is available at <http://www.psych.indiana.edu>. The College of Arts and Sciences is committed to building and supporting a diverse, inclusive, and equitable community of students and scholars.

### The Department of Psychological & Brain Sciences, Assistant or Associate Clinical Professor

The Indiana University Department of Psychological and Brain Sciences invites applications from candidates who are deeply committed to innovative clinical psychological training within an evidence-based, translational, and interdisciplinary model of doctoral training. We are seeking an individual with training and clinical experience in evidence-based intervention techniques and a commitment to intervention development, implementation, and outcome assessment. A strong interest in translational research and practice with a focus on moving interventions from the lab/clinic to the community is desirable. Primary responsibilities will include: (1) supervision of predoctoral psychology students in clinical practicum training; (2) coordination with, and oversight of, external practicum sites; (3) teaching clinical courses in the department; (4) assisting with administrative and accreditation activities in the clinical science doctoral program. Qualifications include a Ph.D. in Clinical Psychology from a PCSAS and/or APA accredited program; licensure in the State of Indiana (eligible), training and clinical experience in evidence based services; clinical supervisory

experience; interest in university level teaching; and commitment to pedagogical advancement. This will be a full time non-tenure track, faculty appointment beginning August 2020. Rank and salary commensurate with experience. The Clinical Science Program at Indiana University is nationally recognized for an emphasis on translational research on mechanisms and intervention. Clinical and research training is highly integrative, often involving approaches from medicine, cognitive science, neuroscience, behavioral genetics, informatics, social and developmental psychology. The Department of Psychological and Brain Sciences' in-house training clinic serves adult, family, and child populations and is integrated with active programs of research. Faculty overseeing its operation are supported by administrative staff. The University is located in Bloomington, Indiana, a university town which offers an exceptional cultural, educational and recreational environment. Interested candidates should submit a letter of application, CV, teaching, and diversity and inclusion statements, and letters of recommendation as described at: [indiana.peopleadmin.com/postings/8766](http://indiana.peopleadmin.com/postings/8766). Review of Clinical Professor applications will begin on December 15, 2019 and will continue until the position is filled. Questions regarding the position or application process can be directed to: Cherlyn Crees, Assistant to the Chair, ATTN: Clinical Professor Search, Department of Psychological and Brain Sciences, 1101 E. 10th Street, Bloomington, IN 47405-7007 or [chcrees@indiana.edu](mailto:chcrees@indiana.edu). The College of Arts and Sciences is committed to building and supporting a diverse, inclusive, and equitable community of students and scholars. Indiana University is an equal employment and affirmative action employer and a provider of ADA services. All qualified applicants will receive consideration for employment without regard to age, ethnicity, color, race, religion, sex, sexual orientation, gender identity or expression, genetic information, marital status, national origin, disability status or protected veteran status.

## NEW YORK

University at Buffalo

Psychology Department

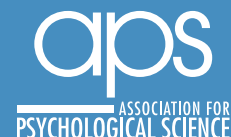
The Department of Psychology in the University at Buffalo, The State University of New York, plans to hire up to three tenure-track faculty members in the study of addictions, with a clinical focus. Two of these hires will be at the Assistant level, with the remaining hire being at the Assistant or Associate level. You will join an interdisciplinary team of researchers in Psychology, Neuroscience, Pharmacology/Toxicology, and Psychiatry whose collective efforts are moving Buffalo to become a leading center for understanding the causes of and successful treatments for addictions, broadly defined. We are seeking individuals with active research programs who have exhibited potential for high-impact research and extramural funding. UB and the Department of Psychology have particular strengths in the study of alcohol and nicotine, but the specific area of study within addictions research is open. Applicants will be expected to contribute to teaching and supervision of both graduate and undergraduate students. The University at Buffalo is New York State's largest and most comprehensive public university. A premier center for graduate and professional education, UB is a member of the prestigious Association of American Universities, placing it amongst the leading research-intensive public universities in the United States. Buffalo is a major metropolitan area with a diverse blend of communities, each with its own distinct character. We are known known for our welcoming nature, and thriving cultural, arts, and outdoor opportunities. University at Buffalo is an affirmative action/equal opportunity employer and, in keeping with our commitment, welcomes all to apply including veterans and individuals with disabilities. Inquiries about the position can be directed to Dr. Craig Colder, Chair of the search committee ([ccolder@buffalo.edu](mailto:ccolder@buffalo.edu)). Applications must be submitted online at ([ubjobs.buffalo.edu/postings/21700](http://ubjobs.buffalo.edu/postings/21700)).



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# INEQUALITY AND ATTITUDES

Psychological scientists **Jolanda Jetten** of University of Queensland, Australia, and **Stefanie Sprong** of Trinity College Dublin, Ireland, are studying how concerns about wealth inequality can affect support for strong and sometimes autocratic leadership.



**Jolanda Jetten**  
University of Queensland

## You were both coauthors on a large international study looking at the link between wealth inequality and political attitudes. What prompted your research?

In recent years, research on the effects of economic inequality has gained ground. We were interested in the impact of economic inequality on citizens' sociopolitical attitudes — a topic that has received much less attention in the literature but is clearly of interest in the current politically turbulent landscape. We explored whether two current developments — rising levels of inequality and a seemingly growing call for strong leaders — might be connected.

## What did you find?

Our research showed that, in both correlational and causal ways, subjective and objective inequality were associated with support for strong leaders who may be willing to abandon democratic principles to achieve particular outcomes. This is an important finding, and it underscores the notion that increasing inequality (and particularly perceptions of inequality) may have more far-reaching consequences than had been recognized.

## What most surprised you about your findings?

We found support for these findings across 28 countries that vary in the extent to which they have stable democracies and/or populist leaders. We think it is fascinating that perceptions of inequality seem so influential in driving support for strong leaders and that this desire even extends to leaders who are willing to break the rules. We find evidence that this is because higher levels of economic inequality enhance the perception that society is breaking down (i.e., enhanced anomie perceptions) and that a strong leader is needed to restore order (even when that leader is willing to challenge democratic values to achieve this goal).

## What's next in your research?

We believe that behavioral scientists, and social psychologists in particular, can make powerful contributions to our understanding of the effects of inequality. We are working on several projects in this area. For example, members of our team are looking at whether perceptions of historical and cultural continuity in a country are related to support for populist leaders. Findings show that the more people feel that the past and the present are connected, the more they support populist leaders, presumably because such leaders are seen to protect collective continuity. Another line of research we're leading provides evidence that economic inequality enhances the belief in conspiracy theories.

## Reference

Sprong, S., Jetten, J., Wang, Z., Peters, K., Mols, F., Verkuyten, M., . . . Wohl, M. J. A. (2019). "Our country needs a strong leader right now": Economic inequality enhances the wish for a strong leader. *Psychological Science*, 30, 1625–1637. <http://doi.org/10.1177/0956797619875472>



Read the full interview online at [psychologicalscience.org/observer/inequality-and-attitudes](https://psychologicalscience.org/observer/inequality-and-attitudes).

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