

Observer

Vol. 31, No. 1 • January 2018

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FEATURED SPEAKERS



Fred Kavli Keynote Address

LYNN NADEL

The University of Arizona

Making and Remaking Memory: Past, Present, and Future

Lynn Nadel's scientific exploration of the hippocampus has led to groundbreaking developments in understanding how space and memory are represented in the brain. He coauthored the seminal book *The Hippocampus as a Cognitive Map* with John O'Keefe. Together, they received the 2006 Grawemeyer Award.



Presidential Symposium

Memory: From Neurons to Nations

APS President Suparna Rajaram brings together four distinguished psychological scientists to speak about the nature of memory from a variety of perspectives that include cognitive, neuroscientific, cultural, and developmental approaches for this year's Presidential Symposium.

SUPARNA RAJARAM (Chair)

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Aarhus University, Denmark

HENRY L. ROEDIGER, III

Washington University in St. Louis

CHARAN RANGANATH

University of California, Davis

QI WANG

Cornell University



Bring the Family Address

The Paradox of Diversity: Promise, Pitfalls, and Implications for Racial Progress

JENNIFER RICHESON

Yale University

Jennifer Richeson will deliver the 2018 Bring the Family Address. She has received numerous honors and awards for her research focusing on the social psychological phenomena of cultural diversity and social group membership. A Guggenheim Fellow and a MacArthur Genius Fellow, Richeson has used a broad range of empirical methods to examine the potential cognitive "costs" and mutual misperceptions associated with intergroup interactions.

Observer

ISSN: 1050-4672

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Federal ID Number: 73-1345573

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Presidential Column **Pursuing Questions at the Heart of Identity**



APS Past Board Member **Jennifer Richeson** talks with APS President **Suparna Rajaram** about the factors that led her into a career studying topics such as inequality, discrimination, race, class, and gender identity.

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If Neuroscience Needs Behavior, What Does Behavioral Science Need?



According to APS William James Fellow **Nora Newcombe**, the answer is an investment in Big Data sets, data sharing, and standardized evaluation tools.

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'I Feel Your Pain'



Observing someone else in anguish can evoke a deep sense of distress and sadness — almost as if it's happening to us. APS Fellow **Ying-yi Hong** and other scientists identify some of

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With help from the APS Fund for Teaching and Public Understanding of Psychological Science, **Lisa Cantrell's** podcast on psychological research has grown its audience to nearly 20,000 listeners over the last 2 years.

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Exploring the Minutiae of Memory

From word association to brain imaging, scientists have taken a variety of approaches to studying the human brain's imperfect reproductions of the past, APS William James Fellow **Daniel L. Schacter** says.

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Teaching Current Directions in Psychological Science



"Social Sleep: Why It Hurts Ourselves and Others to Skimp on Sleep" by **C. Nathan DeWall**

"Why People Believe in God — or Don't" by **David G. Myers**



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Pursuing Questions at the Heart of Identity

Jennifer Richeson on her Guiding Compass in Science



Jennifer Richeson

Yale University

I was thrilled that APS Past Board Member Jennifer Richeson agreed to deliver the Bring the Family Address at the 30th APS Annual Convention in San Francisco. Jennifer, the Philip R. Allen Professor of Psychology at Yale University, is one of the foremost researchers on the many psychological phenomena pertinent to cultural diversity. A Guggenheim Fellow and MacArthur Genius Fellow, she is perhaps best known for her work showing how actual and perceived increases in racial and ethnic diversity can yield both more egalitarian and more exclusionary racial attitudes.

APS Past Board Member Wendy Berry Mendes interviewed Jennifer in 2016 for the APS video series “Inside the Psychologist’s Studio.” In that interview, Jennifer shared her path from her undergraduate years at Brown University to the graduate program at Harvard University, where she worked under the mentorship of renowned social psychologist Nalini Ambady, who passed away in 2013. To give students and young researchers a flavor for the professional path that one takes in building a career in psychological science, I asked Jennifer questions similar to those Mendes asked in her interview. -APS President Suparna Rajaram

Tell us a little about your educational path, and how it led you to pursue a graduate degree in psychology.

I started taking classes in the program in neuroscience at Brown University, and really enjoyed them, but I was also really interested in the social sciences and questions at the heart of identity and diversity. I honestly did not know what to major in that might appeal to these differing interests. It turns out, however, that all of my neuroscience classes and general science classes counted for the psychology major, and psychology also addressed questions of social inequality.

The idea of becoming a professor, though, didn’t occur to me until very late. I took a class in the education department called “The Psychology of Race, Class, and Gender” taught by a Black female — my first Black professor at Brown and certainly my first Black *female* professor — and that was when all the little pieces came together. I asked the professor, Fayneese Miller, “How do I become you?” And she said “Well, you have to go to grad school. You can go into counseling, you can go into clinical, or you can go into social.” And I thought, “Oh, let me see what this social psychology thing is all about.” And I applied to a bunch of schools, and I got into one — it just turned out to be Harvard.

What originally piqued your interest in this area of social psychology?

Honestly, it was simply Professor Miller telling me that it was the area in psychology that was most likely to address the topics that I cared about most, namely inequality, discrimination, race, class, and gender identity. It was a leap of faith on my part and a huge leap of faith on the part of the faculty at Harvard who accepted me into the program.

What obstacles did you face at the beginning of your career?

Some were simply due the fact that I knew very little about social psychology or research with humans — recall that my research experience to that point had been with rats. It was also a tough time to begin graduate school, because *The Bell Curve* — a book that re-ignited the debate about race, class, intelligence, and ability — had just been published. Perhaps needless to say, it was a tough first year, but then Nalini came to Harvard in my second year, and she was the one who said “No, you have a place in this field. I think you have great ideas; come develop them in my lab.” She really reached out to me in a way that was super proactive and incredibly encouraging, and was that way all the way through graduate school and honestly for the rest of her life.

PRESIDENTIAL continued on Page 7 ➡



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PRESIDENTIAL continued from Page 5

Tell us more about what it was like working with Nalini.

She is one of the most brilliant people I've ever met; she's stunningly brilliant. She was so used to being underestimated, and so she had a bit of a healthy edge because of that. I think there's such a lesson in that. You're constantly trying to navigate your way through this field, and people don't take you seriously all the time, especially if you come in a female package or a minority package or are short or young or any number of things. And not only did she handle it so incredibly well, she mentored her students on how to handle it. Through her, we learned that we'd face some hard times, but we're equipped with the skills to manage them.

What's been your guiding compass in your academic career?

Honestly, I simply try to do the very best work that I can to investigate questions that I care about deeply. That is all.

What advice, in general, would you give budding scientists around the world?

At one point in graduate school I was teetering on the edge of exit, and Nalini said, "No, Jenn, we need your voice in the field." And that's true; we need *your* voice and *your* unique perspective. But you do have to really want it ... you do get constant negative feedback. There are so many temptations to go in directions that you may be interested in, or maybe you don't know that you're interested in, but everybody else is interested in pushing you in that direction. It's easy to get sidetracked, especially when there are rewards and incentives for doing so. You have to be clear about why you're in the field, or at least what you hope to accomplish, and you have to try your best to stay connected to that. Try to remember that "This is why I'm in this game, this is what motivates me to go to work." ●

To watch "Inside the Psychologist's Studio" with Jennifer Richeson, visit psychologicalscience.org/r/Richeson.



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Inside the
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Studio**



With APS Past President
Walter Mischel

Walter Mischel's studies on children's self-control are classics in the field of psychological research. In this interview recorded at the International Convention of Psychological Science in Vienna, Austria, Mischel reflects on his famed marshmallow test and other aspects of his storied career.

Interviewed by:

APS Past President Mahzarin Banaji
www.psychologicalscience.org/r/mischel

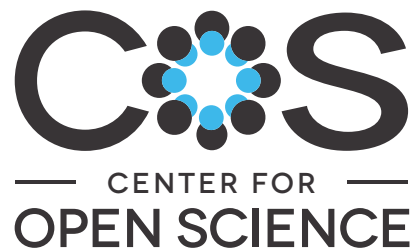
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Sternberg Receives Grawemeyer Award for Intelligence Research

APS William James Fellow **Robert J. Sternberg** has won the 2018 University of Louisville Grawemeyer Award for Psychology for his research on intelligence and education. Sternberg, a professor of human development at Cornell University and editor of *Perspectives in Psychological Science*, is known for his triarchic theory of intelligence, which suggests that intelligence, often narrowly defined through IQ, has analytical, creative, and contextual components.

While the current education system, and college admissions in particular, tend to prioritize analytical thinking, Sternberg has been outspoken in his belief that a more holistic approach to education is required to create a wiser and more ethical workforce.

“Sternberg’s work has resulted in changes in college

admission processes that have leveled the playing field for individuals from diverse backgrounds and, thus, has increased student diversity,” said award director Woody Petry in a press release. “His ideas, which have been applied globally in developed and developing nations, emphasize the importance of cultural context in the assessment of successful intelligence.”

Author of more than 1,700 research publications, Sternberg has worked as a professor and administrator at numerous academic institutions, including Oklahoma State, Tufts, and Yale universities.

Grawemeyer Award winners receive a \$100,000 prize and are scheduled to present free lectures on outstanding works in the fields of music, international relations, psychology, and more this upcoming April in Louisville.

Psychological Scientists Celebrate Thaler at Nobel Ceremony

University of Chicago economist Richard H. Thaler, whose work has roots in the groundbreaking research of APS William James Fellows **Daniel Kahneman** and **Amos Tversky**, received the Nobel Prize in Economic Sciences on December 10 from King Carl XVI Gustaf of Sweden. Thaler collaborated extensively with Kahneman, who himself received the Nobel Prize in Economics in 2002 and the Presidential Medal of Freedom in 2013, as well as with Tversky, who passed away in 1996, to show that irrational decision-making stems from a human tendency toward certain cognitive biases. His findings have inspired

many governments and organizations to inject more behavioral research and economics into policymaking. Among those attending the Nobel Prize ceremonies in Stockholm to support Thaler were APS President-Elect **Barbara Tversky** (pictured with Thaler below at a recent scientific conference); Kahneman; APS Fellows **Eldar Shafir** of Princeton University and **Maya Bar-Hillel** of Hebrew University of Jerusalem; and Harvard University law professor **Cass Sunstein**, Thaler’s co-author on the acclaimed 2008 book *Nudge: Improving Decisions About Health, Wealth, and Happiness*.



Podcasting a Wide Net

By Lisa M. Cantrell

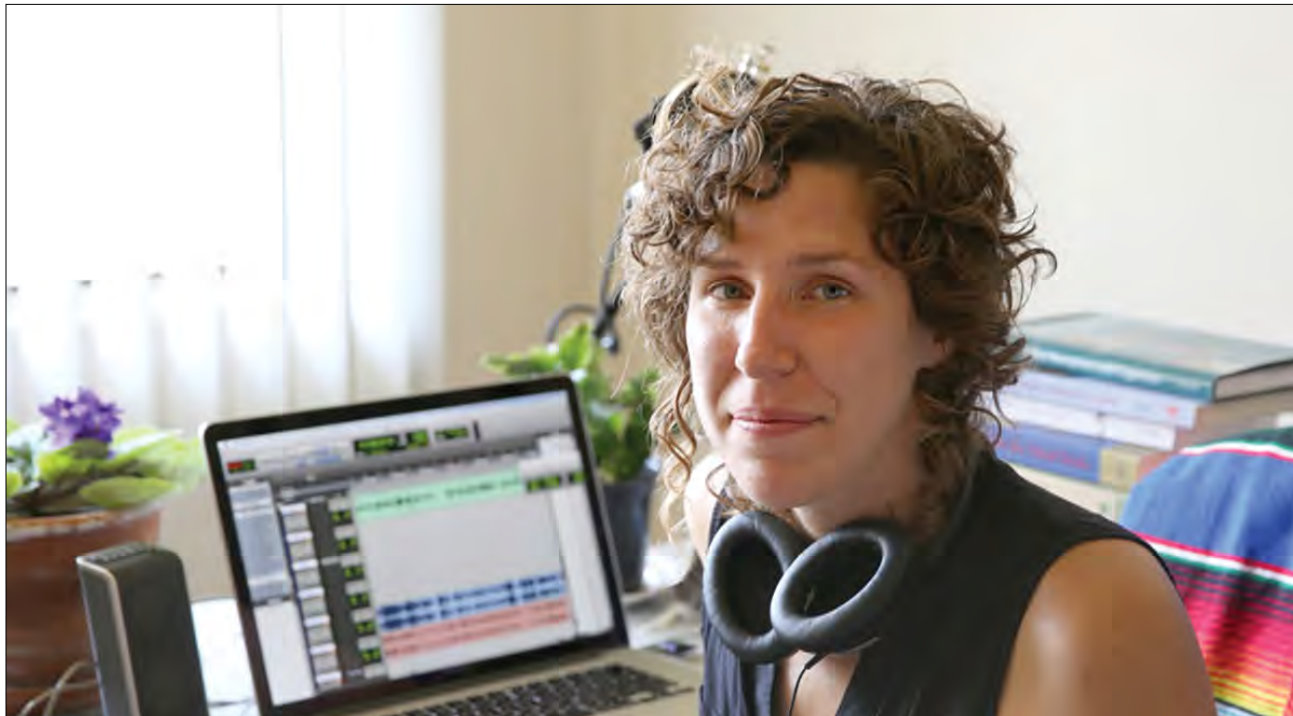


Photo courtesy of Davis Enterprise

Podcasts have become increasingly popular in recent years: A national survey found that listening increased nearly 14% between 2014 and 2015, and approximately 67 million Americans regularly tune in to one or more shows each week. Furthermore, young adults (ages 18 to 25) are the largest podcast audience — suggesting that this format is on the rise among the next generation.

This boost in popularity could be due to podcasts' ease of use. They can be accessed through mobile devices and, unlike videos, can be consumed while engaging in other activities (e.g., driving, cooking, working). Podcasts, therefore, may be the ideal way to communicate science to a large audience.

In 2014, I decided to create my own podcast, “An InExact Science,” to satisfy what seemed to be an unmet need in the reporting of psychological science to the public. At that time, much of psychological research was still reported by science journalists in print. I created the podcast in an effort to close the gap between the science and the public, using an audio platform to take psychology's most interesting findings to a bigger audience. With that mission, I began traveling to labs across the country to interview scientists about the most influential findings in their fields.

Lisa M. Cantrell is an assistant professor in child development at California State University Sacramento.

In 2015, the podcast received support from the APS Fund for Teaching and Public Understanding of Psychological Science to expand its reach. Since then, the podcast's audience has grown to 2,000 subscribers and nearly 20,000 listeners on live radio broadcasts. It has been featured in the *Sacramento Bee* and *Science* magazine and was named by *The Audit* as one of the best indie podcasts of 2016.

Each episode is devoted to understanding a specific phenomenon in human cognition and behavior: how we learn languages, fall in love, experience memory changes as we age, or create imaginary companions. A recent episode explored a phenomenon called aphantasia, a condition affecting one in 50 people in which individuals are unable to mentally visualize anything. An upcoming episode will explore the links among genetics, opioid receptors, and our individual experiences of social pain.

More information, as well as all of the episodes, can be found at aninexactscience.com. •

Further Reading

Edison Research and Triton Digital (2017). Report of digital media consumer behavior in America. Retrieved from www.edisonresearch.com/wp-content/uploads/2017/03/The-Infinite-Dial-2017.pdf

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KEYNOTE SPEAKERS



Arrested Development or Adaptive? The Adolescent and Self Control

BJ Casey

Department of Psychology, Yale University, USA

BJ Casey is widely known for her skillful use of brain imaging to examine developmental transitions across the life span, especially during adolescence. Her work is grounded in translational studies from genetically altered mice to humans, leading to the development of treatments for several mental health problems that affect millions of young people. Her studies have begun to inform when and how to target treatments to the individual based on age and genetic profile, and they have implications for juvenile justice and mental health policy reform. An APS Fellow, Casey is the recipient of numerous awards, and she was named by Thomson Reuters as one of The World's Most Influential Minds in 2015.



Evolution of Emotions and Empathy in Primates

Frans B.M. de Waal

Department of Psychology, Emory University, USA and Utrecht University, The Netherlands

Frans B.M. de Waal is one of the world's best-known primatologists, and his work has vastly advanced our understanding of primate behavior and social intelligence. His research has uncovered similarities between human and primate behaviors such as conflict resolution, cooperation, and sharing. A member of both the Royal Netherlands Academy of Arts and Sciences and the US National Academy of Sciences, de Waal was selected by TIME as one of The World's 100 Most Influential People in 2007.



The Brain in the Ecosystem: Cognition, Culture, and the Environment

Atsushi Iriki

Laboratory for Symbolic Cognitive Development, RIKEN Brain Science Institute, Japan

Neurobiologist **Atsushi Iriki** has drawn worldwide attention for his pioneering studies on tool use, body image, and higher-order representations in humans and primates. He explores the developmental and evolutionary processes surrounding communications, intellect, and altruism using behavior and neurobiology techniques. Iriki's work is advancing our understanding of the evolution of human intelligence and technology. He has been honored with numerous awards, including the Minerva Foundation's Golden Brain Award in 2004.



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APS Award Address

Exploring the Minutiae of Memory

P psychological scientists who study memory have long known that the human brain generates imperfect reproductions of the past — we often combine unrelated events or misremember significant details. Such mistakes can result in banal blunders or more serious misunderstandings: Eyewitness memory, for example, is an area that has proven ripe for mistakes, with many witnesses unintentionally making false identifications with a high degree of confidence.

In keeping with this topic, APS William James Fellow Daniel L. Schacter (Harvard University) asks, “What are the functions served by a constructive rather than a rote/reproductive memory system?” During his award address at the 2017 APS Annual Convention in Boston, Schacter delved into the minutiae of memory, discussing studies that tested people’s recall abilities using everything from semantic association to fMRI.

Over the course of his career, the cognitive psychologist has attempted to investigate the reasons why the human brain stores information in this way: “Maybe one reason we have a constructive memory system is because it does a pretty good job about holding on to the general meaning and themes of experiences, and we typically don’t really need to remember all the details of every experience,” Schacter suggested.

Luring in False Memories

To examine how false memories arise in a low-stakes memory situation, Schacter and colleagues used the Deese, Roediger, McDermott (DRM) procedure. They had individuals study words that have a similar theme (e.g., “candy,” “sour,” “sugar,” “bitter,” “taste”), then tested their memory for those words using a recall or recognition test. In the recognition test, researchers presented participants with either an unrelated word (e.g., “point”) or a “critical lure” — that is, a word that easily could have been on the list but was not (e.g., “sweet”).

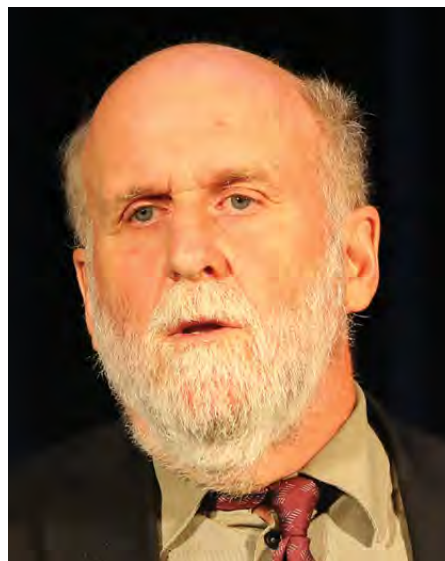
Numerous studies have found that not only are people highly likely to believe the lure was on the list, they also have great confidence in that belief. Early work from Schacter’s lab indicated that older adults show higher levels of both phenomena.

“False recognition here seems to be based on memory for semantic information or relations, and older adults may retain this information and rely on it perhaps even more than younger adults,” Schacter suggested.

To take this line of inquiry a step further, Schacter and collaborators at University College London wanted to examine the brain regions that might affect the connection between words and memories. In particular, they focused on the temporal pole (TP),

which “has been called by many people for many reasons the semantic hub of the brain.”

Supporting this theory, Schacter noted, is the fact that damage to this brain area results in semantic dementia — a type of memory loss wherein individuals have difficulty processing word-related information but are capable of retaining other details.



Our memory systems may mislead us when it comes to remembering details of past events, but they serve us well by retaining the overall gist thereof, says **Daniel L. Schacter**.

Computational models of semantic cognition suggest that fMRI scans should show similar brain-activity patterns when similar words are given to a participant. Thus, Schacter and colleagues predicted, “the probability that a DRM list will generate a false memory should be directly related to the degree of neural overlap [between list items and the critical lure] in the TP.”

Schacter and his team gave participants in an fMRI scanner four sets of words and a lure; importantly, each set was associated with a different probability of a false memory (i.e., some lures were more closely associated with their sets than were others). They posited that a high degree of neural overlap between a set and its lure would result in a high likelihood of false memory creation.

Indeed, that was the case: “No other brain region shows this relationship,” Schacter said.

These findings suggest that our memories are easily swayed by similarities — a phenomenon that may create problems when the consequences of misremembering are not as small as simply identifying the wrong word.

Schacter says we should not despair about the ways in which our memory operates, however. Citing a 2007 study he conducted with APS Fellow Donna Rose Addis (University of Auckland)

APS AWARD ADDRESS continued on Page 19 **▶**



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APS AWARD ADDRESS *continued from Page 17*

and Alana T. Wong, Schacter suggested that remembering past events can be used to positively influence future decisions.

The researchers gave study participants in an fMRI scanner a cue word and asked them to either remember a past experience related to that word, imagine a novel future experience connected to that word, or carry out visuospatial- or semantic-processing control tasks that did not involve a past or future episode. They found that a core network of brain regions showed strikingly similar increases in neural activity when people remembered past events or imagined future events compared with when they performed the control tasks.

“Episodic memory, which is traditionally associated with recollection of past personal experience, plays a key role in imagining possible future scenarios,” Schacter said. “It does so by supporting what we call flexible retrieval and a recombination of elements of shared episodes to construct possible future episodes.”

The psychological scientist explained that this finding led him and Addis to theorize that our memory system could be trained to think about the future in a way that leads to positive choices — a process they call “episodic simulation.”

Such simulation could engender a beneficial outcome for people who have difficulties regulating their eating behavior, for example. Because people tend to devalue a reward the longer it takes for them to receive it, they are more likely to choose a smaller immediate reward (e.g., an unhealthy food) than wait for a larger delayed reward (e.g., a healthier lifestyle).

However, said Schacter, if a person can imagine concrete features of the big reward they are waiting for — such as how they will fit more comfortably into their clothes when they have lost weight — they can more easily make farsighted judgments.

“There is a growing literature on [adaptive functions of episodic simulation] that I think is steadily making the case that, despite not being a perfect process ... episodic simulation does serve a variety of adaptive functions,” Schacter added. He was quick to note, however, that there can be downsides to episodic simulation, such as when elements of different events are miscombined (e.g., during eyewitness testimony).

Putting the Puzzle Pieces Together

To investigate further how and why elements of different events can be miscombined, Schacter also discussed another adaptive memory process called *associative inference*, which allows us to “combine related information in distinct episodes to make novel connections.” If we see two people walking the same dog on different days, for example, we can be reasonably certain that there is some relationship between the two people. This process can

involve one of two key elements: integrative encoding, whereby the presentation of one combination activates the memory of the other combination, or flexible retrieval, whereby a test activates the recall of the link between the pairs.

Schacter and Harvard graduate student Alexis Carpenter wanted to isolate the mechanism of flexible retrieval to see whether it also contributes to memory errors. They theorized that while the process can support connection of related events, it also can cause confusion about the details of each case (e.g., people may recognize an important connection between events but miscombine smaller elements of each event).

In an experiment, Carpenter and Schacter showed participants two scenes: a man holding a toy (AB) and a boy holding the same toy (BC), each in a room of a house. Participants were told they’d be tested on whether the A and C elements were connected and would be asked about minor scene details (e.g., the color of a couch in the room).

During the second part of the experiment, individuals were tested on background scene details for half of the scenes, were then given associative inference tests about the connection between A and C, and finally were tested on background details in the other half of the scenes. While individuals were frequently able to correctly infer the relationship between A and C, they sometimes misidentified small details in each scene as belonging to the other scene or as belonging to both. The scientists posited that successful flexible retrieval might also increase susceptibility to false memories, but only when participants were questioned about details *after* they were tested on the main events.

“You should make more source memory confusions when you get the inference right than when you get it wrong, but only when the source test is given after the inference test, because that’s where flexible recombination is occurring,” Schacter explained. This may be because individuals sometimes merge details from the two scenes when they get the inference correct, thus ingraining the false memories as well as the accurate ones.

That, indeed, is what the scientists found: “You’re making more false memories when you get the inference right, but only when the source memory test comes right after you’ve done the flexible recombination,” he concluded. ●

—Mariko Hewer

To watch the video of Daniel L. Schacter's award address, visit psychologicalscience.org/r/memory.



AT RANDOM

“It wasn’t just marshmallows. We came up with all kinds of stuff that resulted in my first grant to the federal government being rejected with a very short comment in which they urged me to apply to a candy company.”

—APS Past President **Walter Mischel**, talking about his classic studies of children’s self-control, in “Inside the Psychologist’s Studio.”

Presents

Improving the Reproducibility of Our Research Practices Using Open Science Framework



With:

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University of Virginia

Executive Director

Center for Open Science

Courtney Soderberg

Statistical and Methodological Consultant

Center for Open Science

In this six-part workshop, APS Fellow Brian Nosek and Courtney Soderberg of the Center for Open Science review laboratory and personal research practices to improve reproducibility. Topics include project and data management, preregistration, managing collaborations, and getting the most out of the Open Science Framework for private and public laboratory operations. The workshop was recorded at the 28th APS Annual Convention in Chicago in 2016.

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If Neuroscience Needs Behavior, What Does Behavioral Science Need?

By Nora Newcombe

“**N**euroscience needs behavior.” That’s the remarkably direct title of a recent article in *Neuron* by Krakauer, Ghazanfar, Gomez-Marín, MacIver, and Poeppel. For most psychological scientists, the article’s message probably seems uncontroversial and obviously true. But the journal’s primary audience, the neuroscience community, instantly began to debate the Krakauer et al. perspective in various venues, such as on Twitter and in journal clubs.

This disciplinary disconnect has important implications for the pace of discovery and reliability of science, and for that reason alone we should work to overcome it. But this disconnect also plays out in the institutions and policies that govern federal funding for psychological science, with the unfortunate result that psychological science is often not adequately recognized and supported. For example, the Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative is overwhelmingly focused on advances in technology and innovation at the level of the genome, the connectome, and molecular and cellular neural mechanisms. In the same vein, the National Institute of Mental Health (NIMH) Strategic Plan continues to emphasize understanding mental health at the level of cellular and circuit analyses. And there are other examples as well.

Krakauer et al. provide great arguments for the role of psychological science in these kinds of initiatives (for the sake of space, I won’t go into the detailed arguments that are presented in the article, but I encourage you to read it). But we need to take the discussion a step further and identify what’s missing from large-scale federal initiatives that focus on neuroscience to the exclusion of behavior.

In this column, I discuss five examples of the kind of potentially high-payoff areas involving questions that are in the domain of both neuroscience and psychological science but illustrate clear needs that would correct some of the current imbalance in federal support. The first three are examples of the kinds of major infrastructure projects needed in the behavioral sciences, while the fourth and fifth address the behavioral science–neuroscience relationship more directly.

Big Questions, Big Data

In an era of Big Data, it will come as no surprise that one of my nominees for investment is collecting and using appropriate Big Data sets. Given that I am a developmentalist, it’s probably also no surprise that I would advocate for longitudinal studies. But I’m not talking

about just any large-sample longitudinal project where the default assumption is “The bigger the better.” Data-collection projects, large or small, need to be targeted to key outcome variables, with samples and measures selected to illuminate a particular issue. In short, data collection is most useful when it tests a hypothesis.

One example of a fruitful effort that is now complete is the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development’s (NICHD) Study of Early Childcare and Youth Development, which definitively answered a central question, showing that there is little need to worry about nonmaternal care if that concern is based simply on the fact that it is nonmaternal. A second example of an investment with ample returns is a much smaller study, the longitudinal study of language development in typically developing children and children with brain damage, led by APS Immediate Past President Susan Goldin-Meadow at the University of Chicago. This study yielded rich information on the role of parental speech and gesture in development of both kinds of children, leading to recommendations regarding new diagnostic tools and interventions for children at risk. A currently ongoing example is the National Institute on Drug Abuse’s (NIDA) Longitudinal Study of Adolescent Brain and Cognitive Development, which holds immense promise to elucidate the developmental pathways leading to substance-use disorders.

Many more such studies are possible to imagine, including those on topics of interest to NIMH, such as suicide, one of the institute’s current priority areas. Without clear hypotheses, however, payoffs are reduced, as we saw in the case of the proposed National Children’s Study, which suffered from a very diffuse focus and from trying to do everything at once, thus doing nothing well. Nearly all large longitudinal data sets end up having secondary uses once they are made public, but they benefit immensely from initial design with clear goals. Big Data can answer Big Questions, but it requires carefully formulated hypotheses from the outset.



Nora Newcombe is a professor of psychology at Temple University.

continued on Page 23 ►

Congratulations to Dr. Robert Sternberg, the winner of the 2018 Award!

NOMINATION DEADLINE

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A National Behavioral Data System

In an era of open science, a second obvious nominee for what psychological science needs is data sharing. There are compelling examples of how data sharing supports progress in understanding behavior; I'll just cite two efforts in developmental psychology. The field of child language has benefited immeasurably from the Child Language Data Exchange System (CHILDES), spearheaded by Brian MacWhinney at Carnegie Mellon University and now part of a wider data set called TalkBank. More recently, Karen Adolph of New York University and Rick Gilmore at Pennsylvania State University have led the effort to create Databrary, a resource that provides the means for sharing video data sets easily, along with free analytic tools.

Such efforts allow researchers to conduct analyses relevant to understanding disorders such as language delay (CHILDES) or to analyze the parenting of depressed mothers and fathers (Databrary). But both CHILDES and Databrary, and other projects like them, are possible only when stable funding is provided. We urgently need a federal effort to bring the best-curated and most-used data sets in behavioral science into some sort of national "data library" system.

Open Toolboxes

My third nominee for a Big Ask in the study of behavior is for much more work on developing well-standardized and freely available tools for evaluating individual differences. The National Institutes of Health (NIH) Toolbox was an excellent step in this direction, but it's far from comprehensive. One tool it lacks is resources for assessing spatial skill, my own favorite domain. Apparently, spatial thinking just missed the cutoff in a popularity vote concerning which tools to develop for the toolbox! New funding is needed to expand the toolbox so that it truly covers the full range of constructs we need to assess. We also need to address the fact that behavioral testing often requires materials and tools that go beyond paper-and-pencil questionnaires or easily reproducible props. For example, virtual reality environments are needed to quantify individual differences in navigation. Wandering is a prominent and troubling symptom in Alzheimer's disease; indeed, difficulties in navigating can serve as one useful marker for elderly individuals at risk.

But sharing VR paradigms across labs requires standardization, curating, and a stable platform on which to access them.

Translating Across Species

Looking more directly at the linkage between neuroscience and behavior, my fourth example is support for translational cross-species research involving both areas. The majority of research in basic neuroscience involves animal models. But how do we know if the models translate across species? Paradigms that work with rats don't always work with mice, at least not without adjustment, and translating work across species to include humans seems even more of a stretch. So, for example, is a technique that evaluates attention in mice a way to examine human attention? Or is it a measure of what a cognitive researcher would call vigilance?

In research on substance-use disorders, NIDA now prioritizes research in which animals come to self-administer a drug of abuse, rather than passively receiving it from experimenters. After all, humans don't typically develop substance-use disorders because

someone has been injecting them against their will. Similarly, in listening to talks on rodent models of addiction, I've been struck by the fact that animals differ among themselves in their acquisition curves and in how they react to parameters such as delays or varied delivery schedules. Taking these variations as a potential model of individual differences in humans, rather than as annoying error variance, seems to me a desirable goal. But it would be expensive — many more animals would need to be studied in order to get adequate statistical power. A focus on human behavior would underline the importance of pursuing this line of inquiry and could build on well-established individual and developmental differences in human behavior such as risk preferences, reward responsiveness, and impulsivity and inhibition that are known to be related to addiction. But the initial need is to establish the translatability of paradigms across species. Tackling this question will require major investment.

The Right Stuff

My final example concerns the Research Domain Criteria (RDoC) effort at NIMH. My own research does not concern psychopathology, but the effort to delineate types of psychopathology using behavioral, neuroscientific, and computational methods strikes me as exciting. However, these efforts can't succeed if they use the wrong constructs or imperfect measures. When I look at the RDoC recommendations for methods to study behavior, I worry that the effort has not drawn on the best conceptualization of human cognition and social behavior.

Let's just take the case of declarative memory, one area in which I work. The constructs targeted in this area by an RDoC working group are relational memory, associative inference, paired-associates learning, and pattern separation. It's an interesting list, proposed by an expert panel, but not one on which the wider memory community would necessarily converge. There are a number of unsolved research questions in this domain. Consider just the issue of pattern separation, which has been operationalized as distinguishing between two perceptually and conceptually similar items, one of which was seen before and the other novel: It's currently unclear whether pattern separation is the opposite of its hypothesized complement, pattern completion, or if pattern completion is a distinct process that would require separate assessment. Many other issues concerning pattern separation are unsettled, and the development of pattern separation is only beginning to be understood.

A Grand Challenge for RDoC is determining whether we even possess the right analytic concepts and the right methodological tools to make the effort pay off. And if not, as I suspect, we'll need to invest in research dedicated to getting us where we want to be.

There are surely many more examples, but the point is that as psychological scientists we can't wait to be invited to the party. We need to advocate for the infrastructure and other support needed to ensure that the connections between behavioral science and neuroscience are balanced and productive. ●

Reference

- Krakauer, J. W., Ghazanfar, A. A., Gomez-Marín, A., MacIver, M. A., & Poeppel, D. (2017). Neuroscience needs behavior: Correcting a reductionist bias. *Neuron*, 93, 480–490.

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Leading Researchers Name the Most Replicated Findings in Psychological Science

What are the most replicated studies in psychological science? Amid ongoing efforts to improve the reproducibility of psychological science, it's easy to lose sight of the findings that remain sturdy decades after they were first reported. The *Observer* asked a random sample of APS leaders, of various career levels and nationalities, to tell us what they consider to be the most replicated or durable discovery in psychological science. APS Treasurer Roberta “Bobby” Klatzky, who has written and spoken considerably about the replicability issue, provides an introduction to this special section. We invite readers to share their own thoughts about findings that have stood strong over time. Write us at apsobserver@psychologicalscience.org.

See the full text and references for each contribution in the *Observer* online.

Read about APS's leadership role in promoting scientific rigor and reproducibility at www.psychologicalscience.org/r/rigor.



Roberta "Bobby" Klatzky

Carnegie Mellon University

Deep in the wilderness of psychology's replication crisis, my voice has occasionally been heard, pithily uttering, "Huh?" Apparently, I am not alone: This special feature in the *Observer* highlights fundamental and reliable contributions of our science that were identified by APS members.

In my own corner of the psychological science woodlands, the trees seem tall and strong, and it's a daunting task to single out findings that merit special mention. I will frame a few as general themes:

(1) Across the senses, human perceptual sensitivity encompasses only a range of the corresponding physical variation and is far from constant across that range. For example, humans hear sounds between roughly 20 Hz and 20 kHz, with a sweet spot around 3 kHz. The human high-frequency hearing limit is well below the bat's, which is one reason phones don't have a bat-sound ring tone.

(2) There is a tight coupling between perception-based representations and action. People act toward the products of perception. Returning to the sense of hearing for an example, people tend to misperceive sounds as nearer than their actual source locations, so in the absence of corrective feedback, they will fall short when walking to auditory targets. Conversely, people act to create products of perception. Humans (and dexterous animals) manually explore objects in stereotyped ways that depend on the perceptual goal; for example, they might use lateral rubbing motions when judging the roughness of a surface.

(3) Perception demonstrates limited capacity, more so as we move from sensing the world to representing its contents. The famous cocktail-party phenomenon shows we can't decode two speakers at once, but we can detect abrupt pitch changes in an unmonitored auditory stream. When people search for a target in space, their detection times tend to increase linearly with the number of similar distractors, a capacity-driven regularity that emerges in touch as well as vision.

I write about themes here, rather than empirical "laws," because the data from any experiment will vary depending on the particulars. Through the following observations, I'd like to emphasize that dependence on the particulars does *not* mean failure to replicate.

(1) Hypothesis testing is not necessarily the point of psychological science, nor is replication always an issue. Psychophysical judgments are commonly used to make fundamental measurements, as when we "perception types" assess absolute or difference thresholds (minimal stimulation to be detected or differentiated) or quantify perceptual sensitivity to a range of variation across some physical scale. These measurements not only characterize the human sensory apparatus but are also used to track the course of developmental change or to detect deviations that signal accident or disease. What's important here is not replication, but rather the

precision of measurement and the normative range of variation for a particular population.

(2) Sometimes, variation is not just part of the story; it's centrally important. Let's take the two-point acuity threshold for touch. Measure it on the fingertips, and you'll find something on the order of a millimeter. Asking people whether a probe feels like one point or two points may lead to a different measurement than detecting a gap in a continuous edge. This outcome is not a failure to replicate; it points to basic differences in these perception-based decision processes. If we stipulate a particular type of measurement, such as gap detection, we will find that the fingertips permit smaller gaps to be discerned than does the back. Is this a failure to replicate? No; it reflects the distribution of sensory receptors. The frequency-dependent sensitivity in the auditory system mentioned above, along with the systematic tendencies found in exploratory touch, can also be traced to the receptor level.

(3) Value can also be found in those fluctuations we treat as statistical noise. Perceptual systems are variable. Measure the same person twice, in the same way, and more likely than not, you will get a different value (assuming your measure is fine-grained enough to detect a difference). Compare two people, and differences will likely be greater. I'm a big fan of getting down into the twigs of the data to look at the noise. In early work with Jack Loomis and collaborators, we tracked the point-to-point progress of blindfolded sighted, congenitally blind, and adventitiously blind subjects as they tried to make their way back to the origin of a triangle after being led along the initial two legs. When we graphically reported all the trajectories, we showed clearly that people coming from the same drop-off point ended up at considerably different locations. The magnitude of these interpersonal variations, which proved unrelated to visual capability, was part of our story, as were the systematic (and statistically confirmed) effects of the pathway itself. When it comes to getting into the twigs, APS Fellow Jeremy Wolfe set the bar high (or is it low?) in 1998 when he reported distributions of slopes from approximately a million trials of visual search. I'll leave you to read his article, but it's clear that search is both a random and a principled process.

There's a lot more I could say about replication, such as pointing out that within-subject designs make every participant a replicate, or that some level of nonreplication is actually predicted for phenomena predicated on a series of random processes. (My colleague J. David Creswell and I discuss this point in a 2014 article in *Perspectives on Psychological Science*.) These woods are lovely, dark, and deep, but I will make way for others to explore them in this feature.

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Piagetian Conservation Tasks

Terry Au

University of Hong Kong

In developmental psychology, the most-replicated finding is preschool children's failure to pass Jean Piaget's classical conservation tasks, designed to measure logical thinking. Conservation refers to the ability to understand that a quantity remains the same even when it changes shape or form. In one of the most famous of the conservation experiments, a child watches liquid being poured into two short beakers until both contain an equal amount. Then the experimenter takes a tall, thin beaker and fills it with water from one of the short beakers. The child is then asked whether the tall beaker and the other short beaker contain the same amount of liquid. Most children under the age of 6 say the tall container holds the most liquid. In short, they're swayed by the height of the liquid in the tall beaker, ignoring all other dimensions. Piaget's findings showed how children in the preoperational stage of development (ages 2–5) have yet to develop the ability to see an object's properties as conserved or invariant as it undergoes transformation. The results from these experiments were so puzzling and seemed contrary to preschool children's everyday competence that it unleashed a few decades of "early competence" research on preschool children and even infants. The findings of early competence research helped us understand better the starting (or near starting) point of cognitive development.



Priming

Moshe Bar

Bar-Ilan University, Israel

There is one finding that has been serving me most reliably since my graduate school days, to eternity, and it is *priming*. Sometimes referred to as a paradigm, the phenomenon of priming is a finding, and a deep one in what it reflects about the underlying operation of brain and behavior. It is so replicable and omnipresent that it has become almost a household name that does not require an introduction. In the domain of object recognition, for example, where I had encountered it first, it means that when you see an object that you have seen before you would recognize it faster, and often more accurately, than on your first exposure to that object. This is repetition priming, and it is readily evident in almost all types of repeating material. On the one hand, this basic finding facilitated our thinking about learning, (implicit) memory, efficient neuronal coding, and much more. On the other hand, the robustness of priming allowed using it as a powerful flashlight with which to explore the nature of representations. Priming was then used to examine semantic and contextual associations, as well as other conceptual relations in language and vision research. By now, the extent of using priming spans from showing that we can also learn from subliminal visual presentations to using such repetition-based shortening of reaction time for lie detection. It has helped resolve debates about the nature of representation (e.g.,

when is an object representation viewpoint-invariant and when it is viewpoint-dependent?) and continues to open new horizons. Priming is equally robust, interesting, and useful in neuroscience, where explanations of repetition-related activity (rather than reaction time) reduction vary from adaptation to efficient neuronal representation. For me, as a student of cognitive psychology, it was the first and still the clearest demonstration that behavior, when examined correctly, can tell us so much about the brain.



The Forgetting Curve

Dorte Berntsen

Aarhus University, Denmark

In his groundbreaking book published in 1885, psychological scientist Hermann Ebbinghaus identified a systematic relation between forgetting and the passage of time, which subsequently was labelled the "forgetting curve." It is characterized by a steep drop in the beginning of the retention period and a slower decline as retention time increases. The basic shape of this curve has been replicated hundreds of times in a variety of domains. In addition to laboratory settings for laboratory material, it has been documented for memories of autobiographical events retrieved in response to cue words and for the frequency of imagined future events using distance into the future. In a 1996 meta-analysis based on 210 published data sets, APS Fellow David C. Rubin and psychological scientist Amy Wenzel concluded that the best mathematical fits were to the logarithmic function and the power function (plus two other unexpected and rarely used functions). Important exceptions to the forgetting curve also show replicability. One is the reminiscence bump — the tendency for middle-aged and older adults to have more recollections of events and experiences from the time of their adolescence and early adulthood than from the surrounding life periods. Another exception is childhood amnesia — a dramatic reduction in memories from the first years of life. Ironically, this highly replicable forgetting curve was identified with Ebbinghaus, the experimenter, as the only subject. Another irony is that, although the forgetting curve is highly replicable (with highly replicable exceptions), we still lack a clear understanding of what exactly forgetting is.



Behavioral Treatments, Joint Attention

Geraldine Dawson

Duke University Medical Center

In my field of study, two influential phenomena stand out as being highly replicated, reliable, and significant.

Treatments that incorporate behavioral methods have been tested in numerous randomized clinical trials and demonstrate a high level of reliability and replicability. Such interventions are part of practice guidelines for the treatment of a wide range of behavioral health conditions. Examples of empirically-validated behavioral treatments include applied behavior analysis, cognitive behavioral therapy, naturalistic

developmental behavioral interventions, and dialectical behavior therapy. First studied in children with autism in the 1960s by Todd Risley, Ivar Lovaas, and Donald Baer, the use of behavioral therapy to improve outcomes of persons with autism has stood the test of time.

Joint attention is an early-developing social-communicative skill in which two people (usually a young child and an adult) use gestures and gaze to share attention to an object or event. Numerous studies have shown that joint attention is a foundational skill that plays a significant role in children's short- and long-term cognitive, social, and language development. Joint attention impairments are part of the *DSM-5* criteria for autism spectrum disorder. First described by psychological scientists Lauren Adamson and Roger Bakeman in the early 1980s, the central role of joint attention in children's early social, cognitive, and language development also has stood the test of time.



Love as a Cultural Universal

Elaine A. Hatfield

University of Hawaii

[APS Mentor Award Recipient] David Buss and other evolutionary psychologists have found that in almost all societies, men and women want much the same thing from a marriage — someone who is kind, understanding, and intelligent. Men and women

differ somewhat in what they look for in a mate, however. Men care more about youth, physical attractiveness, and fidelity than do women; women care more about power, status, being ambitious, industriousness, a good earning capacity, and kindness than do men. Also, marriage can be understood within an economic framework. Men and women compete for the best mate possible. In this competition, sex ratios are a powerful determinant of the quality of the mate one can attract. A population's sex ratio is defined as the number of sexually receptive men compared with the number of sexually receptive women in a given population.



Error-Related Negativity

Michael Inzlicht

University of Toronto

One of the most robust effects in psychological science has got to be the error-related negativity (ERN), sometimes also called the error negativity. The ERN is an evoked brain potential, recorded by the electroencephalogram (EEG), which

is generated just as participants make errors on speeded reaction-time tasks. This brain potential is lightning fast, usually peaking by about 50 to 100 ms after participants make errors; sometimes you can see the potential begin even before a participant has physically responded, suggesting that the brain recognizes and responds to errors even before an error has been made. The discovery of the ERN has contributed (and continues to contribute) to our understanding of cognitive control, reinforcement learning, fatigue, motivation, and clinical conditions such as generalized anxiety disorders. Discovered in the 1990s by scientists in the United States and Germany, it quickly

became one of the most vigorously studied brain potentials of the past 30 years. It is so highly replicable that I would joke with my students that if you don't see an ERN in any one person, you might need to check the health of your equipment or of your participant. The effect is so robust that you can see the ERN with the naked eye, with very little processing of raw data. Interestingly, the original ERN paper included only six participants, illustrating that statistical power comes from not just sample size, but also design (the ERN is generated in within-subject, repeated-measures designs) and effect size (the effect size for the ERN is massive).



Infant Distress Cries

Jerome Kagan

Harvard University

Two phenomena that emerge in 6- to 12-month-old infants serve as examples of reliable observations that have gained theoretical significance following research in many laboratories. These are the appearance of the child's cry of distress when they

experience (1) an unfamiliar adult approaching too quickly without talking or smiling and (2) their primary caretaker leaving them alone in an unfamiliar place without any explanation. These observations seemed to lack significance because they disappeared in most children by age 3. Subsequent research revealed that other distinct phenomena emerged during this developmental phase, including avoidance of the deep side of the visual cliff and a sudden increase in attention to modifications of familiar events. This prompted the discovery of a major enhancement in working memory during the first year of life, preceded by maturational changes in the brain. It revealed that although infants can recognize that the present is an alteration of the past, they cannot comprehend the discrepancy nor cope with the resulting uncertainty. Hence, during this interval, they begin to cry when encountering strangers and when separated from a caretaker. These discoveries provide a nice example of the role of research. Many 20th century parents and psychologists had interpreted crying in response to separation in the second half of the first year as a sign of an emotional relation to the parent, rather than as the emergence of a new cognitive ability.



The Positive Manifold

Rogier Kievit

Cambridge University

More than 100 years ago, psychological scientist Charles Spearman showed how children who performed better at one ability test tended to be better at all others. This finding, dubbed "the positive manifold," launched the proverbial thousand scientific ships. The desire to understand this pattern led to a range of methodological and conceptual innovations, such as factor analysis, that have influenced science well beyond the field of intelligence research. Subsequent methodological and statistical debates have led to explanations of the positive manifold ranging from the classical

(differences in “mental energy”) to the artifactual (it reflects our inability to test abilities in isolation) to the dynamic (the positive manifold is a consequence of developmental interactions). The positive manifold allows for the summary of (cognitive) ability into a single number that captures “general intelligence” (sometimes translated into IQ). Such summary scores (like IQ scores) have proved strikingly successful: They are relatively consistent across decades and are associated (for a variety of different reasons) with a wide range of important life outcomes, from education and job success to physical health and longevity. Psychological scientist Stuart Ritchie (University of Edinburgh) provides an overview of these factors, as well as the storied and sometimes controversial history of intelligence research, in his 2015 book *Intelligence: All That Matters*. Notably, this shows that replication is no barrier to scientific excitement; despite being replicated thousands of times, a range of important questions on lifespan development, genetics, brain structure and function, the role of the environment, and the ultimate meaning of the positive manifold itself remain a topic of vigorous and fascinating debate.



Life Stress and Health

Iris-Tatjana Kolassa

University of Ulm, Germany

The 1998 Adverse Childhood Experiences (ACE) study has been characterized as a landmark, initiating a growing body of research on the cumulative effects of early life stress. With their initial findings, physician Vincent Felitti

and colleagues, including clinical psychological scientist Mary P. Koss, introduced the idea of a dose-dependent effect of early life stress on adverse health outcomes. Subsequently, several studies replicated an increased risk for poor adult health as a consequence of accumulated early life stress.

Studies have shown that the early onset of autoimmune diseases, Type 2 diabetes, cancer, cardiovascular disorders, dementia, and other disorders increases with accumulating adverse life events. We are beginning to understand that chronic states of increased oxidative stress induce biological alterations, such as increasing low-grade inflammation and functional impairments,

in a dose-dependent manner. Furthermore, traumatic stress is associated with increased genomic DNA damage, which represents a risk factor for the onset of cancer. These novel research findings could lead to new treatments aimed at ameliorating the mental and physical health consequences of traumatic and early life stress. They also call for an allocation of resources to reduce and prevent the worldwide health burden that results from childhood maltreatment and traumatic stress.



Choice Defaults

Elke Weber

Princeton University

Choice defaults are options preselected to take effect unless the decision maker opts out and actively chooses a different option. The poster child for the influence of a choice default on decisions is its effect on people’s willingness to be an organ donor. Although the difference between “If you want to be an organ donor, please check here” (opt-in) and “If you don’t want to be an organ donor, please check here” (opt-out) is just one word, the ensuing difference in organ donation sign-up is dramatic (in the high 90% range for opt-out and as low as 10% for opt-in countries). This figure has been so convincing that governments around the world have heeded the implicitly contained advice to be an organ donation opt-out country. Choice defaults work by multiple demonstrated mechanisms that operate in parallel and to different degrees in different applications. A decision-maker infers that the default option is an implicit recommendation. A default option minimizes efforts or emotional engagement with an unpleasant task. Other options are evaluated relative to the default option, increasing preference for it as the result of loss aversion. Defaults have been widely used in policymaking around the world. The US government, for example, now provides opt-out enrollment in retirement savings for federal workers. (Studies show that employees are 50% more likely to participate in a retirement savings program when enrollment is the default than when not enrolling is the default.) Policy interventions that include defaults are supported by the public in many domains, including green energy, across the political spectrum. ●

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Integrative Science

'I Feel Your Pain': The Neuroscience of Empathy

Whether it's watching a friend get a paper cut or staring at a photo of a child refugee, observing someone else's suffering can evoke a deep sense of distress and sadness — almost as if it's happening to us. In the past, this might have been explained simply as empathy, the ability to experience the feelings of others, but over the last 20 years, neuroscientists have been able to pinpoint some of the specific regions of the brain responsible for this sense of interconnectedness. Five scientists discussed the neuroscience behind how we process the feelings of others during an Integrative Science Symposium chaired by APS Fellow Piotr Winkielman (University of California, San Diego) at the 2017 International Convention of Psychological Science in Vienna.

Mirroring the Mind

"When we witness what happens to others, we don't just activate the visual cortex like we thought some decades ago," said Christian Keysers of the Netherlands Institute for Neuroscience in Amsterdam. "We also activate our own actions as if we'd be acting in similar ways. We activate our own emotions and sensations as if we felt the same."

Through his work at the Social Brain Lab, Keysers, together with Valeria Gazzola, has found that observing another person's action, pain, or affect can trigger parts of the same neural networks responsible for executing those actions and experiencing those feelings firsthand. Keysers' presentation, however, focused on exploring how this system contributes to our psychology. Does this mirror system help us understand what goes on in others? Does it help us read their minds? Can we "catch" the emotions of others?

To explore whether the motor mirror system helps us understand the inner states behind the actions of others, Keysers in one study asked participants to watch a video of a person grasping toy balls hidden within a large bin. In one condition, participants determined whether or not the person in the video hesitated before selecting a ball (a theory-of-mind task). Using transcranial magnetic stimulation (TMS) in combination with fMRI, Keysers showed that interfering with the mirror system impaired people's ability to detect the level of confidence of others, providing evidence that this system indeed contributes to perceiving the inner states of others. Performing fMRI and TMS on other brain regions such as the temporoparietal junction (TPJ) further suggests that this motor simulation in the mirror system is then sent onward

to more cognitive regions in the TPJ.

"Very rapidly, we got this unifying notion that when you witness the states of others you replicate these states in yourself as if you were in their shoes, which is why we call these activities 'vicarious states,'" Keysers said.

Studies have suggested that this ability to mentalize the experiences of others so vividly can lead us to take prosocial steps to reduce their pain, but Keysers also wanted to investigate the depth of this emotional contagion — how and to what extent we experience other people's suffering. To do this, Keysers' lab studied two very different populations: human psychopaths and rats.

While witnessing the pain of others is correlated with activity in the insula, which is thought to contribute to self-awareness by integrating sensory information, and the anterior cingulate cortex (ACC), which is associated with decision making and impulse control, the researchers found that psychopaths who passively observed an aggressor twisting someone's hand exhibited significantly less brain activity than their neurotypical peers. When the psychopathic individuals were asked to attempt to empathize with the person in the video, however, their brain activity increased to baseline levels.

This suggests that the current model of empathy as a one-dimensional scale with empathic individuals at one end and psychopaths at the other may be overly simplistic, Keysers said.

"Psychopaths are probably equally high on *ability*, it's just that they don't recruit this spontaneously, so their *propensity* is modified," he explained.



Cultural emphasis on ingroups and outgroups may create an "empathy gap" between people of different races and nationalities, says **Yung-yi Hong**.



These findings could lead to more effective interventions for psychopathic individuals, as well as to future research into where people with autism spectrum disorders may fall on these axes.

Shared Pain

Studies of emotional contagion in animal models have allowed researchers to further examine the role of deep brain activity, which can be difficult to neurostimulate in humans. Keyser's work with rats has found that these animals are more likely to freeze after watching another rat receive an electric shock if they themselves had been shocked in the past.

Inhibiting a region analogous to the ACC in the rats' brains reduced their response to another rat's distress, but not their fear of being shocked themselves, suggesting that the area deals specifically with socially triggered fear, Keyser said.

Claus Lamm, University of Vienna, investigates the processes that regulate firsthand pain and those that cause empathy for pain through numerous studies on the influence of painkillers.

In these experiments, participants who took a placebo "painkiller" reported lower pain ratings after receiving a shock than did those in the control group. When those same participants watched a confederate get shocked, they reported a similar drop in their perception of the actor's pain.

"If you reduce people's self-experienced pain, if you induce analgesia, that not only helps people to deal with their own pain, but it also reduces empathy for the pain of another person," Lamm said.

On the neural level, Lamm said, fMRI scans showed that people in the placebo group displayed lower levels of brain activity in the anterior insula and mid cingulate cortex in both cases. These results were further confirmed in another study that compared participants who received only the painkiller placebo with those who received both the placebo and naltrexone, an opioid antagonist that prevents the brain from regulating pain.

This resulted in a "complete reversal" of the placebo effect, causing participants to report both their own pain and the pain of others at near baseline rates, supporting Lamm's previous claims about the pain system's role in empathy.

"This suggests that empathy for pain is grounded in representing others' pain within one's own pain systems," Lamm said.

The Self/Other Divide

Empathy may not give us a full sense of someone else's experiences, however. When observers in one of Keyser's studies were given the opportunity to pay to reduce the severity of the electric shocks a confederate was about to receive, on average participants paid only enough to reduce her pain by 50%.

Lamm studied this self/other distinction through a series of experiments that measured people's emotional egocentricity bias. To do so, participants were presented with visuo-tactile stimulation that was either congruent or incongruent with that of a partner under fMRI. In an incongruent pair, for example, one participant might be presented with an image of a rose and be touched with something that felt like a rose, while the other was shown a slug and touched with a slimy substance.

Participants' own emotions were found to color their perception of other people's affect at a relatively low rate — however, when researchers inhibited the right supramarginal gyrus (rSMG), a region of the brain previous associated mainly with language processing, this egocentricity bias increased, suggesting that the rSMG may be responsible for maintaining a self/other divide, Lamm said.

"Empathy not only requires a mechanism for sharing emotions, but also for keeping them separate. Otherwise we are getting 'contaged,' emotionally distressed and so on," he said.

The rate of rSMG activation also changes significantly across a lifetime, Lamm added, with the area's developmental trajectory causing emotional egocentricity to be more common in adolescents and the elderly.

Developing Division

Rebecca Saxe (Massachusetts Institute of Technology) said her work with developmental psychology confirms this trend. In one series of experiments, Saxe monitored the brain networks that 3- to 5-year-old children used to consider a character's mind (the temporoparietal junction, posterior cingulate, and prefrontal cortex) and body (the secondary somatosensory cortex, insula, middle frontal gyrus, and ACC) throughout a short film.

Saxe found that while these brain regions may interact with each other, there were no points of overlap between the mind and body networks' activities.

"When we're getting information from the same source and about the same people, we still nevertheless impose a kind of dualism where we alternate between considering what their bodies feel like and the causes of their minds," Saxe said.

Furthermore, Saxe and her colleagues found that while these networks were more distinct in children who were able to pass an explicit-false-belief task (e.g., if Sally puts her sandwich on a shelf and her friend moves it to the desk, where will she look for it?), the division was present in participants of all ages.

"Most people have treated explicit false belief as if it were *the* milestone," Saxe said. "Actually, the false-belief task is just one measure of a much more continuous developmental change as children become increasingly sophisticated in their thinking about other people's minds."



Researchers are working to unite neuroscientific and psychological perspectives on feelings, empathy, and identity, says **Piotr Winkielman**.

Next, Saxe scaled this experiment down to test the theory of mind of infants as young as 6 months, this time measuring their response to children's facial expressions, outdoor scenes, and visual static. This time period may be key to understanding the neuropsychology of empathy because most of the brain's cognitive development happens within the first year of life, she explained.

"A baby's brain is more different from a 3-year-old's brain than a 3-year-old's brain is from a 33-year-old's brain," Saxe said.

Under fMRI, the infants' brains were found to have many of the same regional responses that allow adults to distinguish between faces and scenes. Their brains didn't show any regional preferences for objects and bodies, however.

This level of regional specificity suggests that the Kennard Principle, the theory that infants' brains possess such resilience and plasticity because the cortex hasn't specialized yet, may be only partially true. There does appear to be some functional organization of social process, Saxe said, with gradually increasing specialization as the child ages.

Empathy in Action

On the surface, neuroforecasting sounds like a concept that would be right at home in the world of Philip K. Dick's *Minority Report* — a science fiction thriller about a society that stops crime before it happens based on the brainwaves of three mutant "precogs" — said APS Fellow Brian D. Knutson (Stanford University), but someday it could play a very real role in the future of economics.

Knutson's research on the brain mechanisms that influence choice homes in on three functional targets: the nucleus accumbens (NAcc) for gain anticipation, the anterior insula for loss anticipation, and the medial prefrontal cortex (mPFC) for value integration.

Using fMRI, Knutson was able to predict participants' purchases in a simulated online shopping environment on the basis of brain activations in these areas. Before participants chose to buy a product, increased activity in the NAcc and mPFC was paired with a decrease in the insula, while the reverse was true of trials in which participants chose not to make a purchase.

"This was very exciting to me as a psychologist to be able to say, 'Wow, we can take activity out of the brain and, not knowing anything else about who it is and what product they're seeing, we can predict choice,'" Knutson said.

His economist colleagues weren't as impressed: They were interested in market activity, not individual choice. Knutson said he accepted this challenge by applying his neuroanalysis to large-scale online markets such as Kiva and Kickstarter.

Knutson asked 30 participants to rate the appeal and neediness of loan requests on Kiva and found that posts with photos of people displaying a positive affect were most likely to trigger the increased NAcc activity that caused them to make a purchase — or in this case, a loan. More importantly, the averaged choices of those participants forecasted the loan appeal's success on the internet. Two similar studies involving Kickstarter campaigns also suggested a link between NAcc activity and aggregate market activity.

While brain activity doesn't scale perfectly to aggregate choice, Knutson said, some components of decision making, such as affective responses, may be more generalizable than others.

"The paradox may be that the things that make you most consistent as an individual, that best predict *your* choices, may not be the things that make your choices conform to those of others. We may be able to deconstruct and decouple those components in the brain," Knutson said.

Global Empathy

The neuroanatomy of our brains may allow us to feel empathy for another's

experiences, but it can also stop us from making cross-cultural connections, said APS Fellow Ying-yi Hong (Chinese University of Hong Kong).

"Despite all these neurobiological capabilities enabling us to empathize with others, we still see cases in which individuals chose to harm others, for example during intergroup conflicts or wars," Hong said.

This may be due in part to the brain's distinction between in-group and out-group members, she explained. People have been found to show greater activation in the amygdala when viewing fearful faces of their own race, for example, and less activation in the ACC when watching a needle prick the face of someone of a different race.

The cultural mixing that accompanies globalization can heighten these responses, Hong added. In one study, she and her colleagues found that melding cultural symbols (e.g., combining the American and Chinese flags, putting Chairman Mao's head on the Lincoln Memorial, or even presenting images of "fusion" foods) can elicit a pattern of disgust in the anterior insula of White Americans similar to that elicited by physical contaminant objects such as insects.

These responses can also be modulated by cultural practices, Hong said. One study comparing the in-group/out-group bias in Korea, a more collectivist society, and the United States, a more individualistic society, found that more interdependent societies may foster a greater sense of in-group favoritism in the brain.

Further research into this empathy gap should consider not just the causal relationship between neural activation and behavior, she said, but the societal context in which they take place.

"What I want to propose," Hong said, "is that maybe there is another area that we can also think about, which is the culture, the shared lay theories, values, and norms." •

-Kim Armstrong



Brian D. Knutson says analysis of individuals' brain activity when considering a purchase may be predictive of aggregate market choices.

Edited by C. Nathan DeWall and David G. Myers

Aimed at integrating cutting-edge psychological science into the classroom, Teaching Current Directions in Psychological Science offers advice and how-to guidance about teaching a particular area of research or topic in psychological science that has been the focus of an article in the APS journal Current Directions in Psychological Science. Current Directions is a peer-reviewed bimonthly journal featuring reviews by leading experts covering all of scientific psychology and its applications and allowing readers to stay apprised of important developments across subfields beyond their areas of expertise. Its articles are written to be accessible to nonexperts, making them ideally suited for use in the classroom.

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Visit David G. Myers at his blog "Talk Psych" (www.talkpsych.com). Similar to the APS Observer column, the mission of his blog is to provide weekly updates on psychological science. Myers and DeWall also coauthor a suite of introductory psychology textbooks, including *Psychology* (11th Ed.), *Exploring Psychology* (10th Ed.), and *Psychology in Everyday Life* (4th Ed.).

Social Sleep: Why It Hurts Ourselves and Others to Skimp on Sleep

By C. Nathan DeWall

Gordon, A., Mendes, W. B., & Prather, A. (2017). The social side of sleep: Elucidating the links between sleep and social processes. *Current Directions in Psychological Science*, 26, 470-475.

I'll never forget the first time a student fell asleep in my class. It was toward the end of the semester, when many students were sleep-deprived. While she snored, her cell phone rang. The rest of the class paused, looked at me, and grew quiet. The call went to voicemail; I resumed my teaching. Then the cell phone rang again. This time I tiptoed to the back of the classroom and hushed the students, who were on the verge of whooping and hollering. I spied an open seat next to the sleeping student and quietly sat down. I turned to her and asked a simple question: "Isn't this DeWall guy boring?"



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"Uh huh," she said. The class erupted in laughter, the sleeping student woke up, and everyone laughed about it the rest of the semester.

This example illustrates a key point that Amie Gordon, Wendy Berry Mendes, and Aric Prather (2017) make on the social nature of sleep: "how well we sleep affects how we interact in the social world" (p. 470). Sleep deprivation increases the risk of romantic disagreement, marital dissatisfaction, and stereotyping and biased thinking (Gordon & Chen, 2014; Maranges & McNulty, 2017; Ghumman & Barnes, 2013). People who don't get adequate sleep are also more likely to experience anger and act aggressively (Hiser & Krizan, 2017; Krizan & Herlache, 2016). Stressful situations hit sleepy people especially hard, which may help explain their social struggles (Prather, Puterman, Epel, & Dhabhar, 2014).

Our social interactions also affect our sleep. Stormy romantic relationships rarely result in a good night's sleep (Hicks & Diamond, 2011). Perceived discrimination also disrupts healthy sleep (Beatty et al., 2011). When people experience social rejection, they tend to go to bed later and sleep worse (Gordon, Flores, Mendes, & Prather, 2017). The bottom line: Stressful social interaction often results in low-quality sleep, and vice versa.

Students enjoy talking about sleep. To them, sleep is universally practiced yet universally neglected. One national survey showed that 69% of college students reported “feeling tired” or “having little energy” several days during the previous 2 weeks (Associated Press, 2009). In the age of the smartphone, student sleep deprivation has swelled, causing some researchers to label current times as the “Great Sleep Recession” (Keyes, Maslowsky, Hamilton, & Schulenberg, 2015).

To bring this cutting-edge science into the classroom, instructors can have students complete the following activity. Be sure not to tell them the study is about sleep! Ask students to form groups of three and to spend approximately 3 minutes discussing each of the following slides:

What Factor Is Linked to These Outcomes? (Hint: It Affects 7 in 10 college students.)

- Romantic disagreement
- Anger and Aggression
- Stereotyping and prejudice
- Difficulty coping with stress

What Outcome Tends to *Follow* These Experiences?

- Romantic arguments
- Perceived discrimination
- Social rejection

Once discussion has finished, instructors can let students know the correct answer to both questions: sleep deprivation! To wrap up the activity, instructors can conduct an informal poll. Ask students to estimate how many hours they tend to sleep each night. Count to 10 and ask students to raise their hand when they hear the number that represents the average number of hours they tend to sleep each night. Although the National Sleep Foundation recommends 7 to 9 hours of sleep, how many hours do your students typically sleep? More than 2 in 3 probably get less sleep than they need (Sleep in America Poll, 2014).

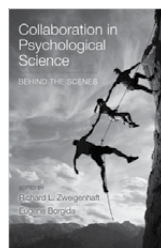
It is easy to preach to students about how they don't get enough sleep and how adding an hour of daily rest will help them earn higher exam scores, improve their physical health, and make them safer drivers. But such sermonizing falls flat because it focuses only on how sleep affects the individual student. Sleep is a dynamic process that affects — and is affected by — our social interactions. By focusing on the interplay between sleep and our fundamental need to belong, students can begin to see the value of prioritizing their sleep health.



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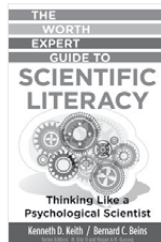
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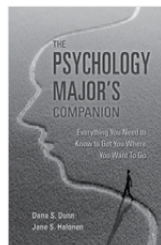
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Why People Believe in God — or Don't

By David G. Myers

Laurin, K. (2017). Belief in God: A cultural adaptation with important side effects. *Current Directions in Psychological Science*, 26, 458–463.

Some aspects of human experience, such as hunger and sleep, are universal. Other aspects are prevalent — love, conflict, sex ... and religion. Worldwide, 84% of humanity identifies with a religion (Pew, 2015). Asked, “Is religion important in your daily life?”, 68% of people worldwide answered “Yes” (Diener, Tay, & Myers, 2011). With varying content, conviction, and engagement, most people claim belief in God.

In her research and in her new review, Kristin Laurin asks (from a psychological perspective):

1. What do people believe about God?
2. Why do people believe in God?
3. Why does believing in God *matter*?

Instructors can pose these questions for class discussion (with both junior and senior level students, Laurin recommends).

What do people believe about God? In “large-scale societies,” she reports, people view God as a “Big God” that is:

- watchful;
- morally concerned; and
- powerful.

Why do people believe in God?

- People believe for *psychological* reasons — because of their tendency to perceive an active mind behind events, to presume that everything has a purpose, or to cope with the terror of their mortality.
- Laurin draws from Ara Norenzayan (2013) to argue that people believe for *cultural evolutionary* reasons. In human history, beliefs that enhance societal flourishing become widespread. Group members who share a belief in a watchful, morally concerned, powerful Big God were more likely to cooperate with than cheat their neighbors, making their groups more likely to survive.

Why does believing in God *matter*?

- When people feel watched (whether by others or by God) they are more likely to self-regulate.
- When people believe that a morally concerned God frowns upon cruelty, they are more likely to practice compassion — and also more likely to believe that their own virtue will induce God's protection, and they are therefore more likely to take risks.



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

- When people believe that God is powerful, they may be more likely to perceive a just world in which God will punish norm violators — so they don't have to administer punishment themselves.

Laurin speculates that if this cultural–evolutionary theory is valid, then we might expect that when other social institutions fulfill these functions — say, when a powerful Big Brother government watches over people and enforces moral norms — that people will be less attuned to a watchful Big God.

Support for an evolutionary psychology of religion comes from other theorists as well. David Sloan Wilson (2003, 2007), E. O. Wilson (1998), and their interpreters have contended that religion is widespread because it is socially adaptive. It fosters social cohesion, morality, and group survival.

Many students — especially students of faith — may appreciate E. O. Wilson's (1998, p. 244) conclusion that religion “is largely beneficent. [It] nourishes, love, devotion, and above all, hope.” Yet, if familiar with rational arguments for theism, they may take offense and protest: Doesn't explaining why people believe explain the belief away? Don't psychological explanations of religion, from Freud's wish-fulfillment to today's evolutionary psychology, diminish religion's credibility? Was E. O. Wilson (1978, p. 192) right to propose that “We have come to the crucial stage in the history of biology when religion itself is subject to the explanations of the natural sciences ... Theology is not likely to survive as an independent intellectual discipline”?

The point to emphasize: *Explaining a belief does not explain it away.* Learning about the psychology of a belief does not make or break its truth.

To illustrate, ask students to imagine the following scenario: Evolutionary psychologists, neuroscientists, and social psychologists have completed their work on the psychology of belief. Religious belief, for example, is fully explained. Imagine, also, that other researchers were simultaneously studying “the psychology of unbelief” (an actual book title from some years ago, which was echoed by later studies on the psychology of atheism in both the United Kingdom and United States) — and that these evolutionary psychologists, neuroscientists, and social psychologists similarly have completed their work. With a full and finished psychology of unbelief, could someone argue, paraphrasing E. O. Wilson, that atheism itself has become subject to the explanations of the natural sciences and is therefore not likely to survive as a credible idea?

Here, critical thinkers would rise to the defense of atheism. If both theism and atheism come to be fully explained, that cannot mean they both are false. Either God or some transcendent power exists or it does not, so musn't one of these beliefs be true?

The point can be extended and is worth teaching. Knowing why someone believes something doesn't tell us about the truth or falsity of that belief. Explaining why one person believes

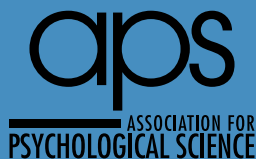
vegetarianism is healthier and another believes that eating meat is healthier does not decide which is right. Explaining the determinants of people's beliefs that Clinton or Trump would be the better president does not indicate which was correct.

Thus we can advise students: Let no one say to you, and do not say to others: "Your beliefs are irrational, because you only believe them for such and such reasons." Archbishop William Temple (Jeeves, 1976) recognized this distinction between explaining and explaining away when challenged after an Oxford address: "Well, of course, Archbishop, the point is that you believe what you believe because of the way you were brought up." To which the Archbishop reportedly replied, "That is as it may be. But the fact remains that you believe that I believe what I believe because of the way I was brought up, because of the way you were brought up."

Ergo, much progress is being made in the psychology of religious belief, of unbelief, and of demonstrably false beliefs. No matter our beliefs, we can welcome the progress. Religion, like other universal or prevalent aspects of human experience, deserves scientific exploration. ●

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Federal Research, Funding, and Policy

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www.psychologicalscience.org/policy

APS Student Caucus: Serving Student Members for 3 Decades

By Amy Heard Egbert

There is much to celebrate about the past 30 years of APS, an organization founded to advance the science of psychology. And that includes a key part of the APS membership — students. From its inception in 1988, APS has boasted a large student base. Of its 30,000 members, more than 13,000 are students. Like APS itself, the APS Student Caucus (APSSC) came from humble beginnings but has grown to serve the needs of students through funding, programming, and career-development opportunities.

History of the APSSC

When APS was founded in 1988, membership grew quickly; after 6 months, more than one third of members were students. In 1989, a group of students at the Second Annual APS Convention established what we now know as the APSSC, with an understanding that serving students would be key to the success of APS. In those days, Alan Kraut, founding Executive Director of APS, began a tradition of hosting APSSC Executive Board members together with APS Board members to discuss the strategies and goals of both groups over dinner.

Although things have changed since the early 1990s, the APSSC Executive Board still meets each year in Washington, D.C., to discuss strategies for better serving APS student members. Over the past 30 years, many things have changed as APSSC has grown to meet the evolving needs of its students. Below are just a few of the things that APSSC offers.

Commitment to Diversity

Over the past several years, APS has increased its commitment to promoting diversity within its membership. From early on, APSSC supported this mission through the Researching Injustice and Social Equality (RISE) Research Award, which was given to four student members who conducted research in fields related to socially and economically underrepresented populations. In

Amy Heard Egbert is the 2017–2018 President of the APS Student Caucus. A fourth-year doctoral student in the clinical psychology program at Loyola University Chicago, Egbert focuses her research on the environmental and biological correlates of obesity and eating disorders.

2016, APSSC moved to expand the reach of the RISE Research Award. Now, in addition to recognizing research related to underrepresented populations, the 2018 RISE Research Award will also recognize students from diverse racial, ethnic, geographic, and cultural backgrounds, as well as from other underrepresented groups in psychological science. In addition to having their work recognized at the Annual Convention, RISE Research Award winners also receive a monetary award.

Consistent with the overall mission of APS, APSSC strongly supports the promotion of diversity within psychological science and is committed to increasing representation of students from all backgrounds and walks of life.

Student Funding Opportunities

APSSC also has several other funding opportunities available to students:

- Student Grant Competition — Provides “seed grant” funding for student members to support initial stages of research: <https://www.psychologicalscience.org/members/grants-awards-and-symposia/student-grant-competition>
- Student Research Award — Recognizes student members conducting exceptional research in any area of psychological science. Students are invited to give a talk about their research at the Annual Convention and receive a monetary award: <https://www.psychologicalscience.org/members/apssc/about/student-research-award>
- Student Volunteer/Travel Assistance Program — Allows student members to serve as volunteers at the Annual Convention in exchange for travel assistance reimbursement: <https://www.psychologicalscience.org/members/apssc/travel>

Annual Convention Programming

From the kickoff Student Social event to the “Naked Truth” panels that provide advice to students at all career stages, APSSC is committed to engaging student members at the Annual Convention. APSSC organizes several talks that focus on getting into graduate school, surviving graduate school, and navigating the job market after graduate school. Last year, as a result of high demand by APS student members, a fourth panel was added to discuss

nontraditional jobs in psychological science. This event brought together APS members from different industries to discuss how to pursue careers outside of academia or clinical practice.

In addition to these discussions, APSSC also gives students the opportunity to interact with key players in the field of psychological science. For students interested in publishing their research, the Editors' Panel brings together individuals from the editorial boards of leading journals in psychological science to discuss strategies for writing successful articles for peer review. Additionally, the annual "Champions of Psychological Science" meeting gives students the opportunity to have informal conversations with leaders in the field who share their thoughts on topics that are important to students, such as career development and work–life balance.

Pulling It All Together

An APSSC Executive Board member is responsible for every flyer distributed, social event organized, and panel created. The APSSC Executive Board is composed of nine members elected by the larger APS student membership. APSSC Executive Board members serve 1-year terms, during which time they work tirelessly to provide the best possible benefits to students. As the 2017–2018 president, I have been humbled by the hard work and dedication that all of the APSSC board members have put forth this year. However, because there are so many student members and so few board members, it is often difficult for students to learn about all of the benefits they receive from being a part of APSSC.

Have you ever wanted to learn more about what goes into the peer-review process to improve your own scientific writing? Student members can play a key role by serving as reviewers for all APSSC award and grant competitions. Interested in becoming a leader at your school and promoting APSSC to other students? You can become a Campus Representative for your university. Would you like the opportunity to mentor an undergraduate who is thinking about graduate school or be mentored by a graduate student if you are an undergrad yourself? Student members can become a part of our mentorship program. (For a full list of APS student member benefits, visit <https://www.psychologicalscience.org/members/apssc>.)

Although there are many ways to get involved with APSSC as a student member, there are likely even more things that APSSC could do to serve students. If you are a student member who is passionate about a certain topic, or if you look at the programming that APSSC provides now and would like to make it even better, I encourage you to run for a position on the APSSC Executive Board in January. Challenge the status quo. Make things better. That is what the group of individuals who founded APS aimed to do, and that is still what we strive for 30 years later. Until then, if you have a question, concern, or suggestion for how APSSC can make things better right now, email me at apssc.president@psychologicalscience.org.

Here's to the next 30 years. ●


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 **Ryan Brown**, University of Oklahoma, *Radiolab*, November 23, 2017: Stereothreat.


John Cacioppo, University of Chicago, *The New York Times*, November 8, 2017: Don't Know What the Angular Gyrus Is? Your Heart Does.

Stephanie Cacioppo, University of Chicago Pritzker School of Medicine, *The New York Times*, November 8, 2017: Don't Know What the Angular Gyrus Is? Your Heart Does.

Tyrone Cannon, Yale University, *Science*, November 16, 2017: A Change of Mind.


David Chan, Singapore Management University, Singapore, *The Straits Times*, October 20, 2017: From Cop to Top Psychologist.

 **Eric Day**, University of Oklahoma, *Radiolab*, November 23, 2017: Stereothreat.

 **C. Nathan DeWall**, University of Kentucky, NPR, December 4, 2017: Tylenol May Help Ease the Pain of Hurt Feelings.


Julie Fiez, University of Pittsburgh, *Science*, November 16, 2017: Why Written Languages Look Alike the World Over.

Lucia Gilbert, Santa Clara University, *U.S. News & World Report*, November 14, 2017: How #Metoo Sparks Sharing — And Healing.

 **Alison Gopnik**, University of California, Berkeley, NPR, December 11, 2017: The Carpenter Vs. the Gardener: Two Models of Modern Parenting.

Adam Grant, The Wharton School of the University of Pennsylvania, *The New York Times*, November 7, 2017: Kids, Would You Please Start Fighting?


Rachel Herz, Brown University, *The New York Times*, November 8, 2017: The Circadian Clock In Your Nose.

 **Michael Inzlicht**, University of Toronto, Canada, *Radiolab*, November 23, 2017: Stereothreat.

Eden King, Rice University, *The Washington Post*, November 17, 2017: Why Sexual Harassment Training Doesn't Stop Harassment.

Stephan Lewandowsky, University of Bristol, UK, *Science*, December 1, 2017: Inoculating Against Misinformation.




 **Elizabeth Loftus**, University of California, Irvine, *Popular Science*, November 14, 2017: Here's How Scientists are Tricking You Into Eating Your Veggies.


Brenda Milner, McGill University, Canada, *AARP*, October 31, 2017: Pioneering Brain Scientist Still Working at 99.

Zita Oravec, Pennsylvania State University, NPR, December 9, 2017: This Year, Consider Giving Presence Instead Of Presents.

John Pryor, Illinois State University, *U.S. News & World Report*, November 14, 2017: How #Metoo Sparks Sharing — And Healing.

 **Juliana Schroeder**, University of California, Berkeley, *The Washington Post*, November 27, 2017: Science Shows Why It's Important to Speak — Not Write — to People Who Disagree With You.


Jim Sidanius, Harvard University, *The Guardian*, November 2, 2017: Have Psychologists Found a Better Way to Persuade People to Save the Planet?

 **Claude Steele**, Stanford University, *Radiolab*, November 23, 2017: Stereothreat.

Philip Tetlock, University of Pennsylvania, *The Atlantic*, November 2, 2017: Humans Are Bad at Predicting Futures That Don't Benefit Them.

Sander van der Linden, University of Cambridge, UK, *Science*, December 1, 2017: Inoculating Against Misinformation.

Elaine Walker, Emory University, *Science*, November 16, 2017: A Change of Mind.

  **Baldwin Way**, The Ohio State University, NPR, December 4, 2017: Tylenol May Help Ease the Pain of Hurt Feelings.



 **Daniel T. Willingham**, University of Virginia, *The New York Times*, November 25, 2017: How to Get Your Mind to Read.

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ANNOUNCEMENTS

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GRANTS

NIH Postdoctoral Research Fellowship Opportunity

The University of Vermont's Center on Behavior and Health announces NIH postdoctoral research fellowship opportunities in its center of excellence for the study of substance abuse. Applicants must have completed their training in psychology, behavior analysis, cognitive neuroscience, or a related discipline and be US citizens or permanent residents. Trainees are selected on the basis of scholastic record and commitment to a career in substance abuse research. The appointment last for 2–3 years. Benefits include a stipend, medical insurance coverage, and travel funds supported by NIH Institutional Training Awards. For more information, visit med.uvm.edu/behaviorandhealth/careeropportunities.

Funding Opportunities for Research on Methodologies for STEM Education

The National Science Foundation (NSF)'s Directorate for Education and Human Resources (EHR) Core Research Program has released a new letter detailing opportunities supporting psychological scientists and others who wish to study methodologies supporting inferences in STEM (science, technology, engineering, and math) education. Interested scientists should visit the NSF ECR Core Research Program site for more information on how to submit a grant proposal. Full proposals are due September 13, 2018; however, researchers can submit for conference grants as well as the EAGER funding mechanism (designed to support exploratory work) throughout the year. For more information, visit nsf.gov/funding.

NSF Funding Opportunity for Leading International Research Experiences for US Students

Recognizing the importance of globally educated scientists, the National Science Foundation has announced a new round of funding for its International Research Experiences for Students (IRES) program. This program allows investigators (e.g., psychological science faculty) to develop programs and support international travel for students via one of three "tracks." For IRES Sites, scientists submit a proposal to create a research theme that enables an experience for undergraduate or graduate students to collaborate with international partners on individual research projects. For Advanced Studies Institutes, scientists submit a proposal to develop an advanced studies institute, focused on educating advanced graduate students and addressing a spectrum within a broad area of a discipline. For New Concepts in International Graduate Experience, scientists submit a proposal for a novel approach to providing research or professional development experiences to graduate students. Applications for IRES Sites are due January 30, 2018, and applications for the two other tracks are due in February 2018. For more information, visit nsf.gov/funding.

NIH Funding Announcement for Methodology Research

The National Institutes of Health (NIH) has released a new funding opportunity announcement designed to support research on methodology and measurement in the behavioral and social

sciences. NIH is supporting research on methodology and measurement via the R21 grant mechanism, which is a 2-year grant for exploratory or developmental research providing up to \$275,000 in direct support. NIH encourages applicants to contact one of the many NIH Institutes or Centers participating in the funding announcement which matches the research focus of the proposed project before applying for funding. The participating Institutes and Centers are: Office of Behavioral and Social Sciences Research, National Cancer Institute, National Eye Institute, National Institute on Aging, National Institute on Alcohol Abuse and Alcoholism, National Institute on Deafness and Other Communication Disorders, and the National Center for Complementary and Integrative Health. Applications are due February 16, June 16, or October 16, 2018, depending on the proposed project.

MEETINGS

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2018 Cognitive Aging Conference

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Atlanta, Georgia, USA
cac.gatech.edu

7th International Congress on Interpersonal Acceptance and Rejection

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30th APS Annual Convention

May 24–27, 2018
San Francisco, California, USA
psychologicalscience.org/convention

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PLAYING TO CHRONOTYPE



Psychological scientist Royette Tavernier, Wesleyan University, is staying closely tuned to her natural sleep–wake preferences to build a career investigating links between sleep and psychological and physical outcomes.

The topic of sleep is popping up everywhere, from books to TED talks and the Nobel Prize. Why do you think people are suddenly paying so much attention to sleep?

Empirical evidence indicates that US children and adults alike are getting less sleep than previous generations. This is a critical issue because of the importance of adequate and good-quality sleep for physical, cognitive, psychological, and interpersonal functioning. Furthermore, this pattern of increasing sleep debt coincides with increases in several physical and psychological health ailments, including depression, anxiety, and obesity. Thus, sleep researchers are particularly keen on investigating sleep as a predictor and/or consequence of poor health.

What led you to zero in on sleep as a component of psychosocial functioning.

Sleep is so fascinating! We all do it — every day. Most of us have experienced both the joys of a good night's sleep as well as the cognitive and psychological challenges that follow a night of poor, insufficient sleep. Yet we don't really understand all the intricacies of this behavior. My fascination with sleep as a component of psychosocial functioning is based on the issue of what goes into and comes out of a good night's sleep. In other words, I am interested in what we do during the day that subsequently affects our sleep at night, as well as how our sleep at night might predict subsequent functioning throughout the day or even across years.

How is sleep in adolescence and emerging adulthood different from sleep at other ages?

Both adolescence and emerging adulthood are considered sensitive periods for sleep because of the unique changes that

take place during these two developmental age periods. At the onset of puberty, there is a biological shift in chronotype to a later circadian timing, which results in an increased preference for later bedtimes and later wake times. The combination of a delayed circadian timing coupled with earlier school start times is perhaps the most critical factor in adolescent sleep debt. For emerging adults at university, the issue is less about sleep duration and more about sleep–wake irregularity because of the differences in sleep–wake patterns between the week and the weekend among university students.

Being a sleep researcher, we have to ask: Do you ever have trouble sleeping? If so, does your scientific background help?

I am lucky to have always had the ability to fall asleep and stay asleep easily. I credit my island upbringing for that: Growing up in Dominica, I never used an alarm and was not allowed to stay up very late, so I am very in tune with my natural sleep–wake preferences and I do my best to stick with it. Of course, as a university student, I too experienced irregular sleep–wake schedules and had a couple of all-nighters, but generally, I tend to listen to my body and go to bed when I am sleepy. I also do not drink coffee (although I love the smell). Interestingly, I have noticed that my sleep suffers during key transitions (e.g., moving, having a new teaching schedule) and I think my scientific background helps me to be more aware of a critical link between sleep and emotional well-being, so I do my best to pay attention to changes in my sleep patterns that might offer me insight into the stressors in my life (and vice versa). ●

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