Observer

March Methodology Madness

Featuring Novel Solutions to Research Limitations

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Our annual look at methodology innovations focuses on novel technology platforms that improve how psychological scientists conduct and analyze research.

Psychologist Roberta Klatzky's "vast experience in haptics and navigation provided critical information for the navigation approach used during the live trials at the firefighter testing facility."

—NIST announcement of a winning design (and $25,000 award) in the 2019 Haptic Interfaces for Public Safety Challenge. Page 14

"There is no other accessible personal library which so well reflects developments in the social sciences, in particular the cognitive sciences in their full breadth, since World War II." —Willem "Pim" Levelt, on the donation of more than 3,200 books owned by Jerome Bruner to the Max Planck Institute for Psycholinguistics. Page 10

Maintaining Data Quality When You Can't See Participants

With online experiments, researchers must accept a much higher degree of uncertainty about who their participants are and the conditions under which the experiment is being conducted. (*Observer, March 2019*)

The Digital Lab

A collection of articles about how web-based technology is revolutionizing the way psychological scientists collect and analyze data. (*Observer, March 2015*)

What Makes a Samaritan Good? Depends on the Beneficiary

New research from *Psychological Science* suggests that helping a total stranger is generally viewed as more moral and trustworthy than helping a family member. But this is only true if the helper did not have to choose between those options. (*News Releases, February 2020*)

The Verdict Is In: Courtrooms Seldom Overrule Bad Science

The varying quality of scientific testimony can make it difficult for judges and juries to distinguish between solid research and so-called junk science. Insights from a new study published in *Psychological Science in the Public Interest*. (*News Releases, February 2020*)

The Science of Goals

Psychology researchers explore a panoply of science that could help people adopt newer, healthier, or safer behaviors. (*Research Topic*)

Universal Design for Inclusive Science

A blind researcher highlights resources intended to enhance the accessibility of nondisability-related research for disabled participants. (*Observer, October 2019*)

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FORWARD INTO THE PAST

By Lisa Feldman Barrett
APS President

An advantage of being APS president is that I hear lots of opinions on the state of our science. One common refrain, particularly from people concerned with the credibility of our scientific enterprise, involves shaking up the field, or even burning it to the ground, so that a better science of psychology can emerge from the ashes. Translation: Some of our colleagues want a Kuhnian-style scientific revolution. If you share this view, this month's president's column is for you.

To date, discussions about remaking psychological science have largely focused on how scientists *behave*. Best practices are important, of course, but let's go beyond that to consider how scientists *think*. In this regard, inspiration can be found by returning to our roots, when mental philosophy was transforming itself into a full-fledged science of the mind.

In *The Principles of Psychology*, published in 1890—and its shorter version, entitled *Psychology: Briefer Course*, published 2 years later—the great William James reflected on the nature of psychological categories. James questioned the deeply rooted assumption of his day that the human mind is structured like a set of mental organs—as types of thoughts, types of perceptions, types of feelings, types of actions—each with its own psychological process, and implemented in its own dedicated set of bodily changes or neurons. In this view of the mind, which we know as *faculty psychology*, the instances of a psychological category, such as anger, are thought to share a set of features that define the category and distinguish it from others, such as fear, episodic memory, or perception. Faculty psychology is an example of what philosophers refer to as typological thinking, which is a close cousin of essentialism: the belief that each category has a deep, invariant, and immutable cause that makes the category what it is, distinct from other categories.

James was skeptical of typological thinking, as his writing on the nature of emotion categories reveals:

> "**The varieties of emotion are innumerable**… The mere description of the objects, circumstances and varieties of the different species of emotion… are to a great extent either fictitious or unimportant, and that its pretences to accuracy are a sham…. The trouble with the emotions in psychology is that they are regarded too much as… eternal and sacred psychic entities, like the old immutable species in natural history…." (James, 1892/2017, Sections 374–375)

With this passage, James was advocating for the emerging science of psychology to depart from the typological mindset common in the other 19th century musings about the human mind. He was comparing that mindset with a similar one found in pre-Darwinian ideas about animal species, which were thought to have inherent "essences," or perfect platonic forms. Before Darwin, the essence of a species—the features that define its type—was thought to be real in nature. Variation—as deviation from that perfect form—was considered to be irrelevant imperfection. Darwin's *On the Origin of Species* (1859) changed all that, introducing the idea that biological categories are populations of variable instances. This populations mindset considers the variation to be meaningful and important in nature, whereas the type is a mere abstraction (Mayr, 2004).

➡

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.

Today, typological thinking remains firmly rooted in a substantial portion of psychological research, despite the fact that psychological scientists periodically reiterate James's concerns (for one lovely empirical example, see Gallistel, 2012). Consider the iconic psychological experiment, for example, in which people are randomly assigned to different conditions of an independent variable. We expose participants to stimuli and then measure their responses. The goal in a traditional laboratory experiment is to constrain or reduce within-group variation, making it easier to observe variation across groups. When we observe variation in responses within an experimental condition, the epistemic assumption is to treat the variation as error. But this approach, in effect, ignores Darwin's insights: Variation within categories is meaningful and therefore important to observe and study.

Darwin's insights likely hold true for any category that involves living creatures, including psychological categories that are created by experimenters in laboratories. Some studies do focus on individual variation, but by and large it is still common practice to make inferences about the mean value of group variation. Yet the mean, as a summary statistic, is an abstraction that does not fully capture the psychological reality of each individual in the group.

> The approach in traditional laboratory experiments, in effect, ignores Darwin's insights: Variation within categories is meaningful and therefore important to observe and study.

As some biologists like to say, no two individuals on the planet, not even monozygotic twins, are identical. If the ultimate goal is to understand the causes of mental activities and behaviors, then we must model individual variation. Otherwise, our inferences refer to fictional abstractions in fictional environments.

Taking things a step further, I've wondered whether typological thinking is responsible, at least in part, for the fact that our experiments do not replicate as well as we might like (Barrett, 2015). Laboratory experiments isolate one or two variables, manipulate them, and expect to observe moderate to large effects. This expectation relies on a mechanistic view of the human mind that is deeply entwined with typological thinking: that is, the view that a psychological phenomenon has a few simple, strong causes that produce equally strong effects. These effects, the argument goes, should be easily replicated from experiment to experiment, as long as the experimental methods are properly controlled, the sample is sufficiently large, and statistical analyses are properly run.

In reality, however, the brain and the body are less like simple, mechanistic systems and more like complex, dynamic systems that are influenced by many nonlinear, interacting causes. Any single variable will have a weak effect on the system, and, more important, we can't separately manipulate one variable and assume that the others remain unaffected. If the brain and body are complex dynamic systems, but we treat them like simple mechanistic systems in a laboratory experiment—targeting one or two variables and leaving the more complete web of influences unmeasured and unmodeled—then the impact of that fuller web appears to us as unbridled variation, *masquerading* as a failure to replicate. But the other possibility—the possibility discovered by Darwin and discussed by James—is that variation is meaningful. The *absence* of replication may, in fact, be the *presence* of meaningful variation with structure that we can discover and model only if we design our studies to measure and observe it. This leads to the startling possibility that our standard experimental method—the laboratory experiment—is in need of a *major overhaul*. This epistemic earthquake about measuring the mind brings with it a shift in our ontological assumptions about what a mind is.

In reality, few scientists might actually think about the mind as resulting from a few simple, mechanistic causes, and only a handful might defend the assumption that a mind is structured as a set of idealized categories of mental types. Nonetheless, conventional laboratory experiments, combined with conventional analytic approaches that rely on aggregating data over time, contexts, and/or individuals, keep us trapped in a typological mindset, whether we endorse that mindset or not. Such experiments inadvertently obscure an inescapable truth: When it comes to the mind and behavior, variation is the norm. Our traditional toolbox of experimental methods may not be up to the scientific task that is required for a robust science of psychology, no matter how carefully and diligently we use those methods.

If this is the case, then discussions of how to improve the credibility of psychological science, following their current course, will not yield the scientific revolution that some are seeking. Even as we take more care with our methods and statistics and curtail whatever bad habits we find lurking about, lack of replication may still emerge. And that's because the variation that scientists have been dismissing as error may, in fact, be the phenomenon of interest.

So, here is my challenge to those who want to shape the future of our field. Consider rejecting typology and cultivating a mindset of variation, as James recommended. Consider embracing a populations mindset, following Darwin's lead. Design studies and model the results to capture variation and discover the underlying features that produce it instead of treating it as error. Capture the complexity of causation: Every action and every mental event emerges

from a rich milieu consisting of a large number of weak, interacting influences. If enough of us accept this challenge, then perhaps there will be no need to burn the field to the ground. We might start a little bonfire here and there, and then toast a few marshmallows to celebrate as we remake our science into the robust, generalizable enterprise we all desire. ●

> Consider rejecting typology and cultivating a mindset of variation, as James recommended. Consider embracing a populations mindset, following Darwin's lead.

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• A letter of nomination specifying why the candidate is judged to have made sustained outstanding contributions.

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Dan Ariely, Duke University, *Forbes*, January 13, 2020: How to Design Your Interview Based on Behavioral Science.

Richard Boyatzis, Case Western Reserve University, *Forbes*, January 20, 2020: 3 Ways to Build Coaching Into Your Career and Why It Matters.

Denise Cummins, freelance author; **Adam Grant**, The Wharton School of the University of Pennsylvania, PBS, December 2, 2019: Why We Need to Redefine 'Full Time' Work.

Nicholas Epley, University of Chicago; **Juliana Schroeder**, University of Chicago; **Todd Rogers**, Harvard Kennedy School, *The Washington Post*, January 2, 2020: How to Avoid the Traps That Produce Loneliness and Isolation.

Eli Finkel, Northwestern University, *The Atlantic*, January 11, 2020: Why William and Kate Are a 'Fairy Tale' but Harry and Meghan Are 'Couple Goals.'

Dylan Gee, Yale University; **Megan Gunnar**, University of Minnesota, *The Atlantic*, January 28, 2020: The Outsize Influence of Your Middle-School Friends.

Adam Grant, The Wharton School of the University of Pennsylvania, *Quartz*, January 20, 2020: How Can We Create a Workforce Full of Lifelong Learners?

Alan Kazdin, Yale University, *The Guardian*, January 10, 2020: How You Attach to People May Explain a Lot About Your Inner Life.

Kostadin Kushlev, Georgetown University, *Forbes*, January 2, 2020: Happy People Don't Ignore The World's Problems, They Act to Solve Them.

Daniel Levitin, Minerva Schools at Keck Graduate Institute, PBS, January 11, 2020: A Neuroscientist Lays Out the Keys to Aging Well.

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HOW NEGATIVITY CAN KILL A RELATIONSHIP

Thanks to our brains' evolutionary bias toward negative events and emotions, it's often our low points that dictate the success or failure of our romantic relationships, writes APS William James Fellow **Roy Baumeister**. APS Fellow **John Holmes**'s work with couples suggests that this negativity effect can cause insecure individuals to spiral into conflict.

THE ATLANTIC | JANUARY 9, 2020

Angeline Lillard, University of Virginia, *Quartz*, January 3, 2020: The Montessori Schools Embracing Kid-Tracking Devices.

Katherine Milkman, The Wharton School of the University of Pennsylvania, NPR, December 31, 2019: Start Fresh: 6 Tips for Emotional Well-Being in 2020.

John C. Norcross, University of Scranton, CNN, January 1, 2020: How to Keep New Year's Resolutions.

Candice L. Odgers, University of California, Irvine, *The New York Times*, January 17, 2020: Panicking About Your Kids' Phones? New Research Says Don't.

Martin Seligman, University of Pennsylvania; and **Aaron Beck**, University of Pennsylvania, *Forbes*, January 2, 2020: The Fourth Commandment of Highly Effective Leadership: Counter Your Negative Thoughts.

Barbara Tversky, Columbia University, *Quartz*, January 2, 2020: The Visual Language of Comic Books Can Improve Brain Function.

Kathleen Vohs, University of Minnesota, *Quartz*, January 24, 2020: The Secret to Dealing With Cynics at Work.

Wendy Wood, University of Southern California, NPR, December 30, 2019: Creatures of Habit: How Habits Shape Who We Are—and Who We Become.

JEROME BRUNER LIBRARY OPENS AT MAX PLANCK INSTITUTE FOR PSYCHOLINGUISTICS

The **Jerome Bruner** library opened January 8, 2020 at the Max Planck Institute for Psycholinguistics in Nijmegen, the Netherlands, making the celebrated psychological scientist's personal collection of more than 3,200 books publicly available to scholars for the first time.

The library "is a lasting tribute to one of the greatest scientists in our field, reflecting his rich mental world and his worldwide scientific network," said APS Fellow **Willem "Pim" Levelt**, founding head of the Institute. "There is no other accessible personal library which so well reflects developments in the social sciences, in particular the cognitive sciences in their full breadth, since World War II."

An APS William James Fellow, Bruner served as chair of the Institute's Scientific Council from 1977 to 1990 and was known worldwide for his contributions to cognitive psychology and the science of perception before his passing in 2016.

The Bruner catalog can be accessed through the Max Planck Institute Library.

Bruner's research on learning established three modes of knowledge acquisition—enactive action-based learning, iconic image-based learning, and symbolic language based learning. His constructivist theory of learning, also known as discovery learning, built on this foundation by further emphasizing the role of students as active learners who build knowledge by engaging with the educational process, rather than passively absorbing it from teachers. His work also highlighted the social nature of learning, including how the teacher-student environment functions as an essential "scaffolding" for education.

"Jerry's curiosity was cosmic and

Jerome Bruner's personal library is displayed at the Max Planck Institute for Psycholinguistics in Nijmegen, the Netherlands.

insatiable," wrote Anthony Amsterdam (New York University School of Law) for the APS *Observer* in 2017. "No precept or principle, theory, text, or brute fact was armored in a shell that could resist his fascinated penetration. Brilliant as he was, the depth and clarity of his insights were matched only by the breadth of his excitement and concern, his instinctive and irrepressible intellectual stance: homo sum, humani nihil a me puto alienum."

Or, "I am human, and I think nothing human is alien to me."

APS Fellow **Patricia Marks Greenfield** (University of California, Los Angeles) noted Bruner's "seminal contributions to an astonishing number of fields" as well as his support to her as both mentor and friend. She remembered sharing with him her newfound love of rowing. "Before I knew it, he had gone to Florida and taken a sculling class…. Over the years we enjoyed rowing together in Vermont and Los Angeles."

Levelt also contributed to the tribute. In Bruner's service on the Max Planck Institute's Scientific Council, he "was generous with his ever-stimulating ideas, with his precious time, and especially with his personal, cordial attention." And referring to the collection that is now at the Institute, Levelt described "a fascinatingly rich collection of cognitive psychology, linguistics, psycholinguistics, developmental and educational psychology, anthropology, and philosophy—beaming Jerry's great intellectual breadth. Many books contain personal dedications from their authors, such as in George Miller's, Alexander Luria's, and Jean Piaget and Bärbel Inhelder's books."

For more on Bruner's life and work, watch the APS video, Inside the Psychologist's Studio with Jerome Bruner, or read Remembering Jerome Bruner in the February 2017 *Observer*. ○

In "Observations," the names of APS Fellows and current APS members are denoted by boldface type.

APS FELLOWS CAREY, ASLIN RECEIVE NAS ATKINSON PRIZE

The National Academy of Sciences (NAS) has awarded the 2020 Atkinson Prize in Psychological and Cognitive Sciences to APS William James Award Fellow **Susan Elizabeth Carey** for revolutionizing the study of the origins of cognition and to APS Fellow **Richard N. Aslin** for his groundbreaking contributions to understanding infant learning and development.

The Atkinson Prize is named for APS William James Fellow **Richard C. Atkinson**, an APS Charter Member whose $3.5 million grant to the NAS resulted in the creation of the award in 2013. Two prizes of $100,000 are presented biennially in recognition of "significant advances in the psychological and cognitive sciences with important applications for formal and systematic theory in these fields."

Carey, a 2002 APS William James Fellow, is the Henry A. Morss, Jr., and Elisabeth W. Morss Professor of Psychology at Harvard University. "Carey's research examines the fundamental question of how humans construct knowledge through processes such as face processing, social cognition, numerical representation, word learning, counting, and explanation," noted the NAS announcement. "Her studies in all of these areas have culminated in a grand theory of conceptual change, which she detailed in her book, *The Origins of Concepts*."
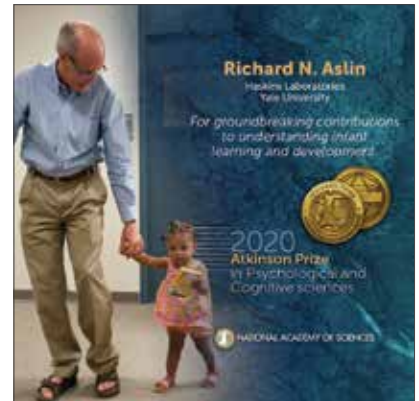
Photos by National Academy of Sciences

Aslin, a recipient of the 2016 APS Mentor Award, is a developmental psychologist and, since 2017, a senior scientist at Haskins Laboratories and Yale University. Previously, he was the William R. Kenan, Jr., Professor of Brain and Cognitive Sciences at the University of Rochester. The NAS announcement celebrated Aslin's "landmark contributions to the study of infancy over the last 40 years, including revelations about the development of vision and speech perception, as well as the early stages of language acquisition." His research has provided important findings about statistical learning in adults, children, and infants, and he "has helped to pioneer the use of functional near-infrared spectroscopy (fNIRS) to understand the neural underpinnings of learning and development in infants."

In addition to Aslin and Carey, APS members receiving other 2020 NAS awards include APS Fellow **Christina Maslach** (NAS Award for Scientific Reviewing) and APS Fellow **Nim Tottenham** (Troland Research Award).

APS Fellows who have received the Atkinson Prize in previous years include APS William James Fellow **John R. Anderson** and APS James McKeen Cattell and William James Fellow **Carol S. Dweck** in 2016, and APS William James Fellow **Richard M. Shiffrin** and Fellow **Barbara Dosher** in 2018.

Aslin, Carey, and other recipients will be recognized at the NAS's 157th meeting on April 26, in Washington, DC. ◉

QUOTE OF NOTE

"There's huge variability in the psychological tools now being admitted in U.S. courts. There's a lot of stuff that looks like it's junk and should be filtered out by the courts, but it's not being filtered out."

—**Tess Neal**, *The New York Times*, February 16, 2020

LINGUISTIC SIMILARITIES BUILD FRIENDSHIPS AND ECHO CHAMBERS

People with traits, interests, and experiences in common are more likely to become friends, and findings in *Psychological Science* indicate that friends also influence one another's linguistic styles over time, contributing to the relational "echo chambers" common on social media and in society as a whole.

"A key driver of social interaction is the principle of homophily: 'birds of a feather flock together,'" write **Balazs Kovacs** (Yale University) and colleague **Adam M. Kleinbaum** (Dartmouth College). "We suggest that the causal arrow points in the other direction as well: In addition to linguistic similarity driving tie formation, friendship ties will also induce increases in linguistic similarity."

Kovacs and Kleinbaum investigated this cyclical relationship through a set of two complementary studies: one analyzing the linguistic styles and in-person social networks of graduate students and another following the relationships between users of the online review platform Yelp.

In the university study, Kovacs and Kleinbaum compared the linguistic styles of 285 first-year graduate students using both their application essay and an exam essay written 2 months later. The researchers also collected information about students' social networks within the graduate program at both time points.

In line with previous findings, Kovacs and Kleinbaum found that students who began the semester with more similar linguistic styles were also more likely to report spending free time together and were more likely to remain friends if they had already formed a connection at the beginning of the program. Additionally, students who became friends early in the program demonstrated more similar linguistic styles during the written exam. ◉

See this article with the complete reference list at psychologicalscience.org.

See more Observations at psychologicalscience.org/obsonline.

LIBERALS AND CONSERVATIVES MAY FEEL MORAL VIOLATIONS DIFFERENTLY

Whether it's feeling certainty in the gut or a tingle of fear down the spine, we often describe feelings not just in emotional terms but as physical sensations as well. But while all humans have this in common, research in *Psychological Science* suggests that individuals on the conservative and liberal ends of the political spectrum may "feel" their feelings somewhat differently when their moral expectations are violated.

"It is possible that, as we found, liberals and conservatives feel moral violations in different body regions, interpret them as distinct complex feelings, and subsequently make different moral and political judgments," **Mohammed Atari** and colleagues **Aida Mostafazadeh Davani** and **Morteza Dehghani** (University of Southern California) write.

As part of the study, the researchers presented 596 online participants with five randomly selected vignettes detailing a moral violation. In line with moral-foundations theory (MFT), the scenarios focused on the domains of care/harm, fairness/cheating, loyalty/betrayal, authority/subversion, and purity/degradation.

In one vignette, for example, participants read, "You see a woman clearly avoiding sitting next to an obese woman on the bus." They were asked to rate both how morally wrong they felt this action to be, as well as the strength of their emotional response to the behavior, on a scale from 1 to 5.

The participants were then presented with two silhouette images on which they colored the areas where they felt an increase or decrease in bodily activity in response to the scenario. Finally, participants self-reported their political orientation and completed a questionnaire assessing the strength of their moral concerns in the MFT domains.

Through overlaying these body maps, the researchers found that each moral concern resulted in a "slightly distinct" increase or decrease in average activity. Most notably, violations of care, fairness, loyalty, and authority were associated with activation in the chest area, whereas purity violations resulted in higher activation in the abdomen. ◉

See a longer version of this article at psychologicalscience.org/obsonline.

FUNDING FOR GUN-VIOLENCE RESEARCH ENDS 20-YEAR DROUGHT

Research funds will be split between two government agencies

With the passage of the 2020 US funding bill in December, US federal funding dollars will finally be allocated for research on gun violence and ways to prevent it. The $25 million directed to this research topic will be evenly split between the Centers for Disease Control and Prevention (CDC) and the National Institutes of Health (NIH). This comes after a drought in funding for gun-violence research that lasted more than 20 years.

Funding for gun-violence research came to a halt in 1996 with the passage of the Dickey Amendment. Named after Senator Jay Dickey (R-Ark), who led the bill, this legislation effectively outlawed research that would "advocate or promote gun control." In March 2018, Congress decided that even with the Dickey Amendment in place, federal funds could be used for research on gun violence as long as they don't support lobbying for gun control.

The two agencies receiving the funding, CDC and NIH, support different research portfolios. CDC is noted for its ability to study and detect patterns in large sets of public-health data. NIH has strengths in looking at factors that put people at risk for harm.

While $25 million is only half of what Democrats pushed for in the lead-up to the finalized budget, it comes amid CDC reports that 39,773 people died in 2017 from gun violence. Because there is little understanding of the causes of gun violence and mass shootings, officials often blame mental illness as a prime factor. APS Fellow Alan Leshner noted this dangerous precedent last summer in "Stop Blaming Mental Illness," published in *Science* magazine and reprinted in the November 2019 *Observer* magazine.

"According to the National Council for Behavioral Health, the best estimates are that individuals with mental illnesses are responsible for less than 4% of all violent crimes in the United States, and less than a third of people who commit mass shootings are diagnosably mentally ill," Leshner wrote.

"Unfortunately it has been difficult to determine precisely the causes of mass shootings and the appropriate approaches to preventing them, largely because of a dearth of public funding for this line of research."

Although the ability of psychological scientists to conduct research on gun violence directly has been limited, researchers have studied the components that underlie violence, aggression, and related factors. For instance, psychological scientists have investigated topics such as mental illness, video games and violence, bullying, and other topics to understand their links, if any, to violence and aggression. Psychological scientists have much to offer this body of research and further public knowledge. ⦿

— Kekoa Erber
APS Government Relations and Policy Assistant

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See this article with the complete reference list at psychologicalscience.org.

See all government funding opportunities at the Federal Research, Funding, and Policy page on the APS website: psychologicalscience.org/policy.

HELP GUIDE NIH STRATEGIC PRIORITIES IN BEHAVIORAL SCIENCE

The NIH Office of Behavioral and Social Sciences Research (OBSSR), which coordinates and advances health-relevant behavioral research at NIH, is preparing to develop a new strategic plan that will guide the office's trajectory over the next five years. OBSSR has asked APS members to suggest new research directions that could advance and transform the health impact of behavioral science.

To share your ideas, visit OBSSR's crowdsourcing IdeaScale website at obssr.ideascale.com. You can also see others' ideas, browse and respond to comments that have already been submitted, and vote for your favorite ideas. Responses must be submitted by March 29, 2020.

PSYCHOLOGICAL SCIENCE CENTRAL IN PUBLIC SAFETY CHALLENGE

APS Past Board Member Roberta Klatzky among winning team of researchers

The National Institute of Standards and Technology's (NIST) Public Safety Communications Research Division has announced the winner of its 2019 Haptic Interfaces for Public Safety Challenge—and psychological science plays a central role in the winning team's work.

Haptic interfaces are systems that allow humans to use movement and sensation to interact with computers.

Carnegie Mellon's winning design for the Haptic Interfaces for Public Safety Challenge (image courtesy NIST).

NIST's Haptic Interfaces for Public Safety Challenge invites applicants to develop haptic-interface prototypes that will help firefighters and other first responders navigate the dangers of their environments. In 2019, the challenge required haptic developers, technology providers, and scientists to create prototypes that firefighters could use to navigate through thick smoke and other hazardous conditions in which visual and audio channels are compromised. Judges tested each prototype while wearing 50 pounds of gear, simulating conditions in the field. Prototypes were also tested through virtual-reality simulations.

A team from Carnegie Mellon led by Yang Cai, and featuring APS Past Treasurer Roberta Klatzky, took home first prize at the competition, winning an award of $25,000 as well as additional recognition for being the most commercially promising development. Klatzky, the Charles J. Queenan, Jr. University Professor of Psychology at Carnegie Mellon and a 2019 recipient of the APS James McKeen Cattell Fellow Award, is also a professor at the Human-Computer Interaction Institute at the Carnegie Mellon Neuroscience Institute, where she studies perception and spatial thinking.

"[Klatzky's] vast experience in haptics and navigation provided critical information for the navigation approach used during the live trials at the firefighter testing facility," noted NIST in its announcement of the winning team.

Klatzky and team's winning design was a band that attached to firefighters' helmet. The band is embedded with haptic actuators that deliver a left, right, forward, or backward directional signal to the wearer.

"The project led by Yang and colleagues hit my sweet spots as a psychological science researcher," Klatzky said. The goal of the project "was to guide first responders by providing vibratory stimulation at various points around a helmet. Haptic signals were necessary, because the responders might find themselves in smoky and noisy environments."

Klatzky added that she has spent much of her career "conducting research on haptic perception and sensory-guided navigation, enabling me to contribute to the design of the hardware and provide guidelines for its use in navigation."

Klatzky and colleagues' winning design is an excellent example of the many potential practical applications of psychological science.

See this article on psychologicalscience.org for a video demonstration of the band being used in the field. ◉

— **Kekoa Erber**
APS Government Relations and Policy Assistant

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Web-based technologies continue to revolutionize the ways psychological scientists conduct, disseminate, and analyze research. In our annual nod to US college basketball's "March Madness" tournament, the *Observer* takes a tour of two sophisticated (and evolving) platforms that are accelerating these advances. Specifically, Lookit enables researchers to run studies with children and their families over the internet, alleviating many of the practical barriers that limit the scope and quality of developmental research. And metaBUS streamlines the search process, allowing researchers to perform instant meta-analyses of over a million (and counting) previously published research findings.

METHODS IN FOCUS AT APS 2020

The 32nd APS Annual Convention, May 21-24 in Chicago, will feature a wide variety of symposia and workshops on psychological research methods and practices. Highlights include:

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- Advances in Multilevel Modeling
- Open Science for Different Methodological Approaches in Psychology

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Kids in Their Comfort Zones

Conducting Online Developmental Research With Lookit

By Kim Scott, Massachusetts Institute of Technology
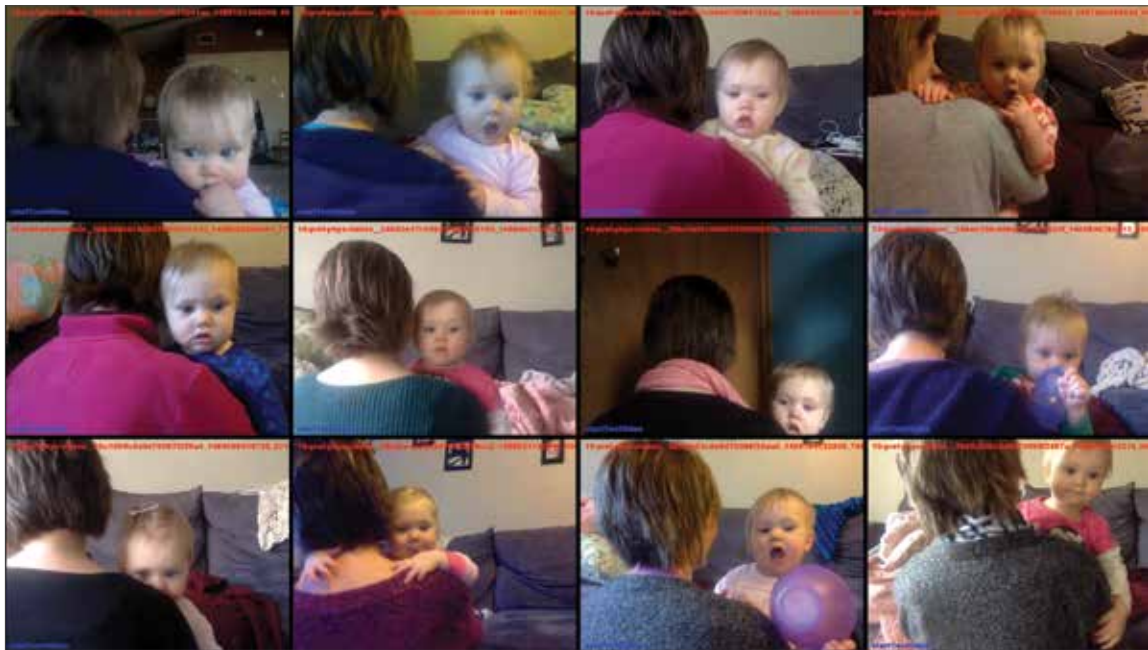
The Lookit platform enables researchers to run studies with children and their families in their homes. This video collage—a token of appreciation for a family—shows the same participant across 12 sessions of the study "Your Baby the Physicist."

In the field of adult psychology, online testing has sped up and democratized data collection, expanded the scope of questions we can answer, and provided a new form of "convenience" sampling that's far more representative than relying on undergraduates or even the volunteers who respond to local ads. Research with children stands to benefit even more, given the disproportionate difficulty of bringing them into the lab, yet developmental psychology has been slower to embrace online testing, largely because of technical hurdles and the particular demands of our discipline.

Online research could help alleviate many of the practical barriers that limit the scope and quality of developmental research. If we could run studies with kids in their homes anywhere in the world, we could reduce the degree of sampling bias inherent in lab testing, in addition to recruiting families with rare diagnoses and being able to observe more natural interaction. If we could bypass the bottleneck of recruiting and testing participants, we could more easily measure graded effects and look at change over time or individual differences. And—most importantly but least flashily—we could adequately power our studies so that other researchers could productively build on our work.

In what started as a small side project, I've been working on a platform called Lookit that allows developmental researchers to conduct online studies for babies and children. Families participate from home, on their own computers and within their own schedules. Parents can select studies from a variety of labs. To participate, they complete a short activity in the web browser with their child, and webcam video of the child's responses is sent back to Lookit. We plan to open the platform to other researchers in May, and I welcome researchers to consider joining us.

The Lookit Platform: Current Status and Capabilities

Back in 2015, as a PhD student studying cognitive development at MIT, I completed several test studies on a simple Lookit prototype. These studies established that it was possible to collect developmental data online and code dependent measures, such as preferential looking from the video collected, as reliably as in the lab (Scott & Schulz, 2017). Since then, with a second grant from NSF's Developmental and Learning Sciences program to expand access to Lookit, I've been focusing on scaling the platform to support multiple researchers running their own studies independently, initially in collaboration with the Center for Open Science, and now with our own in-house software engineer.

Lookit is built using Django, a widely used Python-based web framework that provides solid general-purpose functionality, such as a login system. From the researcher interface, researchers can create, edit, and try out studies; start and stop data collection; manage collaborators' access; confirm consent; download child, demographic, and session data and video; and contact participants.

Study procedures themselves are set up using a library of experiment components ("frames") and a frame player. There are customizable frames available for typical experiment components, such as consent, instructions, showing videos or storybook pages, and surveys. And there's built-in support for random condition assignment, counterbalancing, and conditional logic. Researchers specify

Collecting video online and in participants' homes introduces ethical and privacy considerations beyond those of typical in-lab videotaping. Among other solutions, the Lookit platform asks families to consent by making a recorded verbal or signed statement. The "consent manager" view allows researchers to confirm consent.

Kim Scott is a research scientist at the Massachusetts Institute of Technology (MIT). She runs the Lookit platform for conducting developmental research online. Her research interests include the connection between individual infants' abilities and implicit measures such as preferential looking. She can be reached at kimscott@mit.edu.

Screenshot of participant laughing in "Baby Laughter Games" (run by Caspar Addyman, Goldsmiths, University of London), which compares how funny babies of various ages respond to five different baby "jokes," and examines the role of repetition.

a study protocol using JavaScript object notation (JSON), a standard human-readable text format, and don't need to write any code—although there is the option of adding custom frames. When deployed, each study is siloed in its own docker container, using a snapshot of the codebase, to prevent any unintended changes to study functionality after the protocol is finalized.

The Lookit platform fits into a growing ecosystem of tools in related but complementary spaces: Yale's The-ChildLab.com project, for instance, has developed techniques to run scheduled live-interaction studies with children via webcam. Platforms such as JSPsych, LabJS, PsyToolkit, Testable, Psych-Studio, and Gorilla offer functionality for building and/or hosting (generally adult) online behavioral experiments to run in the web browser. Prolific, Testable Minds, and Amazon Mechanical Turk offer (adult) participant recruitment and management. Our own custom experiment builder within Lookit has allowed us to support a variety of developmental tasks, which are often more complex than adult test trials (e.g., including more audio and/or video instructions, custom animation, interactive elements); however, as other systems mature, we look forward to being able to integrate other options for experiment creation.

With Lookit under active development, we've accepted a limited number of collaborative beta-test studies to make sure we're focusing on what matters to our eventual users (both researchers and participants). We now have 10 studies from eight institutions in various stages of completion—four actively testing, three completed, and three in preparation at the time of writing. Over the past year alone, more than 800 families have registered, and children from 41 US states speaking 20 different languages have participated. Data quality is excellent; the platform's video quality and general reliability alike have improved substantially since initial studies using the prototype. Additional comparisons with in-lab data, and the first novel results, are coming soon from our beta testers.

Launch and Vision

We're targeting May 2020 to officially "launch" Lookit, making it available free of charge to anyone to use for their own research. (Stay up to date on our progress toward launch via Github Projects: github.com/orgs/lookit/projects/.) Researchers will need to sign a general institutional agreement with MIT, developed by MIT's lawyers and modeled after the Databrary agreement, that allows researchers to access and contribute to a shared repository of video from developmental studies. Researchers will also be responsible for obtaining approval from the institutional review board (IRB) at their own institutions.

Our aim is to provide infrastructure that enables a wide range of researchers to creatively and productively address their own questions. As more researchers run studies on the platform, we hope they will give back by participating actively in the community: trying out one another's studies, offering advice, adding to the documentation, and filing bug reports and feature requests to provide input on development.

While all of Lookit's code is open source and publicly available, there's substantial benefit to researchers in banding together to use and support a particular *instantiation* of such a tool. We all benefit from economies of scale in hosting, feature development and software maintenance, and IRB and legal coordina-

A parent and child positioning for at-home neonatal imitation trial in "Baby See, Baby Do" (Laurie Bayet, American University), which estimates the prevalence of neonatal imitation of caregivers—and of caregivers' recognition of imitation—in a natural home setting.

tion. And we can make Lookit a place with constantly refreshing interesting content, which will help with recruiting and engaging participants.

Unique Challenges of Collecting Developmental Data Online

While the basic idea behind Lookit is straightforward, it's taken the better part of a decade to get from an idea to a platform. There have certainly been some project-management and administrative hurdles—we are, after all, proposing to let other people collect video of children on the internet using MIT infrastructure. But for the most part, we've come up with ways to handle the challenges of creating and administering a platform for the field at large. Here are some of the solutions we've been working on:

Collecting video in the home

Collecting video online and in participants' homes introduces a few ethical and privacy considerations beyond those of typical in-lab videotaping. As we plan to scale up, a lot of our effort has been centered on building safeguards for responsible handling of participant data.

First, we need to be extremely certain that all families *agree* to webcam videotaping and that we appropriately handle those cases in which we cannot be certain. Unlike in the lab, it's possible for someone to end up on Lookit and try to "click through" the study out of curiosity without understanding what's going on. Families on Lookit consent to participate by making a recorded verbal or signed statement, which ensures they can understand written English and know they're being recorded. To minimize the potential for human error in the consent process, a "consent manager" view allows researchers to confirm consent videos in the web browser. That confirmation is stored in the database, and only responses with confirmed consent are available to view or download.
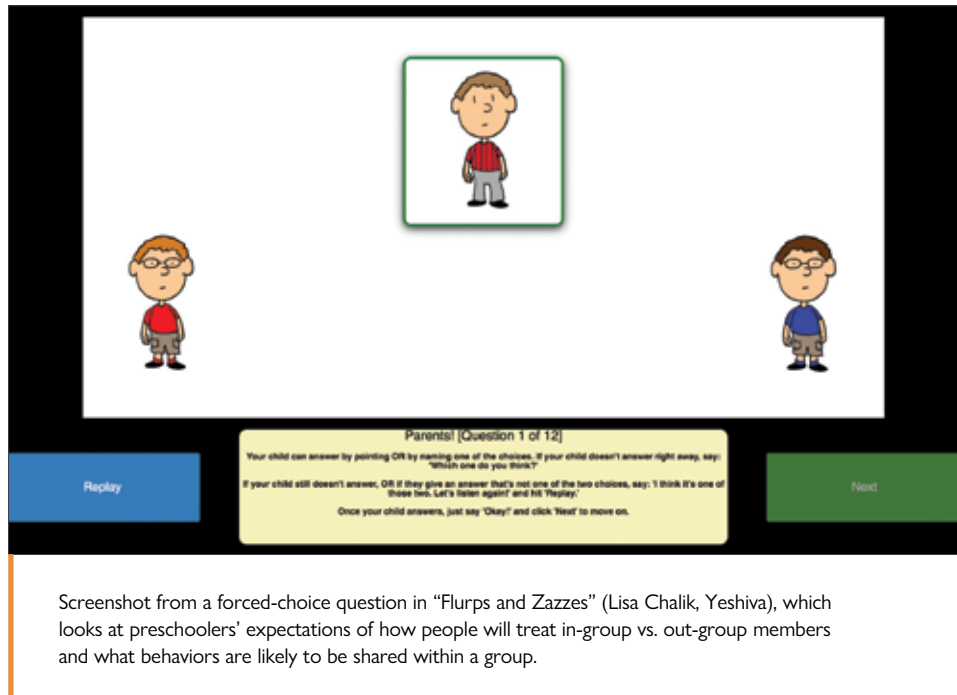
Screenshot from a forced-choice question in "Flurps and Zazzes" (Lisa Chalik, Yeshiva), which looks at preschoolers' expectations of how people will treat in-group vs. out-group members and what behaviors are likely to be shared within a group.

Second, video recording in the home is more likely to incidentally capture other family members, personal information, and uncensored interaction. At the end of all Lookit studies, a standard "exit survey" component lets participants select acceptable uses for their video, including whether it can be shared with Databrary. Parents also have the (very rarely used) opportunity to withdraw video from the study altogether. Withdrawn video is automatically made unavailable and deleted from our servers. Providing privacy options at the end rather than the beginning of the study allows parents to make an informed decision about sharing video on the basis of what happened throughout the study.

Supporting data analysis and sharing workflows while minimizing potential for unintended disclosure

One of our central engineering goals is to make it as easy as possible to download, analyze, and *share* data replicably and responsibly. Researchers can download CSV files with study data as well as automatically generated data dictionaries. Potentially identifying information, such as a child's birthdate or *exact* age at time of participation, is technically accessible, but by default it is omitted from response data downloads. By setting this default behavior, we "nudge" researchers toward planning for eventual data sharing from the start by keeping sensitive data separate. To avoid each lab having to reinvent the wheel for common workflows, Lookit also provides processed data that can be published without redaction. For instance, researchers can download rounded ages as well as child IDs unique to their own studies to avoid unanticipated combination of data across studies.

A shared reputation

A central platform shared across labs not only allows researchers to benefit from economies of scale in engineering and recruitment, but it also means that Lookit studies largely share a common reputation among families. Lookit studies are by design somewhat standardized to reduce cognitive load for participant families, further reinforcing the connections among studies. If another lab's study is really fun, works smoothly, and gets positive media attention, you benefit as well. On the other hand, you are also affected if another lab accidentally discloses
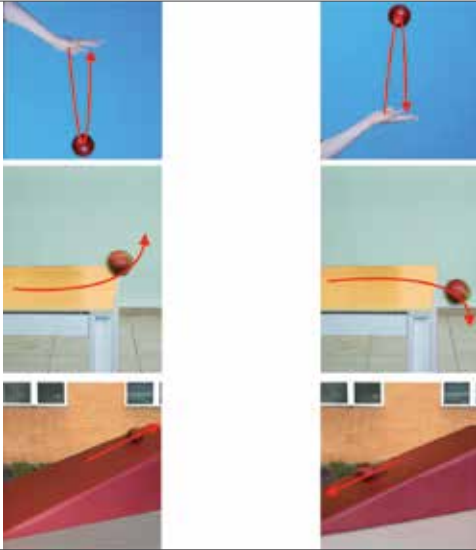
Schematics of example event pairings from "Your Baby the Physicist" (Junyi Chu, Laura Schulz, Kim Scott, MIT; Eliabeth Spelke, Harvard), which uses dense longitudinal sampling—12 sessions over 2 months—to look at individual differences and intraindividual variation in looking behavior in response to violations of gravity, inertia, and support principles.

personal information or conducts an ethically questionable study. Lookit's shared reputation is a large part of why our terms of use reserve the right to review studies ahead of posting for technical and ethical issues and why we have more conservative guidelines than most IRBs on what constitutes "deception" that must be disclosed.

Online recruitment

One of the biggest remaining hurdles is scaling online recruitment. Developmental labs have built up substantial expertise around recruiting in-person participants, but they generally have very little experience recruiting online participants. We have had a few undergraduate students experiment with organic and paid social-media advertising; our primary conclusion is that we should not expect the platform to magically attract thousands more parents without concerted—and skilled—efforts toward advertising and media outreach. On the bright side, recruitment is empirically not a zero-sum game for the multiple researchers

using Lookit: Advertising one study has substantial benefits for the other studies on the site.

Tips for Translating Your Study to an Online Environment

Focus on communication

In my experience, the biggest challenge developmental researchers face in moving studies onto Lookit is nontechnical: communicating clearly with parents despite the noninteractive setting. Although we're great at making studies intuitive and clear to young children, we're used to explaining the goals of and instructions for a study to parents in a social context where we can adapt on the basis of their cues and questions.

Trying to cover these same bases without an interactive setting is hard. It's worth the time, however, to really polish parent-facing study overviews, debriefings, and instruction text and/or verbal instructions. Even the study design itself may need a bit more signposting. Transitions that might be fine in the lab—for instance, proceeding from the last experimental test trial to the exit survey and debriefing—can feel more abrupt online.

Make it fun!

Online, families will be implicitly comparing a study to a kids' app or video game (by comparison, the closest equivalent for a lab visit is a trip to the doctor!). Although it's not realistic to expect a developmental experiment to be quite as engaging as a top-selling app, sometimes delivery or stimuli are drier than they have any scientific need to be, just out of habit.

When researchers record audio or video, they should ask themselves these questions: Is there actually any scientific need for a flat delivery? Will adding silly pages or a fun-to-say chorus to your storybook actually invalidate the interpretation of kids' answers? Is there a reason parents can't have an active role in asking questions or giving feedback?

Think creatively about the value for families

For families deciding whether to participate, the intangible rewards can be just as important as the compensation provided. We're all just getting started figuring out what the possibilities are online, but here are some nonmonetary "rewards" to consider:

- A cute video still from the study. For example, our study that involved dense sampling produced a video "collage" of clips from the 12 sessions.
- Insight into a child's particular behavior or unique strengths
- Some social connection via study "feedback" on the platform, even if it's just your opinion that a particular child's mind is fascinating
- Personal advice or encouragement about common parenting questions related to your research, or customized references to educational or parenting resources

Interested in Joining Us?

Again, we're planning to fully open up the platform in May. But there are a few steps researchers can take ahead of time to hit the ground running.

Do I have to be a "techie"?

The short answer is no. Researchers can create an experiment without writing a single line of code; they do not need to know any programming languages or to have run studies online before. Study specification isn't drag-and-drop (yet),

but what needs to be edited to build a study is a simple, human-readable text document that says what frames to use in what order.

That said, it's important for researchers to read the documentation and keep an open mind about their own abilities, such as not assuming that an error message is beyond them to figure out. Running experiments with babies on the internet might by definition *create* a techie person.

Will it work for my study? What dependent measures can I collect?

In terms of study protocol, researchers can do most of what one can imagine happening in a web browser. It's actually easier to focus on what *isn't* likely to work yet: live coding of looking
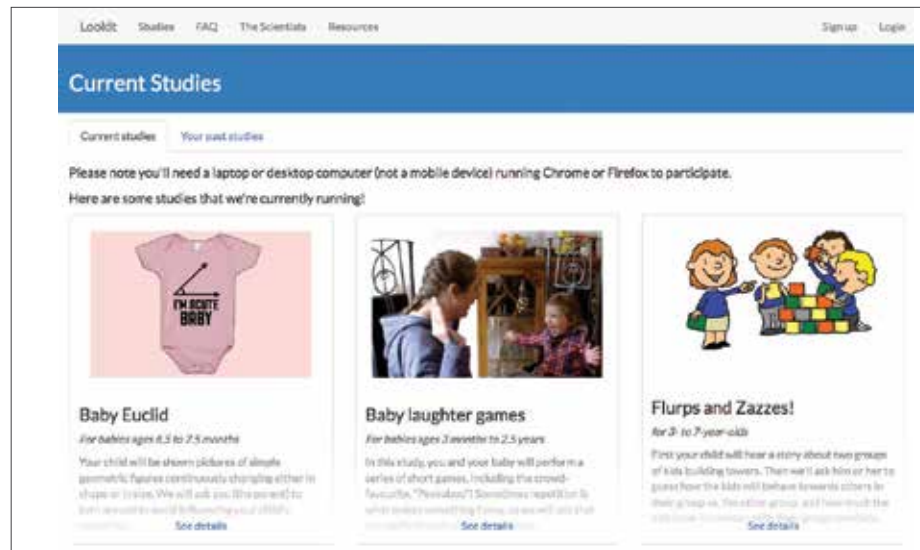
The Lookit interface lets parents select studies from a variety of labs. To facilitate online recruitment, strategies include social-media ads and nonmonetary "rewards" for parents.

measures; precise (frame-level) timing of videotaped responses, such as in some predictive-looking studies; strict control over the environment (e.g., precisely controlling lighting in the room or distance from the screen); and making live experimenter interaction or particular bespoke objects key to the experimental design.

Some studies may not be a good fit for the platform because of its shared reputation. For instance, we don't recommend exposing preschoolers to "the debate" about climate change or making a study that is deliberately frustrating for parents.

Currently, our beta testers are collecting or planning to collect data from newborns through teenagers. They're using looking measures, verbal or pointing responses, laughter, surveys, and performance on custom games. If researchers are not sure if something's possible, they can just ask us!

A Platform for Everyone

At this point, we've only scratched the surface of the possibilities for online developmental research: Initial beta-testers have largely focused on direct adaptations of in-lab studies to verify that their basic protocols will work. I'm especially eager to start supporting the applications I haven't yet imagined and the (potential) researchers who wouldn't otherwise *be* running developmental studies at all because they lack resources.

I hope you'll join us this spring! ●

References and Resources

Scott, K., & Schulz, L. (2017). Lookit (part 1): A new online platform for developmental research. *Open Mind*, *1*(1), 4-14.

Lookit wiki: github.com/lookit/research-resources/wiki

Lookit documentation and tutorial: lookit.readthedocs.io/en/develop/

Lookit codebase and development plans: github.com/lookit/

HERE'S HOW TO GET STARTED

Step 1: *Get your legal ducks in a row*

The first step if you're interested in using Lookit is to ask your institution to sign the Lookit Access Agreement. You can find the agreement and more information at github.com/lookit/research-resources/wiki/IRB-and-legal-information.

We recommend getting started on this piece right away. It should only take a few minutes, but your institution may take a few months to return it. You just need to email the form to someone at your institution who can act as an "authorized institutional representative."

Step 2: *Learn to set up your study*

The best way to get up to speed on Lookit is to complete the tutorial included in the documentation at lookit.readthedocs.io/en/develop/tutorial.html. You'll learn how to access the Lookit platform and community; get comfortable editing and troubleshooting an example study; walk through setting up a realistic study from scratch; and practice coding consent and interpreting downloaded data. You'll even learn to add to the documentation yourself (I know, thrilling!), in case you find something missing.

Millions of Findings at Your Fingertips

Supplementing the Traditional Literature-Search Process with metaBUS

By Frank A. Bosco, *Virginia Commonwealth University*

met•a•bus (ˈme-tə-ˌbəs) *n.*
1. A cloud-based research synthesis platform sitting atop the world's largest collection of curated social science research findings.

📊 1,113,483
Findings

📄 14,081
Articles

👥 1,175
Users

The home page of metabus.org updates in real time with the number of research findings, articles, and users.

The field of psychology has produced hundreds of thousands of journal articles and, within them, millions of findings in the form of effect sizes (e.g., correlation coefficients). As researchers, we rely on these findings practically every day—to estimate statistical power, generate or justify research questions, conduct meta-analyses, interpret research outcomes, satisfy simple curiosities, and, for some, to joke with colleagues about the conventions of null-hypothesis significance testing. After all, as noted by Cohen (1988), the effect size is "what science is all about" (p. 532). So, in an age in which most of us are accustomed to Amazon.com, why do we still search for research findings the old-fashioned way? Why don't we have a search engine of our research findings?

Most psychologists are familiar with the traditional, "top-down" literature search process. It starts by specifying a phenomenon of interest and ends after arduous hours of searching and filtering. Although impressive in scope, search engines like Google Scholar operate at a higher order (i.e., article) level and, consequently, often return too few hits and too many misses. This can make the search process a monument of inefficiency.

But what if things were different? What if the millions of psychology findings were managed with Amazon.com-like efficiency? Imagine if a researcher could visit a website, request all reported findings on the relation between, say, conscientiousness and age, and then view an instant meta-analysis containing hundreds of previously published findings. In fact, this functionality has been around for several years in the domain of applied psychology through the metaBUS platform (Bosco, Aguinis, Singh, Field, & Pierce, 2015; Bosco, Field, Larsen, Chang, & Uggerslev, 2020).

The metaBUS approach is, essentially, the opposite of the current search process. That is, the platform

> One clear benefit of metaBUS is portability: The effort involved in extraction can be leveraged to facilitate research in perpetuity.
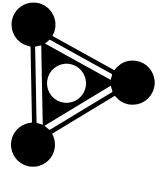
metaBUS

systematically extracts all findings from papers *and then* allows users to specify phenomena of interest to retrieve and summarize findings. One clear benefit of the metaBUS approach is portability: The effort involved in extraction can be leveraged to facilitate research in perpetuity, even long after achieving your presumed end goal, such as publication.

With more than 1,100,000 findings and growing, metaBUS is, to our knowledge, the largest manually curated collection of research findings across the social sciences.

The Backstory

As a doctoral student, I worked with faculty who were enthusiastic about content-analysis and meta-analysis in the organizational sciences (e.g., Aguinis, Dalton, Bosco, Pierce, & Dalton, 2011; Dalton, Aguinis, Dalton, Bosco, & Pierce, 2012). I began to convince myself that if all primary studies' research findings were in one big database, conducting and updating meta-analyses would be a breeze. Furthermore, many "science of science" questions could be addressed. Why hadn't we developed such a database? Probably because the task was perceived as overwhelming. In fact, I was repeatedly advised by colleagues to "earn tenure before launching a crazy project like that!"

But I couldn't help myself. I was a huge Microsoft Excel enthusiast (still am). And, luckily, I worked in a field in which effect sizes were, in more than 90% of cases, correlations reported within nice, neat matrices. There's a lot of data in those matrices—zero-order effects ripe for meta-analyzing. In 2011, to take my mind off my dissertation, I started experimenting with combinations of PDF extraction software and Visual Basic for Applications (VBA) script in Excel (the script was needed to transpose the extracted data, remove non-numeric characters, and the like). Eventually, I had the semiautomated extraction process down to roughly 15 to 30 seconds per matrix.

The next hurdle was the "vocabulary problem"; that is, many terms refer to the same thing (Furnas, Landauer, Gomez, & Dumais, 1987). After collecting a few thousand rows of data, it became clear that the variety of terms was debilitating. I couldn't just search for "performance" (a common applied-psychology topic) and expect to locate results comprehensively. I was going to need a hierarchical taxonomy containing essentially all *things* studied in the scientific space, with each entry tagged to the taxonomy. Between 2011 and 2013, I collaborated with Kulraj Singh and James Field to develop a taxonomy containing roughly 5,000 variables/constructs. We also refined protocols for semiautomated correlation-matrix extraction and manual coding. Together, by 2013, we had amassed a database of roughly 200,000 findings and had started answering "big

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science" questions with it (see Bosco et al., 2015). All the original components remain in use by metaBUS today.

Over time, with funding assistance and new team members, the database grew and evolved. We also experimented with a variety of web-based software platforms before ultimately deciding on a platform built in R Shiny (Chang, Cheng, Allaire, Xie, & McPherson, 2019). Today, the metaBUS platform is used regularly in the field of applied psychology to conduct and assist meta-analyses.

metaBUS: Under the Hood

The process of extracting and classifying findings with metaBUS begins with the semiautomated extraction of correlation matrix content using optical-character-recognition software. The extraction is considered *semi*automated because trained coders oversee the process for each matrix to ensure accurate transcription into a standardized database format.

Next, for each variable contained in each matrix, trained coders manually

assign classifications pertaining to several attributes (e.g., country of origin, sample size, sample type, response rate). They also manually classify each variable according to the metaBUS taxonomy, a hierarchical "map" of nearly
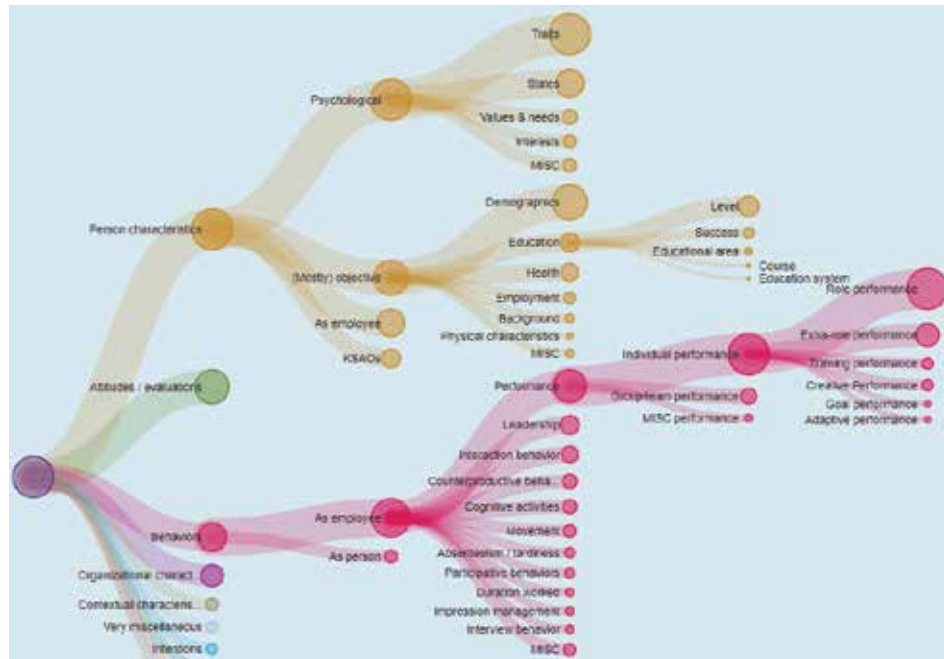
Abbreviated view of the metaBUS taxonomy. The complete taxonomy contains approximately 5,000 nodes and an interactive version is available for viewing at shiny.metaBUS.org.

5,000 constructs and variables studied in applied psychology. MetaBUS also leverages R software packages to analyze search results, thus enabling instant, rudimentary meta-analyses.

Test-Drive Demonstrations

Following are easy-to-replicate functionality demonstrations geared toward the first-time user—a sort of metaBUS test drive. I demonstrate the metaBUS taxonomy and the process of conducting an instant meta-analysis. I also describe how one might leverage each deliverable to enhance research and graduate training.

Please keep in mind that the metaBUS platform currently contains findings from applied psychology (i.e., industrial-organizational psychology and related fields such as human-resource management and organizational behavior) simply because that's where the project began. There is the potential to expand metaBUS to other areas of psychology, but a search at this time for terms such as "Stroop effect" or "word frequency" or "implicit attitudes toward sugared soft drinks" is likely to be disappointing.

Demonstration 1: Explore the Taxonomy

As a starting point for gaining familiarity with metaBUS, I suggest exploring the taxonomy of constructs. The taxonomy is arranged hierarchically and contains nearly 5,000 construct or variable names that appear in applied

METABUS AT A GLANCE

• MetaBUS is a cloud-based research-synthesis platform sitting atop the world's largest collection of curated social-science research findings.

• More than 1,113,000 findings from more than 14,000 published articles

• More than 1,175 users (faculty, students, and practitioners) who have together conducted roughly 13,000 searches

• Funding sources: None until 2014; later sources include the National Science Foundation and the Social Sciences Humanities Research Council

• 44 team members (listed at metabus.org/about_us/)

• Learn more at metabus.org, or explore the platform, including an interactive version of the taxonomy, at shiny.metabus.org. For a more detailed look at metaBUS, also see Bosco et al. (2020).

psychology. As shown in the figure on the opposite page, the taxonomy starts with broad branches (e.g., *behaviors*, *attitudes*), each of which subsumes finer level topics. For instance, *behaviors* subsumes *employee performance* and *absenteeism.* During data collection, coders manually assign all reported variables a taxonomic node (represented by a five-digit unique identifier), providing some degree of shelter from the vocabulary problem.

Research use cases: Researchers can explore the taxonomy to browse and ascertain the variety of terms used to refer to a given construct. As an example from applied psychology, the following terms that have appeared in published sources are equivalent: *turnover intention*, *quit intention*, *conviction of decision to quit*, *considering exit*, *perceived chance of leaving*. Thus, for a traditional literature search, such terms could be added to other to-be-searched variants. Alternatively, to conduct a metaBUS literature search independent of text-string shortcomings, one could rely on taxonomy codes in addition to—or instead of—text strings. For example, rather than dealing with the variety of terms used to refer to turnover intention, you could simply specify *20179* (i.e., an arbitrary 5-digit code representing quit intentions in the metaBUS taxonomy), which will capture all entries tagged by coders as *20179* during data collection, as well as all the node's "children."

Education use cases: Students can interact with the taxonomy to gain a rapid awareness of the universe of constructs studied within an entire scientific space along with an understanding of constructs' conceptual neighbors. Furthermore, because the node size is scaled according to the construct's frequency of occurrence in tables of results (larger nodes are studied more

THREE CUTTING-EDGE APPROACHES TO ADDRESSING CRITICAL ISSUES IN META-ANALYSES

The March issue of *Advances in Methods and Practices in Psychological Science* concludes a special focus on multilevel modeling and meta-analysis begun in the September issue, and includes three articles exploring novel approaches to enhancing the rigor of meta-analyses.

In *Advancing Meta-Analysis With Knowledge-Management Platforms: Using metaBUS in Psychology*, Frank Bosco (Virginia Commonwealth University), James G. Field (West Virginia University), Kai R. Larsen (University of Colorado Boulder), Yingyi Chang (Virginia Commonwealth University), and Krista Uggerslev (Northern Alberta Institute of Technology) introduce an online interactive tool that enables researchers to search from more than a million research results and obtain instant meta-analytical data. MetaBUS relies on standards-based protocols in combination with human coding to organize and provide an accessible database of research findings, offering the potential to advance research and education in psychological science, the researchers say.

In *Enriching Meta-Analytic Models of Summary Data: A Thought Experiment and Case Study*, Blakeley B. McShane and Ulf Böckenholt (Northwestern University) pose this question: What if, even when only summary data are available, meta-analysts acted as though they possessed individual-level data from each study and considered the model specifications these data might fit? This thought experiment could allow researchers to better understand the complexity of the data they are analyzing and move toward richer summary-data approaches when the complexity of the data warrants it. The authors present cases in which the common meta-analytic approach is appropriate, such as when trying to understand the overall effect on a single dependent variable in a single group, measured in multiple studies. And they present cases that warrant different approaches, including multilevel modeling, such as when trying to understand effects in multiple dependent variables, in multiple groups and covariates.

In *Obtaining Unbiased Results in Meta-Analysis: The Importance of Correcting for Statistical Artifacts,* Brenton M. Wiernik (University of South Florida) and Jeffrey A. Dahlke (Human Resources Research Organization, Alexandria, Virginia), provide the R code to correct artifacts that can bias the results of individual studies and meta-analyses. Artifacts—including variance due to sampling error, unreliability of measurements, and range restrictions—can bias the results of individual studies and meta-analyses, leading to inaccurate conclusions about mean effect sizes and heterogeneity of studies in a meta-analysis. The researchers also describe how to estimate the effects of these artifacts in different research designs and correct for their impact.

In an accompanying editorial, Frederick L. Oswald (Rice University) and Jennifer L. Tackett (Northwestern University) emphasize the importance of practical guidance and future-oriented thinking for the advancement of multilevel modeling and meta-analytical research. These three approaches to meta-analysis show not only the need for improving the researchers' approaches to complex data but also how advances in technologies, analytic methods, and open science practices might shape the future of meta-analysis.

See this article online on psychologicalscience.org/issue/mar-20 for the reference list.

frequently), students can quickly gain an understanding of variance in research attention across topics, indicating, for example, areas ripe for meta-analysis.

My colleagues and I urge readers to browse the metaBUS taxonomy and then, as a thought experiment, consider a scientific field with which they have little familiarity. In my case, such a field is sociology. I asked myself, *What would an analogous map of sociology look like*? I have no idea, but I can imagine the enormous educational value of a "map" of sociology topics, arranged by frequency, especially if I were a student of sociology.

Demonstration 2: Conduct an Instant Meta-Analysis

When presenting metaBUS at conferences, I often demonstrate the instant meta-analysis feature by asking the audience to name two constructs. (It feels a bit like performing a magic trick: "Pick a construct, any construct.") On one occasion, the audience picked *turnover intention* and *self-efficacy*. I submitted the two constructs to a metaBUS search and, abracadabra, within a few seconds, I presented the results of an instant, rudimentary meta-analysis that returned 49 effects with a mean r of −.06. Try the same analysis by duplicating the search terms shown in the figure on this page on the metaBUS platform (shiny.metaBUS.org).

To conduct an instant meta-analysis, two search terms must be specified in the form of taxonomic codes, text strings, or a combination of the two. (See Bosco et al., 2020 for new "exploratory" meta-analysis search functionality that requires specifying only one search term.) Because the taxonomy contains roughly 5,000 elements, the number of possible taxonomic search-term permutations is quite large. However, many possible pairs return zero results; thus, we urge users to try the platform at first by considering searches that involve popular research

Screenshot of the metaBUS instant meta-analysis feature. Relation between turnover intention and self-efficacy displayed. Cloud-based version available at shiny.metabus.org/q/da73b175-0b8e-4349-b4a5-9076edd09690.

topics. (As noted earlier, construct frequency may be ascertained by contrasting the metaBUS taxonomy's node sizes.)

Research use cases: The most obvious use case of the metaBUS instant meta-analysis feature is to facilitate the location of research findings. Indeed, findings are often difficult to locate because their variables may have played an ancillary role in the study (e.g., age as a control variable) and are not visible in the article's abstract or keywords. Thus, researchers conducting meta-analyses may wish to search metaBUS to locate findings that may have gone overlooked following a traditional literature search. Furthermore, authors frequently require examples of previous findings to craft manuscript introductions or to justify hypothesis statements. In situations like these, a search engine of findings such as metaBUS becomes highly useful.

Additionally, we envision a variety of meta-scientific studies using the metaBUS database. For example, studies that have examined the frequency distribution of p values (i.e., p-curves) have lamented existing reporting conventions (e.g., $p < .05$) that prevent the calculation of exact p values. In contrast, the metaBUS database contains more than 1,000,000 findings, each with a corresponding sample size. This would allow the largest investigation on the p-curve, with available nuance by publication year and bivariate relation type, and the analyses could likely be completed in a single day! Again, the up-front effort associated with the extraction of findings is portable to other purposes.

Education use cases: Meta-analyses have increased in popularity over the last several decades. In fact, many graduate degree programs now include meta-analysis training. The metaBUS instant meta-analysis feature could be an ideal teaching tool for these courses. Indeed, using the platform, users can interact with the contributing effects (i.e., toggle include/exclude and view impact on summaries), limit by sample size, publication year, and the like. Furthermore, students could gain familiarity with scripting languages by viewing the R script used to derive the meta-analytic estimate.

A Well-Funded, Collaborative Future

At this point, one might wonder, "can metaBUS be adapted to psychology more broadly—beyond applied psychology?" My knee-jerk response is, "yes, with sufficient elbow grease and collaboration."

As my colleagues and I describe in *AMPPS* (2020), the contents of correlation matrices are easy to extract and contain a wealth of information. However, effect-size reporting in other areas (e.g., much of experimental psychology) is precisely the opposite—the articles often contain relatively few effects, and the sheer variety of effect-size indices (and conditions that give rise to them) makes challenging the development and navigation of coding protocols. Put differently, efficient coding of experimental research is possible, but it will require some serious head-scratching. However, there are certainly other areas of psychology (e.g., military, personality, developmental, educational) that have traditionally reported correlation matrices or, over time, have done so with increased frequency. In my view, the best chance psychology has to demonstrate and promote effective, accurate curation of the research backlog in the near term, is to (a) focus on areas that have reported correlations by convention (i.e., worry about experimental research later on), (b) secure long-term funding for *manual* curation, and (c) assume a collaborative mindset.

I will elaborate.

Regarding funding, I love a magic pill as much as the next person. However, I believe it is unwise, at this time, to sink millions of dollars into unattended algorithm-based/artificial intelligence approaches with hopes of achieving a one-click solution to curating psychological research. In my view, it would be far wiser to fund manual effort-driven curation at first, for these reasons:

It would cost less to pay graduate students (e.g., during the summer) to manually code—or perhaps double-code—the backlog.

This effort would result in a more reliable database (compared with automated approaches), and its contents would be immediately useful for a variety of scientific purposes.

The data created from manual efforts would serve as the ideal "answer key" for *later* development of automated solutions.

Viewed through this lens, it would seem funders and researchers often put the cart before the horse and waste resources. So, for the near term, and to put it frankly, perhaps we should leave the engineering work to engineers and the psychology work to psychologists—at least until our data warehouse is in order. Regardless, dedicated, long-term funding should flow directly from psychology's known stakeholders to develop and maintain these manually curated search engines. To prioritize the curation and indexing of one's corpus of findings is, in my opinion, a no-brainer.

Regarding collaborative mindsets, let me first note that competition is not necessarily an unhealthy thing. Indeed, academics regularly compete for limited journal space and research funding; we are not strangers to the recognition economy and relish being the "first," the "founder," the "lead," the "principal investigator," and the like. However, some efforts, such as those involved in curating an entire scientific field's findings, rely on coordinated efforts (e.g., Collins, Morgan, & Patrinos, 2003). Fewer resources would be wasted by coordinated effort than a dozen ego-driven teams hoping to secure their respective places as top gun. This would only lead to delayed progress or, worse, incompatible database formats that limit the ability to merge data and answer larger questions.

I am optimistic that the metaBUS approach (by any other name) will spread throughout psychology and beyond. Indeed, research findings are important, and it's unwise to bet against the value provided by search engines. I just hope that it will be done collaboratively so that efficiency and scientific insight might prevail, and so that scientists—for the near-term, at least—resist the urge to develop "magic pills." This is a job that, at the present time, requires elbow grease for proper completion. ○

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SELF-SERVING MEMORIES: WHEN THE GOOD OUTWEIGHS THE BAD

By Cindi May and Michael Scullin

Whether it's a parking ticket, a disagreement with a co-worker, or a low score on an evaluation, negative events can leave a sting, and in some cases it seems as if the bad is stronger than the good (Tierney & Baumeister, 2019). The good news, according to Constantine Sedikides and John Skowronski (2020), is that over time our memories for positive events can be stronger than memories for negative events, particularly when those events have direct personal relevance.

Sedikides and Skowronski argue that self-regulatory mechanisms influence cognition in a way that protects and enhances the self. Consequently, we remember the good things about ourselves and our life events more than the bad. For example, when people recall personal experiences involving pride or shame, they remember the prideful moments in greater detail than the shameful ones (D'Argembeau & Van der Linden, 2008). Similarly, when people hear feedback statements (e.g., "You are the kind of person who cheats on tests") and consider whether the statements apply to themselves, recall is strong for positive statements about central traits and relatively weak for statements that are self-threatening (Sedikides, Green, Saunders, Skowronski, & Zengel, 2016). This is especially true when the statements target traits that are relatively unmodifiable (e.g., whether someone is perceived as trustworthy), thus magnifying the threat to self.

People also show a positivity bias in their memories for autobiographical information and events. For example, they misremember their cholesterol scores (Croyle et al., 2006) or course grades (Bahrick, Hall, & Berger, 1996) as being better than they actually were. Furthermore, when recalling disputes with another person, individuals are more likely to place the blame on the other than on themselves (Wilson, Smith, Ross, & Ross, 2004). Even the emotion associated with positive personal memories can endure longer than that associated with
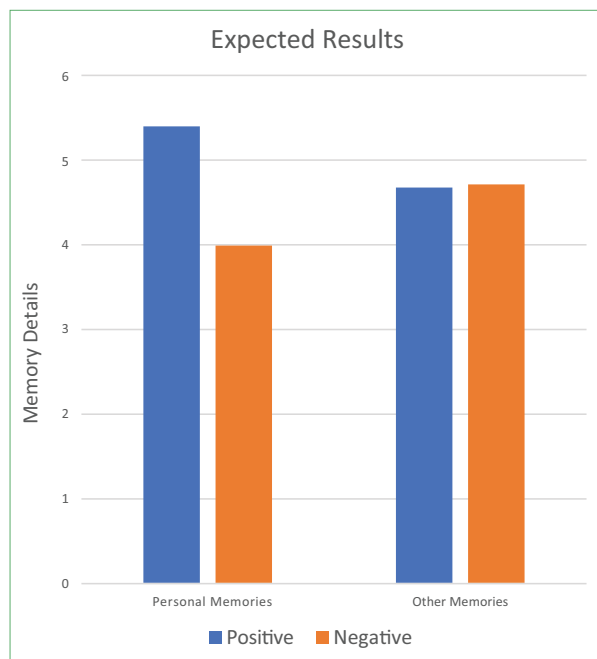
Data from D'Argembeau and Van Der Linden (2008) suggests your students' results may look something like this.

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negative memories, a finding known as the fading affect bias (Walker, Vogl, & Thompson, 1997). When individuals review old diary entries, for example, the affect associated with those memories fades over time, but more so for negative than positive entries.

It is important to note that there are exceptions to the positivity bias; the good does not always outweigh the bad. For example, there are individual differences in the fading affect bias. It is stronger among people with favorable self-images and relatively diminished in those with less favorable self-views, including those with anxiety (Walker, Yancu, & Skowronski, 2014), with symptoms reflecting an eating disorder (Ritchie, Kitsch, Dromey, & Skowronski, 2019), and with narcissism (Ritchie, Walker, Marsh, Hart, & Skowronski, 2014). Furthermore, people show a positivity bias for events that happened in their own lives but not for events that happened in the lives of others (Skowronski, Betz, Thompson, & Shannon, 1991). Nonetheless, there is robust evidence demonstrating a positivity bias in personal memories.

To bring these findings to life in the classroom, and to help students understand how researchers investigate autobiographical memory, ask students to complete the following activity: tinyurl.com/tlu7kzh. The activity involves recollection of four personal memories and can be completed in one session of 10 to 12 minutes, although some teachers may prefer to split it into two sessions.

Have students first recall two positive events (feeling proud of oneself and feeling admiration for someone else). They will write a brief description of each event and then rate their memories of each event on several dimensions, including visual and sensory details as well as memory for thoughts and actions during the event. Have students use a scale of 1 to 7 (higher scores reflect more detailed, vivid memories). Be sure to have them save their ratings for each event. Then have students recall two negative events (feeling ashamed of oneself and feeling contempt for someone else). As with the first session, students will write a brief description of each event and rate their memories on several dimensions.

After you complete the activity, ask students to calculate an average rating for each of the four events. Then have them compare the average score for their "proud" memory with the average score for their "shame" memory. Have them raise their hands if their proud scores are higher than their shame scores. Because these are personal memories, it is likely that most students will have higher scores for their proud memories than for their ashamed memories.

Then ask students to compare scores for their memories of admiration with their scores for the memories of contempt. Because these are memories for feelings about others, it is likely that scores will be similar for these memories.

As a follow up, point out to students that the focus here is not on the accuracy of the autobiographical memories but on the perceived quality of those memories as rated by the retriever. Because it can be difficult to determine the accuracy of autobiographical memories, many researchers have focused instead on understanding other qualities of those memories. In some cases like this one, methodological limitations force researchers to be innovative with their measures, and our understanding of the nature of human memory is enriched as a result.

So the next time you get a parking ticket, negative evaluation, or experience a disagreement with a coworker, take heart! What you remember in the future will likely be more positive than how things feel in the moment. ○

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See this article with the complete reference list at psychologicalscience.org.

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: psychologicalscience.org/publications/teaching-current-directions.

IS THERE A BRIGHT SIDE TO STRESS?

By C. Nathan DeWall

Regina and Katie are adventurous souls. For their honeymoon, they plan to visit the Sahara Desert, where they will ride camels, hike in the baking sun, and sleep in traditional tents. To make sure they're safe, Regina and Katie will hire a guide. They want someone who is adept at detecting snakes and other threats. More than that, Regina and Katie need someone who swiftly senses their fears and addresses them.

Katie, a psychological scientist, adds an odd twist to their honeymoon planning. "We need to hire someone who experienced childhood stress," she says. "The more our guide experienced stress as a child, the better that guide will keep us safe." According to Willem Frankenhuis and Carolina de Weerth (2013), this reasoning is solid.

Frankenhuis and de Weerth propose that early-life stress shapes, rather than impairs, adult cognition. *Shaping* occurs when experiences shift people's psychology to become better adapted to their environment. When toddlers experience famine, their cognition toward food changes. When children experience physical abuse, their cognition toward interpersonal safety changes. Such cognitive shifts help these children survive and reproduce. In effect, stress can increase fitness to one's environment.

To say that early-life stress shapes cognition is provocative. Rather than focus on shaping, researchers have often emphasized how children who experience early-life stress show cognitive impairments. Children who experience prolonged maltreatment, for example, demonstrate deficient cognitive performance and emotional reasoning (Gould, Clarke, Helm, Harvey, et al., 2012; Pears & Fisher, 2005). Frankenhuis and de Weerth acknowledge these deficits while also demonstrating that adults who experienced high levels of childhood stress show faster detection of threatening stimuli and fearful faces (Davis et al., 2011; Pollak, 2008). Nonhuman animals that experience early-life trauma have similar advantages in detecting environmental threats (Sullivan & Holman, 2010). Our experiences shape our thoughts—and childhood stress is no exception.

To bring this provocative research into the classroom, instructors can ask students to complete the following two activities. The first activity introduces students to the concept of shaping. The second activity encourages students to engage in perspective-taking with people who have experienced early-life stress.

Activity #1

Ask students to list the most unusual activities a person could complete every day for one year. Be creative. Perhaps it is walking across campus backwards? Typing emails with your eyes closed? Picking up laundry with your toes? Have students share their ideas with a partner. Instructors can then call on students to share their ideas. Next, have students describe how these activities might have drawbacks, besides other people thinking you're goofy. More seriously, ask students how engaging in those unusual activities would change their thinking after a year. How might those activities affect you if you completed them repeatedly for 5 years? What if those 5 years were during the period in your life when your brain is most adaptive, such as early childhood? How might the activity make you more adapted to your current environment?

Activity #2

Ask students to read the following scenario and consider how they would respond.

You own a hang gliding company. The largest part of your business is tandem flying, in which a guest pays to complete a flight with an expert-level flyer. You need to hire one new expert-level flyer. The job's two main requirements are to quickly detect potential safety threats and to ensure that guests don't experience overwhelming fear. You've narrowed the field to two finalists. Below are their credentials and personal information. Select the candidate you would like to hire.

Candidate A: 16 years of tandem flight experience; 3,146 hours flight time; important personal fact: lived in an orphanage first five years of life, in which the candidate experienced tremendous stress and abuse.

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Candidate B: 17 years of tandem flight experience; 2,853 hours flight time; important personal fact: third-generation graduate of renowned New Hampshire college preparatory school.

Have students share who they would want to hire and why. What made their candidate more qualified than the other candidate? Instructors can then review the Frankenhuis and de Weerth article, which suggests that Candidate A may outperform Candidate B at quickly identifying environmental threat and fear expressions. How many students would like to change their hiring decision? Why or why not?

No child should ever experience abuse, neglect, or other maltreatment. But for those who do, all is not lost. Out of their pain is formed an alloy of strength and awareness that alerts them and others to potential threats. If there is a bright side to stress, it is having a cognitive edge in ensuring that you remain out of harm's way in the future. ◉

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HOW CAN WE ALL CONTRIBUTE TO A MORE DIVERSE PSYCHOLOGICAL SCIENCE?

By Dom Weinberg

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Diversity is central to the moral, educational, and civic mission of universities (Hurtado, 2007). Yet the senior ranks of psychological scientists do a poor job of representing the populations that they ought to serve. In 2018, 30% of US psychology graduate students (and the general population) were people of color, but barely 10% of full professors were (Hall, 2019). This is no small problem. Workforce diversity has been found to foster innovation and creativity (Hewlett et al., 2013), and so our current homogeneity can hinder our ability to address complex societal issues. Even more importantly, the failure to diversify psychological science is an issue of justice and fairness.

Change must start at the top. Our leaders, senior academics and administrators whose recruitment responsibilities determine who is hired, selected, and promoted have to do more than just use the language of diversity for branding purposes (Lam, 2018). (Columbia University's guide to best practices in this area seems to be a good starting point; Office of the Provost, Columbia University, 2016.) Leadership is also required to manage the conflicts that can follow from diversity (Jang, 2018); bringing people with a range of experiences together doesn't automatically lead to good outcomes. Perhaps ironically, it may be already-disadvantaged groups who are most destabilized and threatened by diversity (Richeson, 2018).

Those of us in other positions of privilege (yes, graduate students have many privileges compared with others) can also contribute to making psychological science more inclusive. We can be mindful about how we work with diverse groups of colleagues and students, such as by attending intercultural awareness workshops, using language that doesn't discriminate, and taking steps to be explicitly antidiscriminatory (Savage et al., 2016; Thomas & Hirsch, 2016). Many institutions are creating initiatives, training programs, and other resources that can help; my own university, for example, recently introduced a diversity toolbox to help researchers increase their awareness of diversity, reflect on their identity, and contribute positively to sensitive discussions (Utrecht University, 2019).

During a recent workshop I attended on how to communicate research, the presenter discussed seven examples, six of whom were of white men, likely reinforcing presumptions about who fits in psychological science. As teachers, we need to think about why there is a growing movement to "decolonize the curriculum" (Abdi, 2012; Felix & Friedberg, 2019). This means, among other things, recognizing the importance of including the works of nonmale, non-White, non-Western thinkers in our lectures and reading lists, as well as raising students' awareness of the social and historical contexts that have produced the academic knowledge that we use.

We might also follow the practical steps set out by the American Association of University Professors (Harper & Davis, 2016). These include acknowledging our implicit biases (due in part to cultural stereotypes), integrating diversity into the curriculum, and counteracting stereotype threat—whereby group stereotypes threaten self-evaluation, which in turn alter identity and performance (Steele & Aronson, 1995). As educators, we have a duty to our students to cultivate diverse and inclusive learning environments, where students feel comfortable expressing themselves. Such goals are far from simple to implement in reality: There is no easy route to making our classrooms places where people feel safe yet ideas are critically and robustly examined (Weinberg, 2017).

We also have responsibilities in our research. Most psychological scientists are aware by now that the vast majority of what we think we know about human behavior is based on participants in (Western, educated, industrialized, rich, democratic (WEIRD) societies (Henrich et al., 2010). And even within such societies, research is much easier to conduct on wealthier, more highly educated ➡

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> We have a responsibility (especially when we're publicly funded) to disseminate our research in ways that reach and engage a diverse audience....
> It is easy to dismiss some groups as too hard to reach, but this is an excuse for not thinking about the messaging and media outlets that have a broader reach. We must do better.

majority groups, who are more accessible research subjects. As a result, we develop theories, interventions, and treatments on the basis of trials with the people who (relatively speaking) may not need them the most. Practitioners, service designers, and policymakers are therefore inevitably less able to address the unique challenges experienced by low-income or minority groups.

Furthermore, we publish many findings behind paywalls, meaning only researchers at the wealthiest institutions can read them (Schiltz, 2018). The barriers of academic jargon may be even more impenetrable to the average person. We have a responsibility (especially when we're publicly funded) to disseminate our research in ways that reach and engage a diverse audience (from children to highly educated adults). It is easy to dismiss some groups as too hard to reach, but this is an excuse for not thinking about the messaging and media outlets that have a broader reach. We must do better.

But it's not only our research participants and readers who need to be more diverse; our reference lists should be too. A brilliant Argentinian scientist I met at the start of my PhD reminded me of the enormous disadvantages that researchers from low- and middle-income countries face in getting their work recognized. First, they have fewer resources to begin with. Second, major journals aren't as interested in their work (Smith, 2017). And third, even if researchers find their work, they are probably unlikely to reference it anyway. Take a moment to think about whether you've ever failed to read beyond the abstract once you've realized the researchers weren't at a globally recognized institution. Instead, you may have found a similar paper, based on a WEIRD sample, that you guessed your coauthors would more quickly approve of.

Those of us in positions of privilege need to act and not just talk. But we also need to do a lot more listening. And as a white, native-English-speaking cis man, I need to listen to diverse voices more than most. I recently found a great new tool, Transform Your Feed (The Female Lead, 2019), that has introduced several new diverse and positive female role models into my social media feeds. I hope that I'll find many more inspiring and diverse psychological scientists to follow in the coming years of my PhD program. ○

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Student Notebook serves as a forum in which APS Student Caucus members communicate their ideas, suggestions, and experiences. Read other Student Notebook columns at psychologicalscience. org/studentnotebook, and learn about the benefits of Student Membership at psychologicalscience.org/ members/apssc.

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ANNOUNCEMENTS

GRANTS

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.

Call for Abstracts: Behavior, Energy, and Climate Change 2020 Conference

The Behavior, Energy, and Climate Change (BECC) 2020 Conference is accepting abstracts for posters, individual presentations, and panels through April 1, 2020.

BECC, to be held December 6-9 in Washington, DC, presents behavioral research on how to encourage behavior change for energy and carbon savings, how to evaluate these programs, how to understand why individuals and groups change, and how to make these transitions in fair and equitable ways.

Student fellowships are available for the conference through the Stanford University. The conference is co-convened by Berkeley Energy and Climate Institute and Stanford Institute for Economic Policy Research.

Submit an abstract or get more information at beccconference.org.

MEETINGS

32nd APS Annual Convention
May 21–24, 2020
Chicago, Illinois
psychologicalscience.org/convention

4th International Convention of Psychological Science
March 25–27, 2021
Brussels, Belgium
ICPS2021.org

2020 Cognitive Aging Conference
April 16–19, 2020
Atlanta, Georgia
cac.gatech.edu

Consortium of European Research on Emotion (CERE) 2020
June 5–6, 2020
Granada, Spain
cere-emotionconferences.org

International Society for the Study of Behavioural Development 2020 Conference
June 21–25, 2020
Island of Rhodes, Greece
issbd2020.org

2020 Society for Affective Science Conference
April 23–25, 2020
San Francisco, California
society-for-affective-science.org

35 Annual SIOP Conference
April 23-25, 2020
Austin, Texsas
siop.org/Annual-Conference

AAAS Forum on Science & Technology Policy
May 7–8, 2020
Washington, DC
aaas.org/page/forum-science-technology-policy

Biennial International Seminar on the Teaching of Psychological Science
July 13–17, 2020
Paris, France
nitop.org/BISTOPS.org

Behavior, Energy, and Climate Change 2020 Conference
December 6–9, 2020
Washington, DC
beccconference.org

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30 September 2020

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THE TALENT BIAS

Years of performing as a pianist sparked psychologist **Chia-Jung Tsay**'s curiosity about perceptions of "natural talent" and other factors that can influence how we evaluate achievements.

Chia-Jung Tsay
UCL School of Management

Your research explores decisions and biases about talent. What got you interested in this line of research?

I spent many years performing as a classical pianist. Whether the performances were for concerts, competitions, or auditions, the audience was key. I became fascinated by the role of the evaluator—and, more generally, the factors that contribute to professional selection and evaluation processes.

I am fortunate that in the academic environments I have experienced, a range of backgrounds and training were welcome. Although several streams of my research were initially motivated by my experience as a musician, many of my observations have implications for other domains as well. As an academic in a school of management, these discussions about performance, judgment, expertise, and communication remain quite relevant, and I'm glad to be able to offer a different perspective.

What are some hidden factors that you've found to influence our evaluations of people and information?

One stream of research was motivated by seeing that professional musicians often try to downplay their long hours of practice to enhance the idea that they have natural talent. At many conservatories, you'll find musicians blocking the windows of practice rooms with clothing, newspapers, even furniture so that people can't peek in to see who is striving so hard to master a difficult piece. It seemed that musicians intuit that appearing to be effortless prodigies could enhance their reputation and achievement. I decided to test this empirically as a social scientist.

I found that how we attain our achievements does indeed impact how we're evaluated. For example, when people are presented with candidates who have equal achievements, they often judge the "naturally gifted" candidate as superior to the hard-working "striver." This is true even when the candidates' biographical information and sample performance output are identical. Yet people prefer the "natural." We are more willing to hire that person and more willing to invest in and listen to his or her ideas.

This is at odds with what we say we believe—that we place great importance on hard work and effort. We generally admire the archetype of the self-made individual and see their effort as a way to support a meritocratic society.

What do you consider your most counterintuitive findings about the way we perceive talent and ability?

Through my own experiences in music competitions, I realized that the type of evaluation process involved—whether competitions required us to submit sound or video recordings—can lead to very different results for the same candidates. I was curious to examine why.

Most people assume that sound is central to the judgment of music performance. I had research participants either listen to or view silent videos of excerpts of live classical competitions. Interestingly, only those who watched silent videos were able to identify the actual winners. This was true for both classical music novices and experts. It seems the original competition judges were overweighting visual information when evaluating performances. Believe it or not, the best way to identify the winners of music competitions may be to turn the sound off.

As an academic, I was delighted to find these counterintuitive results about the power of visuals. As a classical musician, I was somewhat disturbed. These findings hold implications for any type of professional judgment—any decision or domain in which visuals are present but other information may be assumed to be more informative. ⚬

Read the full interview online, and see a video of Tsay performing an excerpt of Liszt's Totentanz, at psychologicalscience.org/observer/talent-bias.

Back Page showcases particularly interesting work by a wide variety of psychological scientists. Know of a good candidate for a future profile? Contact the *Observer* at apsobserver@psychologicalscience.org.

Time-Sensitive Material