2018 APS Janet Taylor Spence Award Recipients

Observer

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Association for Psychological Science | 30th Annual Convention

FEATURED SPEAKERS

Fred Kavli Keynote Address
Making and Remaking Memory: Past, Present, and Future
LYNN NADEL
The University of Arizona

Bring the Family Address
The Paradox of Diversity: Promise, Pitfalls, and Implications for Racial Progress
JENNIFER RICHESON
Yale University

Presidential Symposium
Memory: From Neurons to Nations
SUPARNA RAJARAM
Stony Brook University,
The State University of New York (Chair)
CHARAN RANGANATH
University of California, Davis
DORTHE BERNTSEN
Aarhus University, Denmark
QI WANG
Cornell University
HENRY L. ROEDIGER, III
Washington University in St. Louis

Inside the Psychologist's Studio

Henry L. Roediger, III, will be the featured scientist in this year's *Inside the Psychologist's Studio*. He will be interviewed by his former student, APS President **Suparna Rajaram.**

APS-David Myers Distinguished Lecture On The Science And Craft Of Teaching Psychological Science
Improving the Use of Psychological Science in K-12 Education
DANIEL T. WILLINGHAM
University of Virginia

Featured Symposium
From Academia to the Tech Industry: Making the Leap

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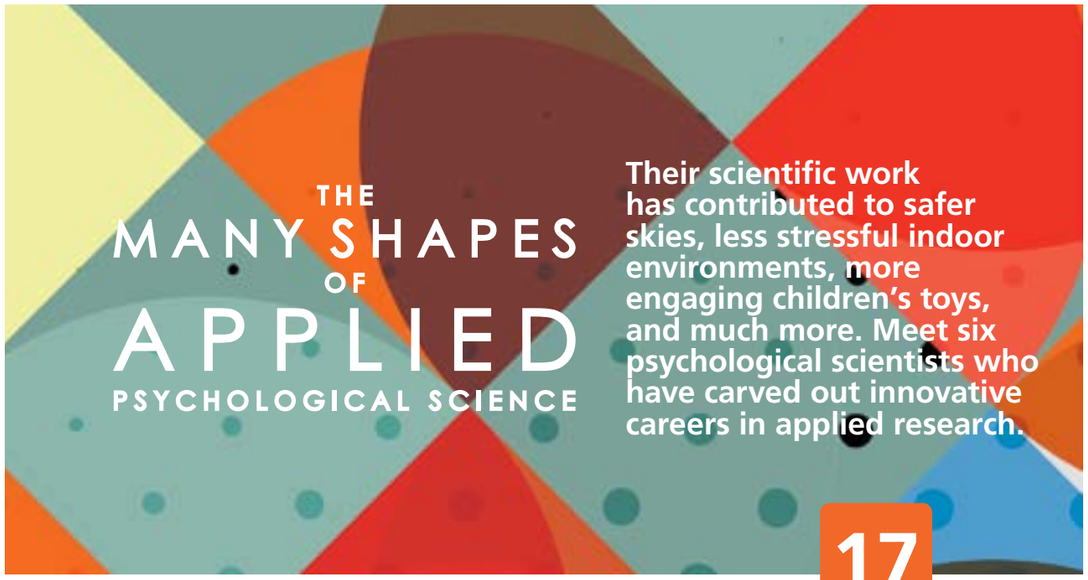


Departments

Teaching Current Directions in Psychological Science

"Getting High on Social Connection" by **C. Nathan DeWall**

"Don't Go Shoe Shopping When You're Hungry: How Cognitive Mind-Sets Carry Over From One Task to Another" by **Cindi May** and **Gil Einstein**

On Spanning the Borders

As psychological scientists, we gain something more when we span locations. The subject matter we study is, by its very nature, enriched by context.

Photo credit: Jeanne Neville

Suparna Rajaram
APS President

In my inaugural column back in August, I reflected on an undertaking at APS that is fundamental for the growth of science — making the organization international. As the Association prepares to celebrate its 30th anniversary at the Annual Convention this month in San Francisco, I want to share some thoughts — and numbers — to return to this aspirational theme.

As scientists, we are concerned with methods and techniques that are independent of geographical borders. We want to put theories to empirical tests, run replications, collaborate, and develop better scientific practices, irrespective of where we are located. It is the methods that matter and the data that count. These goals create instant common ground and provide ready vocabulary for conversation among scientists.

As psychological scientists, we gain something more when we span locations. The subject matter we study is, by its very nature, enriched by context. Varied locations can therefore add unique value because when we talk to colleagues from around the world, and if possible work with them, these opportunities give us a cross-cultural lens through which to view the psychological phenomena under study. There is also the benefit of learning from variations that may exist in training practices and educational programs. Such variations help us recognize the strengths and challenges associated with different practices and improve upon our collective efforts to advance science.

In my inaugural column, I reminisced about the change in the organization's name in 2006, when the American Psychological Society became the Association for Psychological Science. The percentage of international members around that time was approximately 8%, growing to about 24% by 2016. Also of note: About 17% of APS Fellows come from 34 non-US countries, and about 25% of the Rising Stars in the last 2 years have been from outside the United States. Perhaps the most visible expansion has been the APS conferences outside the United States — the International Convention of Psychological Science (ICPS), first in Amsterdam, the Netherlands (2015), then in Vienna, Austria (2017), and coming up next in Paris, France (2019).

There has been international expansion on several other fronts, too. For example, the upcoming San Francisco convention is shaping up nicely in bringing more international scientists together than ever before. This would not have been possible without the exceptional leadership of Program Committee Chair Professor Elizabeth Kensinger and the expert contributions of our colleagues on the Program Committee. About a decade ago, we had one invited international speaker. At the 2018 Convention, we will have 28 invited speakers from around the world. The numbers are also encouraging for the submitted symposia where, with 75 international speaking authors in 2018, the number has more than doubled compared to a decade ago.

The number of international registrants, too, has been improving at the US APS conventions. There has been a six-fold increase between 2008 and 2017, but the numbers are still modest. Traveling from afar to attend a convention is complicated and expensive, and a collective effort would be essential for making it less burdensome for international attendees to come to the convention. The ICPS has been helpful in this regard; for instance, at the 2017 ICPS in Vienna, more than 2,000 attendees came from more than 70 different countries. We need continued creative efforts to make the conventions more accessible to psychological scientists worldwide. The APS Internationalization Committee (Inaugural Chair, Past APS Board Member Tom Carr; Current Chair, APS Board Member Cindy Yee-Bradbury) has been working on this and many other fronts.

International representation has been increasing in other areas, too. Manuscript submissions from outside North America to the APS journals have risen from 40% in 2007 to approximately 52% in 2017, with the publication rate for international submissions at about 38% in 2017. Another interesting window is the user traffic to the APS website. In the age of information technology, this is a particularly important way to increase access and connection because it creates a relatively level platform. The map on page 6 shows that the APS website is being accessed around the world. The top 10 user countries include not only the United Kingdom, Canada, Germany, and the Netherlands from the Western hemisphere, but also India, Australia, the Philippines, Singapore, South Africa, and Malaysia.

➡

To return to a concluding point from my inaugural column, the efforts to internationalize proceed within the context of the other major goals of an organization with an expansive mission. These include efforts to continue to build on the APS Diversity Initiative; serve the goals of clinical psychological science; advance best practices in methodology, analysis, and dissemination of science; guide the student community; connect with funding agencies; and promote psychological science with legislators and the Congress. Our science and our scientific community would be well-served by working simultaneously toward these diverse and coherent goals. It has been a great honor to serve as President, and I wish my colleagues near and far a creative, robust, and productive path of discovery forward.

Acknowledgement: The data included in this and my previous columns have been made possible by the efforts of the APS staff.

Top 10 countries accessing the APS website.

APS Fellow Kristina Olson Receives Nation's Top Honor for Early-Career Scientists

APS Fellow **Kristina Olson** has received the National Science Foundation's 2018 Alan T. Waterman Award, the nation's highest honor for early-career scientists. Olson, Associate Professor of Psychology and Director of the Social Cognitive Development Laboratory at the University of Washington, received APS's Janet Taylor Spence Award for Transformative Early Career Contributions in May 2016. She was nominated for the Waterman award by APS.

In announcing the award, NSF noted Olson's "innovative contributions to understanding children's attitudes toward and identification with social groups, early prosocial behavior, the development of notions of fairness, morality, inequality and the emergence of social biases."

Olson will receive a research grant of $1 million over 5 years and will be honored by NSF Director France Córdova at an event hosted by NSF and the National Science board in May. Olson is the first psychological scientist to receive the honor since it was established in 1975.

"I'm still in shock about the award," said Olson of the announcement. "I'm thrilled and surprised on behalf of myself and our entire field."

The Waterman Award "is a wonderful tribute to Kristina Olson's research," said **Sarah Brookhart**, APS Executive Director. She added, "this award also highlights the exciting and important work being done in basic psychological science and will inspire scientists in the early stages of their career to continue their efforts to explore the fundamental processes and mechanisms underlying human behavior. We're grateful to NSF for this recognition."

Photo credit: Kristina Olson, University of Washington

Olson is the first psychological scientist to ever receive the Waterman Award, established in 1975.

In nominating Olson for the award, APS highlighted the inherently collaborative and international nature of her work, which has studied families throughout the United States, South Africa, and China.

In nominating Olson for the award, APS highlighted the inherently collaborative and international nature of her work, which has studied families throughout the United States, South Africa, and China. Olson's research on social cognition and cognitive development in children embodies the core values of psychological science, including transparency and reproducibility.

A primary focus of her research includes examining how children's sense of their own place in a social category affects their perception of other categories. This empirical work elucidates some of the factors that influence children's thoughts, attitudes, and values and their development over time.

In a 2015 study published in *Psychological Science*, Olson investigated gender-related cognition in children who identify as transgender. Findings from both explicit and implicit measures showed that transgender children, who ranged in age from 5 to 12 years old, viewed themselves in terms of their expressed gender rather than their natal sex. Group comparisons showed that their responses mirrored those of nontransgender children of the same gender identity.

"I am excited and humbled to have received the award and think my selection reflects the work of the incredible team of people I've been working with over the last decade. I have been fortunate in having a tremendous group of collaborators, students, staff, postdocs and undergrads," said Olson.

Olson completed a PhD in Social Psychology at Harvard University in 2008 and was assistant professor of psychology at Yale University from 2008 to 2013.

Psychological Scientists Honored By NIH

The National Institutes of Health (NIH) Office of Behavioral and Social Science Research (OBSSR) has announced that psychological scientists are taking home top honors at its annual event recognizing the best in behavioral science. APS Fellow **Terrie E. Moffitt** has been named the NIH Matilda White Riley Behavioral and Social Sciences Honors Distinguished Lecturer, and several psychological scientists have won the Matilda White Riley Early Stage Investigator Paper Competition.

OBSSR's Matilda White Riley Behavioral and Social Sciences Honors festival recognizes the best behavioral science conducted across and beyond NIH. Moffitt, the Nannerl O. Keohane University Professor of Psychology and Neuroscience at Duke University, was selected to be the distinguished lecturer for this event. She will be presenting a talk, titled "A Good Childhood Is a Smart Investment," which will discuss the ways in which interventions that enhance brain health in early life may hold the key to improving national health.

Moffitt's work on this topic has transcended disciplinary and geographic boundaries. She is also Professor of Social Behaviour and Development at King's College, London; and she is Associate Director of the Dunedin Multidisciplinary Health & Developmental Research Unit at the University of Otago, New Zealand. The cross-cutting nature of her work was on display recently in her keynote address at the 2015 International Convention for Psychological Science (visit https://bit.ly/2GxtPoM to see a video of her talk.).

Terrie E. Moffitt

OBSSR also holds a paper competition in search of the best behavioral science conducted by early-career researchers. Psychological science's strong showing continued in this category as well — psychological scientist **Ruth T. Morin** (San Francisco VA Medical Center) will be recognized for her paper titled "Do Multiple Health Events Reduce Resilience When Compared With Single Events?" Psychology researchers **Justin Parent** (Florida International University) and **Bryan F. Singer** (The Open University, Milton Keynes, Buckinghamshire, United Kingdom) are also winners.

Scientists and members of the public who are interested in this research should attend the NIH Matilda White Riley Behavioral and Social Sciences Honors festival. The event will be held on Thursday, May 31, 2018, from 8:00 AM to 12:00 PM in Bethesda, Maryland. The event is free, but registration is required. Visit https://bit.ly/2upaCRx to register for the event.

Charles L. Brewer, 1933–2018

Renowned psychological science teacher and mentor **Charles L. Brewer** passed away on March 20, 2018, at age 85.

Brewer was an APS Charter Member and Fellow and emeritus professor of psychology at Furman University. He was an influential teacher of psychological science, with more than 200 undergraduate students who went on to earn psychology PhDs. Early in his career, he taught at the College of Wooster in Ohio and Elmira College in New York. He joined the Furman University faculty in 1967 and served as the chair of the university's psychology department from 1972 to 1984. He received the first Alester G. Furman Jr. and Janie Earle Furman Award for Meritorious Teaching in 1969. Brewer retired from Furman University in 2014.

Brewer coedited numerous books and authored many articles on psychological science and teaching. He was editor of the journal *Teaching of Psychology* for 12 years, psychology editor for the *Encyclopedia Britannica*, and keynote speaker at the International Conference on Education in Psychology at their inaugural conference in 2002 and again in 2008. In 2012, the *Princeton Review* honored Brewer as one of their "Best 300 Professors."

Brewer had a special interest in early behavioral psychological scientist **John B. Watson**. Brewer gave lectures around the United States and wrote a book chapter about the Furman graduate, who conducted seminal research on animal behavior, child-rearing, and advertising and established the psychological field of behaviorism.

Charles L. Brewer

In the numerous video, text, and audio tributes students made to Brewer during his life, Brewer's unique sayings come up again and again. Some students refer to these as Brewerisms, which include wise words such as, "Write with clarity, conciseness, and felicity of expression," and "Things always take longer than they do."

Two former students created a collection of essays devoted to Brewer's and fellow psychological science professor **Wilbert McKeachie's** contributions to psychology teaching and published them in 2002. After their mentees write for some 200 pages about all that Brewer and McKeachie have contributed to the field, Brewer writes in the book's conclusion:

"Despite being less prestigious and less lucrative than many other professions, teaching is the most exciting, challenging, rewarding, and difficult thing that I have ever done; I cannot imagine doing anything else."

American Academy of Arts and Sciences Elects APS Leaders as Members

Several APS leaders, including APS Past President **Robert W. Levenson**, APS Past Board Member **Lisa Feldman Barrett**, and *Current Directions in Psychological Science* Editor **Randall W. Engle**, have been elected to the American Academy of Arts and Sciences.

The psychological researchers are among a new class of 213 accomplished scholars, scientists, writers, artists, and civic, corporate, and philanthropic leaders that includes President Barack Obama, US Supreme Court Justice Sonia Sotomayor, and Oscar-winning actor/director Tom Hanks.

Levenson, a University of California, Berkeley professor of psychology, is known for his groundbreaking work applying psychophysiology and affective neuroscience to the study of emotion, aging, and martial interactions. Barrett, of Northeastern University, works at the forefront of research on the nature of emotion. Engle, Georgia Institute of Technology, is a leading expert on attention, intelligence, and memory.

Other APS Fellows in the 2018 class include:

Robert Cialdini, Arizona State University, an authority on the science of persuasion and influence; **Susan Levine,** University of Chicago, a prominent scholar on cognitive development; **Catherine Lord,** Weill Cornell Medical College, founding director of the Center for Autism and the Developing Brain at New York–Presbyterian Hospital; **Michael Hasselmo,** Boston University, an expert on the neurophysiological and behavioral basis of memory; **Jill G. de Villiers,** Smith College, whose work focuses on language acquisition and cognitive development; and **Marta Kutas,** University of California, San Diego, a leading authority on how meaning is constructed in the brain.

The American Academy, a leading center for independent policy research and one of the oldest honorary societies in the United States, has more than 4,600 fellows and 600 honorary foreign members. The new class will be inducted at a ceremony in October at the Academy's headquarters in Cambridge, Massachusetts.

2018 APS Janet Taylor Spence Awards for Transformative Early Career Contributions

Six psychological scientists have been recognized with the 2018 APS Janet Taylor Spence Awards for Transformative Early Career Contributions for their cutting-edge research on fields varying from the development of decision-making skills to mathematical models of happiness and how we rationalize disturbing realities. The award, named for APS's first elected president, honors the most creative and promising researchers who embody the future of psychological science.

This year's recipients shared their experiences and ongoing research with the *Observer*. The awards will be presented at the 2018 APS Annual Convention, May 24–27, in San Francisco, California.

Elliot Berkman University of Oregon

sanlab.uoregon.edu

I study the psychological and neural processes that support goal pursuit. Much of my work focuses on health goals, such as smoking cessation and dietary change, and uses theories from social–personality psychology and methods from neuroscience to develop and refine interventions to improve health outcomes.

The big question that drives much of the work in the lab right now is how to boost people's motivation to engage in behavior change. We have projects targeting a wide variety of behaviors related to health and well-being, such as dietary change and positive parenting, but the common underlying process is motivation. We're drawing inspiration from experimental paradigms used by behavioral economists, such as willingness to pay, though our ideas about how to increase motivation go well beyond just monetary incentives. Some of the most exciting questions revolve around how identity can be used as a source of motivation for behavior change, which in turn have led us to carefully reconsider how identity and self are characterized by psychological scientists. In our field, we focus quite a bit on identity stability but have only nibbled around the edges of how and why identity changes during adulthood and whether that change can be intentional. That set of questions feels like a ripe direction for self-regulation research right now.

Marc Berman The University of Chicago

enl.uchicago.edu

I focus on understanding the interaction between individual psychological processing and environmental factors that give rise to human behavior. My research has two main lines. In one line of research I study how external environments, such as the physical environment and the social environment, affect human behavior. For example, I'm currently studying how interacting with different environments, such as natural ones, can improve cognitive functioning, as well as how sustained exposure to more natural spaces can positively affect physical and mental health.

In my second line of research, the focus is on assessing individual cognitive, affective, and neural processing, which I term the "internal environment." For example, we've found that individuals who have better self-control have brain networks that act more efficiently when performing challenging cognitive tasks. We are also finding that when the brain is in more fractal states (as measured with nonlinear dynamics measures), it is exerting less effort. We now want to examine whether interacting with nature pushes the brain into these more restful states. In both lines of research I employ multivariate statistics, computational modeling, neuroimaging, and behavioral experimentation.

Catherine Hartley New York University

hartleylab.org

Research in my lab focuses on characterizing the diverse learning and decision-making processes that support adaptive motivated behavior. Specifically, I focus on understanding how we learn to evaluate potential behavioral responses in the face of environmental challenges (e.g., goals, threats), how these learning and decision-making processes change over development, and what factors facilitate or constrain these processes for a given individual. I examine these questions at the computational, cognitive, and neural levels using an array of methodological techniques including neuroimaging, psychophysiology, computational modeling, and genetics, coupled with experimental paradigms that draw upon animal learning and economic decision theories.

In graduate school, I was inspired by a body of research in animal models suggesting that the ability to exercise control over important outcomes facilitates the use of proactive, versus reactive, behaviors in the face of later challenges. In the ensuing years, we've begun to translate these findings into human models, recently publishing a paper showing that exercising control over a threat engages prefrontal-striatal circuitry and decreases reactive responses to subsequent threats, even when they are no longer controllable. We are currently taking this research in many new directions, exploring whether control over reward has similar effects and whether there may be sensitive periods during development in which the controllability of important outcomes has especially robust effects.

Kristin Laurin University of British Columbia, Canada

magiclab.psych.ubc.ca/

My research covers a range of topics, all loosely connected by my fascination with goals and motivation on the one hand and "big ideas" — politics, religion, morality — on the other. In all my work, I am particularly interested in people's tendency to rationalize aspects of the world that they find disturbing — how they adjust their attitudes and beliefs to feel better about these disturbing realities. Pursuing this interest in rationalization, I have explored both the causes and consequences of inequality.

I am interested in two somewhat opposing concepts: first, abstract theoretical ideas about humans' social and cognitive functioning, probably shaped by my lifelong admiration of the beauty of logic and math and things that make perfect sense. Second, real-world issues threatening to derail civil society as we know it, probably shaped by my various mentors and advisors as well as by my relationships with humans from a wide range of social classes. My work tries to merge these two interests, which can be difficult because real-world issues often appear to make little sense at all, let alone perfect sense. Right now most of my projects involve at least one of the two following topics: rationalization — the way we reassure ourselves that everything is and will continue to be alright — and social class.

Robb Rutledge Max Planck UCL Centre for Computational Psychiatry and Ageing Research, United Kingdom

robbrutledge.com

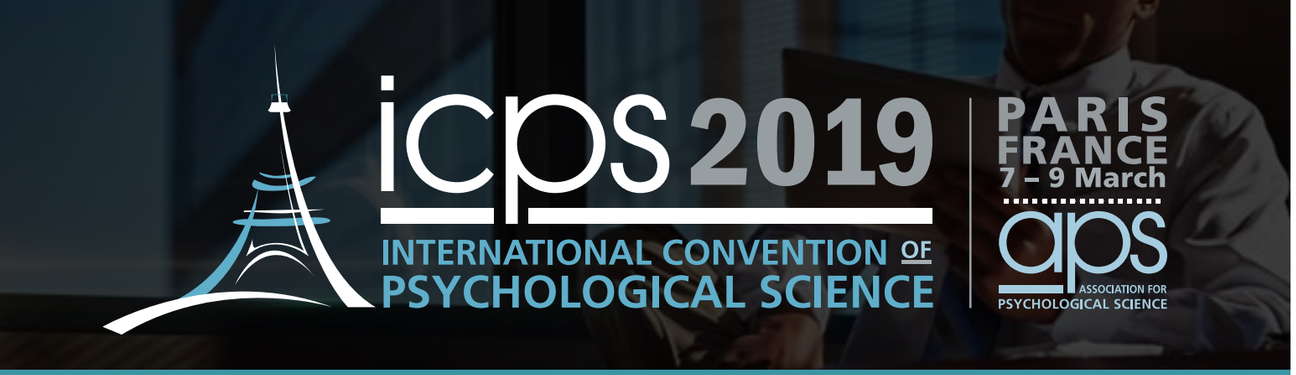
Feelings of happiness and sadness are a big part of our subjective conscious experience, but we still don't know exactly what causes these feelings and how they relate to the decisions we make. Using a combination of neuroimaging, pharmacology, and large-scale smartphone-based data collection, my lab builds mathematical models that predict how subjective feelings change from moment to moment. The results of our experiments will tell us more about how emotions work and may explain some of the symptoms of major depression and bipolar disorder.

I am most excited about my lab's clinical collaborations, which aim to apply the new models we are building to explain happiness in relation to many factors including effort, learning, goal attainment, ambiguity, and future prospects. In one project, we are using our smartphone app, The Great Brain Experiment (www.thegreatbrainexperiment.com), to test previously depressed individuals who either switch to placebo or stay on antidepressant drugs for a year. We want to know which model parameters change before symptoms get worse. For example, we predict that parameters capturing the emotional impact of negative events will increase before depressive symptoms do. I think some of the key parameters for psychiatric disorders are ones that will link emotions with behavior, and understanding those requires building better behavioral models that incorporate emotions.

Amrisha Vaish University of Virginia

pages.shanti.virginia.edu/Social_Development_Lab_3/

My research aims to understand human sociality and cooperation. The starting point for this work is the proposal that humans are tremendously cooperative beings and that our ultracooperative, moral nature is thought to account for our success as a species. I seek to understand the psychological attributes that allow humans to engage in cooperation from early in their development. In particular, my research focuses on the ontogenetic emergence of the moral emotions, cognitions, and behaviors that make children successful cooperators. This includes the emergence of social emotions such as sympathy, guilt, and gratitude; of moral evaluations of others' behavior and of one's own; and of moral behaviors such as prosocial behavior and the enforcement of moral norms. This work has revealed that by as early as 2 to 3 years of age, children are deeply motivated to enhance others' welfare, enforce norms on others, and repair damage to their relationships, thereby upholding and promoting cooperation. I have recently begun to explore the development of more uncooperative phenomena, such as cheating, in order to expand our understanding not only of when and why cooperation works but also of when and why it doesn't. I also have several related research interests such as children's understanding of others' desires, and the development of the negativity bias. All of these research directions together contribute to an understanding of the social child. One direction I very much want to pursue is the development of positive psychology, particularly those emotions that help children flourish and promote their well-being, both in the present and in the long term. We have learned a great deal about positive psychology in adulthood, yet we know so little about it in children. ●



THE ASSOCIATION FOR PSYCHOLOGICAL SCIENCE IS PROUD TO ANNOUNCE

ICPS 2019 CALL FOR SUBMISSIONS NOW OPEN

The 2019 International Convention of Psychological Science (ICPS) offers opportunities to submit symposium and poster presentations. ICPS is the culmination of efforts by APS and an international network of organizations and individual scientists to stimulate scientific advances that are integrative; that is, in which investigators attack scientific problems by drawing broadly on research conducted at multiple levels of analysis and in multiple branches of psychological science, the cognitive sciences, the neurosciences, and other related disciplines. The initiative has been designed, in essence, to surmount artificial disciplinary boundaries that can impede scientific progress and to highlight areas of investigation in which those boundaries have already been overcome.

SUBMISSION DEADLINES

Symposium Submission Deadline
15 September 2018

Poster Submission Deadline
30 September 2018

Travel Grant Submission Deadline

Poster:
15 June 2018
Symposium:
15 September 2018

Students and early career researchers are eligible for APS travel assistance to defray costs including registration, roundtrip economy airfare and lodging. Apply today via the APS submission system.

For eligibility and submission requirements, please visit:
WWW.ICPS2019.ORG

CALL FOR NOMINATIONS
APS RISING STARS

DEADLINE: SEPTEMBER 30, 2018

The APS Rising Star designation is presented to outstanding psychological scientists in the earliest stages of their research career post-PhD. Established in 2015, this designation recognizes researchers whose innovative work has already advanced the field and signals great potential for their continued contributions.

Individuals being considered for Rising Star designation will be evaluated for their promise of excellence in research based on the following criteria:

- significant publications
- significant recognitions
- significant discoveries, methodological innovations, or theoretical or empirical contributions
- work with potentially broad impact

Eligibility for the 2018 nomination period is limited to individuals who received a PhD between January 1, 2013 and December 31, 2017.

Nominations Process: Each nomination must be supported by two APS Members, one of whom must be an APS Fellow. For information on submitting nominations, please visit **www.psychologicalscience.org/rising-stars**.

More than **35,000 people are using Wikipedia to learn about psychology** every month. Yet, of the more than 8,000 psychology-related articles in Wikipedia, *fewer than 0.01%* have been assessed to have the quality of a professional encyclopedic entry. **Hundreds of articles are missing accurate content and reliable citations.**

JOIN YOUR COLLEAGUES IN THE APS WIKIPEDIA INITIATIVE!

Join the thousands of psychological scientists who are undertaking an effort to improve the quality of information on psychological science and related fields in Wikipedia. You can help by **creating Wikipedia writing assignments** in the courses you teach. With guidance from instructors, **students are improving Wikipedia articles** about psychological science instead of writing traditional research papers.

APS is collaborating with the Wiki Education Foundation at wikiedu.org, which has developed a targeted set of resources for classroom use. For more information, go to **www.psychologicalscience.org/apswi**

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ASSOCIATION FOR PSYCHOLOGICAL SCIENCE

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Meet six researchers who are bringing psychological science into creative and practical directions: Their work stands to bolster conservation efforts, improve the usability of consumer products, create optimal indoor settings, improve safety for airline passengers, and much more. Whether testing the bounds of human endurance in a mock spaceship or pioneering the ways in which we interact with social media, these scientists are pursuing projects that serve as prime examples of applied psychological science today. We spoke to experts in neuropsychology as well as clinical, behavioral, developmental, and human factors psychology about what drove them to make their research a reality in the air, underwater, and on center stage.

Psychological Science at the Extremes

Ever wondered if you could handle a trip to Mars? How about a trek to the South Pole? Sheryl Bishop, professor and senior biostatistician at the University of Texas Medical Branch School of Nursing, is a social psychological scientist who has spent her career studying people in extreme circumstances. One of the surprises of her work: There is no such thing as the "right stuff" for extreme missions and expeditions.

"A long-duration mission requires a very different person than a short-term, task-focused mission," she says. "A large group requires a different mind-set than a small group. So the 'right stuff' is really identifying the best fit for the specific mission that is being conducted. The kind of person that would do best in one mission may be the absolute worst choice for the other kind of mission."

Bishop made sure she kept her mind and options open early in her career. She says she chose to be a generalist within the field of social psychology "so that my range of activities could be as broad as my range of interests."

And she's covered quite a range. She's studied mountain climbers, deep-cave explorers, groups trekking across the desert, people living and traveling around arctic environments, and space explorers. Sometimes she can watch from a distance, but studying teams in extremis often means being there herself. That can mean getting stuck in a mock-up space station during important family events.

"My first granddaughter was born while I was participating as a team member of an all-female team at the Mars Desert Research Station in Utah in 2005. I celebrated her birth with a bottle of nonalcoholic champagne at 5 a.m. with my fellow teammates and was later interviewed as the 'first grandmother on Mars'!" Bishop says.

Other times, her line of work means sharing some of the more extreme difficulties along with study participants. While working with Mayo Clinic researchers to study the effects of altitude on sleeping and behavior, "I had my first experience with altitude sickness at 8,000 ft. on the side of Mt. Aconcagua. My Argentinian guide had to catch me as I slid off my horse onto the narrow trail with a precipitous plunge to the river below on one side and a steep cliff wall on the other side."

The varied nature of her work has allowed Bishop to work hand-in-hand with other psychological scientists along with engineers, neurosurgeons, and cardiologists. She says diverse viewpoints help reach deeper insights: "To get beyond the superficial examinations, we need to grapple with the hard things. And that takes the many-colored perspectives of more than one."

Sheryl Bishop studies people's responses in extreme conditions, including arctic environments and space.

Her latest research introduced Bishop to a new kind of team: design engineers and architects. A 20-year-old insight from her colleague, Washington State University Tri-Cities human factors researcher James Wise, and his subsequent investigations found that some geometric patterns in nature, called "bionomic fractals," support cognitive function and performance. Now, Bishop is working to see whether these patterns, incorporated into the design or decoration of an indoor space, could decrease some of the problems that go along with confinement. NASA is interested in this principle to apply to spacecraft design, but Bishop sees many more possibilities. "Theoretically, we could design any environment that is stressful — think of hospitals, jails, courtrooms, doctor's offices — with fractal properties that reduce stress and improve cognitive functioning and performance passively, and then would not have to make folks do things to counter these negative effects as much. That's a huge win for space environments!"

From Toys to Masking Noise

Audio giant Bose recently released noise-masking "sleepbuds" — battery-powered earbuds that help people sleep better by drowning out snoring and other disturbances with soothing sounds. Psychological scientist Kathleen Kremer played a key role in the development of the product, contributing lab and human factors research to help make the product comfortable and stable for a variety of ear shapes and sleeping positions.

Since 2016, Kremer has been a User Research Engagement Lead and Researcher for the Consumer Wellness Division at the Massachusetts-based company, serving as a conduit between Bose's research and product development teams. She formulates key questions throughout the design and development phases, oversees research and disseminates the findings, and partners with colleagues in departments ranging from engineering to sales to help drive and refine the resulting products.

Kremer says her work requires familiarity with a mix of psychological research and statistical approaches, including motivational and behavioral science.

"It requires understanding people — their needs and desires, attitudes and motivations, behaviors, capabilities and limitations, to know what products and experiences to design and how to do so in order to enable people to reach their potential," she says.

Kremer has spent her career working in a number of different industry sectors. Prior to joining Bose, she spent 11 years at toy manufacturer Fisher-Price/Mattel, providing expertise in child development research. While many of the methodologies she used there were similar to those she now applies at Bose, she was often working with infants and children up to age 8. This introduced some distinct challenges, as her research centered on designing products for a population with limited capabilities, knowledge, and experiences. She might, for example, have had to explore whether a toddler's inability to play an interactive game stemmed from lack of attention to the instructions, dexterity problems, or simple disinterest.

Kremer takes particular pride in her role in developing the Fisher-Price Little People Apptivity "Barnyard," one of the first app toys ever released. Using research showing how very young children naturally try to combine physical and digital experiences, she and her colleagues created an interactive farm playset that married a physical toy farm with iPad activities. The product won an international award for its unique, interactive user experience.

Kremer says her father's work running an innovation industry research lab inspired her to pursue a series of applied internships and consultancies while she worked toward her doctorate in Experimental Child Psychology at the University of Minnesota. Through those experiences, she discovered her passion for applying research to the design and development of technological products. And Bose, she says, provides her with plenty of opportunities to fulfill that enthusiasm.

Kathleen Kremer contributes psychological research, statistical approaches, and behavioral science in the development of consumer technology.

"One of the things that has impressed me since joining Bose is the company's emphasis on scientific research and innovation," Kremer says. "This emphasis stems from the company being founded by MIT professor Amar Bose and is reflected in our slogan, 'Better sound through research.' While many companies have small pockets that focus on such activities, here it is part of our DNA and embedded in all that we do."

The Restorative Role of Marine Life

There's something mesmerizing about watching a school of fish or a strand of seaweed sway beneath the waves, and Deborah Cracknell, an honorary research fellow at Plymouth University and the European Centre for Environment & Human Health (University of Exeter Medical School) in the United Kingdom, has made it her job to find out why. After 12 years in the finance service industry, Cracknell returned to Plymouth University to pursue a degree in marine biology and microbiology. Upon graduating in 1998, she went on to work at the United Kingdom's National Marine Aquarium (NMA), also in Plymouth, for 19 years.

In that time, Cracknell worked as a biologist and diving officer, an environmental manager, and the lead researcher for the aquarium. When the NMA sank an ex-Royal Naval frigate, the ex-*HMS Scylla*, in 2004 to create Europe's first artificial reef off the coast of Plymouth, Cracknell was responsible for monitoring its progress across the decade that followed. Eventually a wrist injury prevented her from continuing with the more physically demanding aspects of her diving role, and Cracknell transitioned to coordinating the NMA's research program for Plymouth University students.

In addition to liaising with universities, Cracknell's role as lead researcher involved serving on the NMA's Ethics Committee and advancing the aquarium's conservation efforts — in particular, how to address the problem of plastic pollution — at environmental sustainability workshops and conferences.

Ten years into her career as a marine biologist, this — along with a chance conversation with University of Exeter Professor Michael Depledge, who was then in the process of founding the European Centre for Environment & Human Health — prompted Cracknell to enroll in a part-time PhD program in environmental psychology at Plymouth University to further her research on the restorative qualities of aquatic environments and biodiversity. She completed her PhD in 2016.

Deborah Cracknell explores how greater engagement with marine life can enhance health, well-being, and pro-environmental behaviors.

"I had observed that our visitors reacted to the exhibits in different ways, often commenting on how relaxing they found certain exhibits," Cracknell says. "Researching ways in which the marine environment and its animals could influence human health and well-being seemed a natural progression."

As part of her deep dive into the relationship between the Earth's oceans and human health, Cracknell created a walking group through Natural England's Walking for Health Initiative to provide a seaside outlet for people with special education needs and mental health problems. The group meets every Friday on the shores of Plymouth.

➡

Since leaving the NMA last year, Cracknell has renewed her research focus on the restorative role of marine species and environments and is particularly interested in how to make these benefits more accessible to people in landlocked areas, for instance, through virtual reality technologies.

"I'm also interested in the conservation implications of these interactions — for instance, does greater engagement with marine life for health and well-being lead to a greater appreciation for marine life and, ultimately, more pro-environmental behaviors?" Cracknell says of her future research.

Safer Skies Through the Science of Pilot Selection

She may not take to the skies herself anymore, but Diane Damos, president of Damos Aviation Services, is still flying high in her career as an aviation psychologist. As an undergraduate student at the University of Illinois in the 1960s, Damos discovered her passion for flight when a classmate suggested she take a tour of the college's Institute of Aviation.

"I was hooked immediately," Damos said, adding that the flight simulators in particular captured her attention. She changed her major from physics to psychology the next day and never looked back.

Damos was required to get a private pilot's license for her PhD program, and that firsthand experience has proved invaluable since she received her doctorate in 1977.

"We could talk directly to pilots in their own language, and we knew what some of the problems were because we'd experienced them also, so it was absolutely critical," Damos said of her time in the pilot's seat.

During her 20 years in academia, Damos was a professor at the State University of New York at Buffalo, Arizona State University, and the University of Southern California. There, she developed pilot selection tests for the military — including the United States Navy and Air Force — the only entity with enough funding to support the years of trial and error that go into the process. After working through a university for 2 decades, Damos set out on her own to found Damos Aviation Services, an independent vehicle for her work with pilot selection systems.

The selection systems generally consist of a variety of personality and cognitive tests meant to tease out candidates' spatial and quantitative abilities, Damos said. Overall, she explained, you want someone who is a logical thinker.

Damos Aviation Services, founded by psychological scientist Diane Damos, provides tests that tease out the spatial and quantitative abilities of prospective airline pilots.

While Damos sometimes spends her days reviewing test results from smaller airlines, her work primarily focuses on consulting with airlines on how to design their selection process. She has traveled broadly throughout the course of her work, teaching classes on pilot selection all across the United States, Canada, Africa, Europe, and Asia.

Outside of the office, Damos also serves as elected president of the Association for Aviation Psychology and as an expert witness in legal cases in which a pilot has died or otherwise been forced to stop flying before retirement This involves charting the pilot's probable career path and determining their potential lifetime earnings for consideration in the case, she said.

Damos' current research focuses on new cognitive tests for pilot selection.

Psychological Science on the Silver Screen

Psychological scientist Jessica Cail brings new meaning to the phrase "smart as a whip": As a neuroscientist, stuntwoman, circus performer, and scientific consultant for Hollywood, Cail's talents are as varied as her interests.

"In reality, I didn't set out with the intention of being any of these things. I just love to learn and I follow wherever fascination leads me," Cail says. "My work as a scientific consultant for Hollywood feels like kind of a logical progression."

A serendipitous moment at a San Diego Comic-Con led to Cail's first involvement with the film industry. At a panel "humorously bashing the poor accuracy of science in popular entertainment," she met a National Academy of Sciences representative who was touting the foundation of The Science & Entertainment Exchange, an agency that connects writers, directors, and producers who have inquiries about scientific phenomena with experts in the field.

Cail was in the perfect position to help. Originally a journalism major, she enrolled in some psychology classes during her undergraduate career and was immediately fascinated by biological psychology and psychopharmacology. In particular, she is attracted to the idea that behavioral choices could have biological bases.

"Here was everything I loved about psychology as a predictor of behavior, but even more so, because this was not subjective attitudes and tendencies pushing people in certain directions, but actual wiring and chemistry!" Cail recalls. "I felt the idea that we could control our biology by controlling our psychology was game-changing. I chose to focus on addiction, specifically how the environmental cues surrounding opiate drug use become embedded with the memory of the drug's effects, and how breaking this psychological association could actually break the physical addiction."

Because of her specialization, Cail often works with productions on the topics of addiction and superhero (or supervillain) enhancement logistics. For Marvel's "Agents of S.H.I.E.L.D.," she used her knowledge of the body's systems and interactions to create a plausible formula for a drink that would turn a mild-mannered surgeon into the superhuman Mister Hyde.

"I decided that a high-potency anabolic-androgenic steroid would fit the bill, although those are not usually administered orally because first-pass metabolism by the liver usually breaks them down before they can do anything," Cail explains of the scientific thinking behind the end result. "I added a liver-enzyme inhibitor to the 'recipe' and sent it to them along with information about Intermittent Explosive Disorder. This included behavioral characteristics (such as growing sensitivity to sound before an outburst) for the actor to work into his performance should he choose to. I found myself whooping in the living room laughing when I heard what they had done to my recipe. Perfect!"

That's not to say Cail isn't busy in the field of psychological science as well. As a part-time professor at Pepperdine University, she not only imparts academic knowledge to her students but also ensures they understand that there is more than one way to have a successful career.

A former stuntwoman, psychological researcher Jessica Cail helps the entertainment industry inject more scientific accuracy into films and television shows.

"Not every psychology career is a single-minded line from point A to point B," she emphasized. "I'm not sure when we stopped valuing the idea of a Renaissance Man, but I think it's important for people to see role models of scientists as healthy, well-rounded individuals of diverse interests."

Science in Service of the User

Behind each website and app you use stands a team of developers and designers — and, if you're lucky, at least one psychological scientist like Jennifer Romano Bergstrom. As a user experience (UX) researcher, it's Romano Bergstrom's job to examine the behavioral side of products and determine how to make those products better for all of us.

"We're really the voice of the user," she says. "UX research is about understanding how people interact with products, understanding what works well and what doesn't work well."

Romano Bergstrom was researching healthy cognitive aging as a graduate student at Catholic University when she learned about an internship in the Usability Lab at the US Census Bureau.

"At the time, I didn't know what usability or user experience was, but the internship posting talked about designing and conducting studies, analyzing and reporting findings, and those were things that I knew how to do very well," she says.

Working in the Usability Lab to understand how users interacted with forms, surveys, and websites, had Romano Bergstrom hooked on UX.

After an internship and postdoctoral fellowship at the Census Bureau, she joined the applied research company Fors Marsh Group, where she established a UX team that worked with governmental and nongovernmental clients. When an opportunity arose at the social media giant Facebook, she made the move to San Francisco, joining what was then an 80-person UX team.

These professional transitions may seem carefully plotted, but Romano Bergstrom says they wouldn't have happened without good old-fashioned networking at conferences.

"I knew someone back when I was at the Census Bureau who had started at Facebook. I ran into him at a conference and we just started chatting about what he was doing," she says. "I had no idea how big Facebook was or how big the team was."

As a user-experience researcher, Jennifer Romano Bergstrom has helped Facebook understand the user's perspective in its development of new products asnd services.

The products at Facebook presented a radical shift in both scale and scope for Romano Bergstrom, who suddenly had millions of "clients" around the world. Of the many projects she worked on, one of her favorites was Facebook's Safety Check.

"It's amazing to see how people use the vast power of social media to connect during a crisis, to tell others they're okay, or to connect and share resources," she says.

Whether they were working on Safety Check, Facebook Lite, or aspects of Instagram's performance, the UX team engaged in an iterative research process to understand the product from a user's perspective. They observed people's interactions with the product, identifying any problems, and delivered these findings back to the designers or developers. After the product was improved, the UX team would test it again to ensure that the changes actually resulted in a better user experience.

Now, Romano Bergstrom is applying her skills in a different context: teamwork. As a UX researcher at Bridgewater Associates' Systemized Intelligence Lab, led by IBM Watson creator Dave Ferrucci, she will be examining a product designed to promote "idea meritocracy" among teammates and collaborators. Teams will be able to use the product, an artificially-intelligent coach of sorts, to ensure that their best ideas rise to the top.

According to Romano Bergstrom, having a strong scientific background gives her a noticeable edge in a diverse field that is fundamentally concerned with understanding human behavior.

"The psychological training is really important, really valuable," she says. "Sure, anybody can ask questions, but are they asking good questions?"

Leaders in Applied Research

The **APS James McKeen Cattell Award** honors psychological scientists for their lifetime of significant achievements in applied psychological research and their impact on critical problems and challenges in society at large. Here are a few of the award recipients and the years when they received the honor. See an expanded list online at the *Observer* page.

2011

J. Frank Yates

J. Frank Yates's research in the field of cognitive psychology investigates judgment and decision-making in real-world circumstances. His insights have informed the understanding of how the cognitive processes that allow us to make judgments affect our decisions. Yates has created a model for decision-making, the Cardinal Issue Perspective, which splits the process of sound decision-making into 10 basic, universal elements. His research findings have been implemented across disciplines including business management, marriage, medicine, and cross-cultural collaborations and powerless populations.

2013

Nancy E. Adler

Nancy E. Adler investigates individuals' inclinations to engage in health-damaging behaviors and how their understanding of risk affects these choices, with an emphasis on reproductive health in adolescents. Her work has been particularly influential in the field of health psychology, helping to increase the level of sophistication in the study of health disparities across the globe. Her empirical work has evaluated inequalities in disease risk and mortality as a result of social conditions including socioeconomic status, race, and sex. Her findings have been used to review policy, propose protective mechanisms for disadvantaged groups, and promote further study of the relationship between social inequality and health disparities.

2016

Phoebe C. Ellsworth

Phoebe C. Ellsworth is known for her research on the cross-cultural nature of emotion. Throughout the course of her work, she has studied jury decision-making, attitudes toward capital punishment, jury selection for death-penalty cases, and eyewitness identification. Many of Ellsworth's research findings, including her findings on how to reduce the influence of racial bias in White mock jurors, have been applied to policy and legal debates and have helped identify avenues for future examinations of jury biases.

2018

Richard A. Bryant

Richard A. Bryant's research focuses on post-traumatic stress disorder (PTSD), Acute Stress Disorder (ASD), and Prolonged Grief Disorder. Bryant has developed widely used measurement tools to assess ASD and has identified several biological, cognitive, and behavioral symptoms of acute stress. The psychological scientist also works on major national and international projects, including the Australian National Health and Medical Research Council's PTSD treatment guidelines, Web-based treatments for complicated grief patients and US troops returning from Iraq, psychological support systems for tsunami survivors in Thailand, and counselling programs for disaster survivors in the United States after Hurricane Katrina.

ICPS 2019

INTERNATIONAL CONVENTION OF PSYCHOLOGICAL SCIENCE

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APS ASSOCIATION FOR PSYCHOLOGICAL SCIENCE

THE ASSOCIATION FOR PSYCHOLOGICAL SCIENCE PRESENTS

ICPS 2019 Integrative Science Symposia

Changing Minds and Behaviours Throughout Society: The Greatest Challenge of Our Times

Enny Das, *Centre for Language Studies Faculty of Arts, Radboud University Nijmegen, The Netherlands*

Stephen Fleming, *Wellcome Trust Centre for Neuroimaging, University College London, United Kingdom*

Susan Michie, *Centre for Behaviour Change, University College London, United Kingdom*

Our Minds Are Not Our Own: The Role of Guts and Germs

Alyssa N. Crittenden, *Department of Anthropology, University of Nevada, Las Vegas, USA*

Robert Dantzer, *Department of Symptom Research, Division of Internal Medicine, The University of Texas MD Anderson Cancer Center, USA*

Jane A. Foster, *Department of Psychiatry & Behavioural Neurosciences, McMaster University, Canada*

Mats Lekander, *Department of Clinical Neuroscience, Karolinska Institutet, Sweden*

William P. Hanage, *Department of Epidemiology, Harvard University, USA*

The Consequences of the Evolution of Language on the Mind

Lera Boroditsky, *Department of Cognitive Science, University of California, San Diego, USA*

José Morais, *Centre for Research in Cognition & Neurosciences, Université Libre de Bruxelles, Belgium*

Jennie E. Pyers, *Department of Psychology, Wellesley College, USA*

Alexandra Rosati, *Department of Psychology, University of Michigan, USA*

Collective Emotions in Cooperation and Conflict

Emma Cohen, *Wadham College, University of Oxford, United Kingdom*

Paolo Gerbaudo, *Department of Digital Humanities, King's College London, United Kingdom*

Eran Halperin, *School of Psychology, Interdisciplinary Center, Israel*

Bernard Rimé, *Faculté de psychologie et des sciences de l'éducation, Université catholique de Louvain, Belgium*

Christian von Scheve, *Institute of Sociology, Freie Universität Berlin, Germany*

Dan Zahavi, *Department of Media, Cognition and Communication, University of Copenhagen, Denmark*

Human Culture: What Is It and How Does It Work?

Marcus Feldman, *Department of Biology, Stanford University, USA*

Miriam N. Haidle, *The Role of Culture in Early Expansions of Humans, Heidelberg Academy of Sciences and Humanities, Germany*

Henrike Moll, *Department of Psychology, University of Southern California, USA*

Dan Sperber, *Institut Jean Nicod, France*

How Changing Our Bodies Changes Our Selves

Henrik Ehrsson, *Department of Neuroscience, Karolinska Institutet, Sweden*

Nichola Rumsey, *Centre for Appearance Research, University of the West of England, Bristol, United Kingdom*

Melvyn Slater, *Department of Clinical Psychology and Psychobiology, Universitat de Barcelona, Spain*

Integrative Science Symposia explore major scientific topics in a cross-cutting, interdisciplinary manner, with presentations from investigators in neuroscience, genetics, anthropology, linguistics, and many other fields.

From the Heart to the Eye: Interoception and Awareness

Lisa Feldman Barrett, *Department of Psychology, Northeastern University, USA*

Martin Paulus, *Laureate Institute for Brain Research, USA*

Catherine Tallon-Baudry, *Laboratoire de Neurosciences Cognitives, Ecole Normale Supérieure, France*

Manos Tsakiris, *Department of Psychology, Royal Holloway, University of London, United Kingdom*

Studying Perception: Is It Worth It?

Ned Block, *Department of Philosophy,* New York University, USA

John McGann, *Department of Psychology, Rutgers, The State University of New Jersey, USA*

Yael Niv, *Princeton Neuroscience Institute and Department of Psychology, Princeton University, USA*

Aude Oliva, *Computer Science & Arificial Intelligence, Massachusetts Institute of Technology, USA*

Brian Scholl, *Department of Psychology, Yale University, USA*

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Integrative Science

Bridging the Lab and the Real World

Whether and to what degree discoveries made in the lab generalize to the real world has been a long-standing debate among researchers of all stripes. New advances in technology and methodologies are enabling psychological scientists to bridge this divide and bring the controlled assessment of the lab into the world at large. Five researchers working in a variety of areas came together at the 2017 International Convention of Psychological Science in Vienna, to discuss the ways in which they balance, combine, and synergize the confines of the lab with the complex reality of our world.

Gesturing Toward Language

APS Past President Susan Goldin-Meadow of th University of Chicago uses a combination of lab-based and real-world environments to examine another aspect of infant development: gesture and its relation to language acquisition. It may seem intuitive that children use gestures as a stand-in for words they don't know or can't yet say, but Goldin-Meadow has found the movements are more than that. Pointing gestures not only function like words in children's speech, but may actually be part of the word-learning process.

Goldin-Meadow first found indications of this by comparing the spontaneous gesture production of typically developing 14-month-old children with their vocabulary at 54 months. In addition to a correlation between gesture and vocabulary, she also found that the well-established positive association between socioeconomic status and child vocabulary size can be partially mediated by gesture production at 14 months.

To go deeper into this relationship and investigate the possible causal role of gesture, experimenters manipulated gesture production during a series of experimental sessions in the children's homes. Experimenters did not use gesture in their sessions, used gesture but did not instruct the child to do so, or gestured and encouraged the child to do the same. Children who were told to gesture used more words in a follow-up assessment than did those who had only witnessed the experimenter gesture or who saw no gestures at all. They also produced more gestures with their parents outside of the experimental session. Because the experimenters manipulated gesture, the findings provide convincing evidence that gesturing can play a causal role in word learning.

In a series of lab-based studies (which will be followed up by neuroimaging studies), Goldin-Meadow also found that performing a gesture of an action (e.g., miming the turning of a knob) helps children better generalize that word to other knob-turning situations than does simply turning the knob themselves.

These observations about children's use of gesturing and language in the real world, supported by laboratory testing, demonstrate how these two settings can work synergistically to provide us with new insights into development.

Just Moving to Move

APS Fellow Karen Adolph, a professor of psychology at New York University, aims to capture the complexity of infant learning beyond what has been observed in the lab. For example, technological advances such as head-mounted eye tracking for mobile infants have revealed that they don't attend to their caregivers' faces as much as previously believed — in one study, Adolph found that infants spent about 16% of the time looking at their parents and only 5% of the time focused specifically on parents' faces.

Lab setups to study infant walking typically involve getting subjects to walk in a continuous, forward, straight path through a designated recording area. But infant ambulation in the real world is often far from a continuous, forward, straight path — babies stop and start, walk in every direction, and move in curves. These components were previously not able to be studied in the lab-based paradigm, but a larger recording area with a pressure-sensitive floor has enabled researchers to track how babies walk freely around a room.

Technological advances have allowed Adolph to investigate not just how babies walk, but why. Young children were typically theorized to use walking to get to a destination that they can see but that is not reachable from their current position. Using the same eye-tracking technology as the previous experiment, Adolph found that these destination-based bouts of walking account for only about 18% of toddlers' movement. Sometimes they look toward one destination but then walk to another in what Adolph terms "discovery bouts," accounting for about 10% of their walking trips. Babies, it turns out, are largely wanderers; most bouts do not have a destination at all.

"They are just moving to move," says Adolph.

While lab tasks have the advantage of being well-controlled, Adolph's findings reveal how they fail to capture the full picture.

"The cost of over-simplifying behaviors is that we lose sight of the phenomenon that we want to study," she said. "In developmental psychology, over-reliance on laboratory tasks has led us to develop erroneous and superfluous theories about infant development."

Adolph hopes to correct this trend moving forward.

Attention in Detail

To draw clear conclusions about the complex construct of attention, lab-based studies have typically separated out two main aspects of attentional shifting. These shifts can be driven by endogenous signals, which are voluntary and strategic (e.g., searching for a specific target), or exogenous signals, where attention is automatically shifted in response to an external stimulus — a more reflexive reaction. Voluntary attentional shifting has been linked to the dorsal frontoparietal (dFP) region of the brain, while the ventral frontoparietal (vFP) area has been thought to primarily mediate reflexive shifts, though more recent evidence suggests the two systems may also interact and overlap with each other.

The lab studies that have provided these insights, however, use primarily stereotyped paradigms and simple, repeated stimuli, a far cry from the cohesive, complex visuospatial landscape we encounter in our everyday lives. Recent technological advances in eye tracking, saliency maps, and imaging methods have enabled researchers like Emiliano Macaluso, a professor at the Lyon Neuroscience Research Center, to study attention in a more naturalistic setting, where stimuli are more numerous and dynamic and where there is not always an explicit task to be done or goal to be achieved.

Macaluso has used dynamic visual environments, including first-person perspective videos and virtual environment setups, to examine how attentional shift is mediated in the brain under different conditions and to compare the responses of healthy subjects with those of subjects with lesions in the vFP region. Throughout these studies, he also has mapped and compared brain activation in individuals when viewing task-relevant objects and objects that were relevant only to a previous task, as well as when shifting their attention toward salient stimuli. These activation patterns were largely segregated between the ventral and dorsal networks, but also revealed greater nuance in how the brain controls attention, as the vFP was found to play a role in orienting attention toward task-relevant objects, and lesions in the ventral region interfered with this processing. Conversely, the dFP was activated during orientation toward salient events and locations.

Macaluso hopes to continue using these naturalistic settings to gain even greater insight into how the brain mediates the processes of attentional control.

Language Richness and Reward

Language and communication do not exist in a vacuum; they are constrained by both lower-level sensorimotor processes as well as higher-level social factors. Rick Dale, a cognitive scientist at the University of California, Los Angeles, has examined these dynamics in the lab. In one experiment, he and collaborators tracked the eye movements of two people looking at a shared screen while one spoke and the other listened. They found that when speakers' and listeners' eye movements were more closely aligned, the listener performed better on a subsequent comprehension test.

"Language and communication are actively entangled in these perceptual motor processes," Dale said.

Thanks to the internet, large natural datasets are more readily available than ever, allowing Dale to investigate the social side of these constraints in the real world. Using Yelp Dataset, a natural dataset of reviews and tips written by hundreds of thousands of users about more than 60,000 businesses, Dale was able to study the relationship between social connectedness and various facets of the language of these reviews. He found a pattern of "community innovation," in which more interconnected networks of users tended to use richer language than did less connected ones, indicating there may be a social incentive to use more lexically rich language.

To examine these phenomena in more controlled environments, Dale and his student recruited internet-based and lab participants to produce language by typing it out for an extended time. Participants faced simple, familiar tasks such as summarizing plots of favorite movies or writing reviews (as in the Yelp dataset). He measured their typing speeds and textual richness. He found that typing speeds were higher for low-richness textual inputs than for highly rich ones.

"There's an incentive needed to communicate a richer message, and social incentive can induce a participant to invest more cognitive effort," Dale explained. He noted that integrating new natural data with traditional psychological research can unveil causal linkages between the cognitive and the social. "What's left is to link those typing dynamics to the social structure, so that indeed you can overcome the cognitive cost of typing richer text when there's a potential social incentive that's conditioned by the social network that one's in."

Navigating New Technology

Smartphones have changed not only the ways in which we communicate with each other, but also how we interact with the world. Yvonne Rogers, a professor of Interaction Design at University College London, focuses on questions about how technology affects people's lives, how people behave when encountering a new technology, and how technology can be leveraged to engage communities and to inform new understandings of behavior.

One target of Rogers' investigation has been the effect of using a GPS-enabled mobile device versus a paper map for navigation. Lab studies have shown that people using paper maps take less time to get to their destination, better remember the route, and have a better mental model of the area traversed.

Rogers wondered, however, what people were doing with all the cognitive resources freed up by mobile navigation, which trades cognitively taxing decision-making for lower-effort instruction-following. In a task where subjects had to navigate a route through London with either a paper map or a GPS, she found that participants who used paper maps looked at them more frequently, especially before critical turns, while those using smartphones checked them less and usually after critical turns. Subjects using smartphones recalled more street views and drew more detailed maps of the route they took. Users of paper maps drew routes that were more spatially accurate, but had fewer subjective and emotional descriptions of their trip than did smartphone users.

Rogers said this suggests that smartphone users experience the environment differently and adopt different strategies for navigating.

"Our findings compared to the previous lab findings were quite different, but also more positive. What we're saying is [smartphone navigation] is not all bad," she said.

This research is illustrative of the many new avenues of study that technological advances have opened up.

"I think researchers have new opportunities to change what they do, and to ask different questions and to use different techniques and methodologies by which to explore them," Rogers said. ●

-Amy Drew

Call for Applications

APS Fund for Teaching and Public Understanding of Psychological Science

Small Grants Program

The APS Fund for Teaching and Public Understanding of Psychological Science (otherwise known as the APS Teaching Fund) invites applications for non-renewable grants up to $5,000 to launch new projects broadly addressing the categories below:

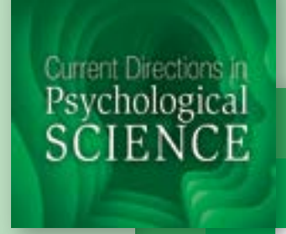
- **SCHOLARSHIP OF TEACHING AND LEARNING (SOTL):** Grants in this category support high quality, potentially publishable, scholarship directed at the teaching and learning of psychological science.
- **MEETINGS AND CONFERENCES:** Grants in this category support efforts that facilitate communication among teachers of psychological science who share common challenges and who would benefit from sharing ideas and resources.
- **TECHNOLOGY AND WEBSITES:** Grants in this category support projects leveraging technological resources to enhance the teaching and learning of psychological science, and to increase the reach and efficient dissemination of related resources.

NEXT APPLICATION DEADLINE: OCTOBER 1

For details, go to: **www.psychologicalscience.org/smallgrants**

Questions? Contact **teachfund@psychologicalscience.org**

The Teaching Fund was established with the support of The David and Carol Myers Foundation.



Teaching Current Directions in Psychological Science

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.*

Visit the column online for supplementary components, including classroom activities and demonstrations: www.psychologicalscience.org/teaching-current-directions.

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* (*12th Ed.*), *Exploring Psychology* (*10th Ed.*), and *Psychology in Everyday Life* (*4th Ed.*).

Getting High on Social Connection

By C. Nathan DeWall

Inagaki, T. K. (2018). Opioids and social connection. *Current Directions in Psychological Science, 27,* 85–90. doi:10.1177/0963721417735531

Students crave social connection. Endowed with a need to belong, they strive to form and maintain positive and lasting relationships. They pledge fraternities or sororities, join clubs and sports teams, and seek romantic partners. But until recently, psychological scientists have remained uncertain about the *biological* basis for why people — students, professors, and people beyond the ivory tower — desire social connections.

Tristen Inagaki (2018) helped solve this riddle. Drawing on studies of animals and humans, Inagaki argues that social connection triggers the body's opioid system. When we hold our partner's hand, when someone on social media likes our posts, or when we bond with others over a stressful experience, we experience a rush of neurochemical activity similar to that of taking opiates. The opposite is also true: When we experience social disconnection, our body's opiate system ceases to function properly, increasing our distress.

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To illustrate, imagine the experience of receiving loving messages from your close friends and family members. Normally, these messages would signal to your body that you've experienced a strong social connection, causing your body's natural opioids to ooze through your system. In an ingenious experiment, Inagaki and colleagues (2016) blocked the brain's ability to receive signals from its natural opioid receptors by having participants take the opioid antagonist naltrexone. Compared with when participants took placebo opiate pills, naltrexone reduced feelings of social connection when participants viewed loving messages from family and friends. Naltrexone also reduced daily feelings of social connection, suggesting that a compromised opioid system caused broad changes to how people experience their social interactions.

Is the opioid system related to feelings of social disconnection? To find out, Barbara Herman and Jaak Panksepp (1978) recruited some cuddly guinea pigs and separated them from their mothers. Before the social disconnection experience, Herman and Panksepp injected the guinea pigs with a drug that would release (morphine) or block (naloxone) the body's natural opiates. They found that morphine numbed the guinea pigs to the pain of social disconnection, whereas, consistent with Inagaki and colleagues' (2016) results, naloxone increased their distress.

To bring this cutting-edge science to the classroom, instructors can have students complete the following activity, which demonstrates how social connection and disconnection affect the body's opioid system.

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Activity: Going to Any Lengths

Instructors can begin by reviewing Inagaki's argument on the close relationship between social connection and the body's natural opioid system. Please review this material. Your students will need to understand the link between social connection and the opioid system in order to answer the discussion questions. Next, on a PowerPoint slide, ask students to use their phones, laptops, or a piece of paper to record their answer to this question:

What is the most extreme thing you have ever done to be accepted by a group or another person?

After 3 minutes, ask students to spend 5 minutes discussing their responses with a partner. I have used this activity for more than a dozen years and am always surprised by students' responses. Ask students to consider the following questions:

- Why did your need to belong drive you to engage in such extreme behavior to gain acceptance? What does that say about the strength of the need to belong?
- How did it feel when you experienced the hoped-for social acceptance?
- How do you think your social-acceptance experience affected your body's opioid system? How might your social acceptance experience have differed if you had taken a drug (naltrexone) that blocked your brain's ability to receive signals from its natural opioid receptors?

On a second PowerPoint slide, instructors can ask students to consider how they might respond to this question:

What is your most extreme experience of social disconnection?

As students consider their response, ask them to spend 1 minute reflecting on how Inagaki's research might help them answer the following two questions:

- How would your experience of social disconnection have been different if you had taken a drug that released your body's natural opiates, such as morphine?
- How would your experience of social disconnection have been different if you had taken a drug that blocked your body's opioid system, such as naltrexone?

All humans have a need to belong. Even if we prefer solitude to socializing, people need to have positive and lasting connections to feel that life has purpose, coherence, and significance. Sometimes we might question why we crave social connection, considering it a weakness. But we now know that social connections feel good because they activate the body's opioid system, giving us a burst of reward and euphoria. Getting high on social connections shows us why it pays to invest in relationships — and identifies the costs associated with social disconnection.

Don't Go Shoe Shopping When You're Hungry: How Cognitive Mind-Sets Carry Over From One Task to Another

By Cindi May and Gil Einstein

Xu, A. J., & Schwarz, N. (2018). How one thing leads to another: Spillover effects of behavioral mind-sets. *Current Directions in Psychological Science, 27*, 51–55. doi:10.1177/0963721417724238

Most of us know better than to grocery shop on an empty stomach, as hunger can drive us to overfill our shopping carts. But new research by Alison Jing Xu and Norbert Schwarz (2018) suggests that it would be wise to grab a snack before shopping for any merchandise, as hunger can also make us purchase more nonfood items such as office supplies or shoes. It seems that the drives that motivate behavior in one domain (e.g., food acquisition) can "spill over" and influence behavior in another domain (e.g., product acquisition). Once we activate a set of processes necessary for the pursuit of a goal, we are likely to persist with that mind-set when pursuing other goals.

One study of these spillover effects offered hungry and sated participants office supplies. Xu and colleagues (2015) induced hunger by asking all participants to refrain from eating for 4 hours prior to the study. At the start of the study, some participants (hungry condition) examined binder clips, decided how many they wanted to take, and then rated the clips. After completing the binder task, they ate cake. Other participants (sated condition) ate cake before engaging in the binder task. Although the groups rated the binder clips similarly, those who were hungry took 70% more than those who were sated.

These spillover effects occur in other settings in which the mental processes engaged in one setting continue to influence behavior in subsequent settings. For example, when offered a selection of chocolates, people will generally make two decisions. They first decide if they want to eat chocolate; if the answer is *yes*, they then decide which chocolate they desire. However, if people are first asked to consider which elective classes they want to take next term and are then offered a selection of chocolates, they tend to bypass the whether-to-choose decision and move straight to the which-to-choose decision. Consequently, they eat more chocolates than those who didn't consider courses first (Xu & Wyer, 2007). Similarly, people who make comparative judgments of animals first are likely to bypass the romantic should-I-date decision and instead tackle the whom-should-I-date decision (Xu & Wyer, 2008).

To help students understand this basic effect, consider this demonstration.

Give half of the students in the class (control group) a sheet of paper with the following instructions:

Please think about what you learned in this class last week and write down the first three things that come to mind.

Give the remaining students (comparative group) a sheet of paper with the following instructions:

Listed below are five elective courses that might be offered next term. Please select the course you would most like to enroll in if it were offered:

- "Not Fit for the Dinner Table: Religion, Race, and Politics in America"
- "Planes, Trains, and Automobiles: More Than Just a Movie"
- "Everything I Need to Know I Learned in Kindergarten"
- "Another Brick in the Wall: Exploring the Representation of Education in Pop Culture"
- "Out of the Lab and Into the World: Science, Media, and Society"

Allow students 1 minute to complete these tasks. When they have finished, pass around a bag with different types of candies. Tell students they may take as many as they like, but they must leave the candies on their desks until the end of class. Once students have taken their candies, assess whether those in the comparative group took more than those in the control group. The research by Xu and colleagues suggests they will, as they are likely to bypass the should-I-take-some question and instead skip right to the which-ones-should-I-take question.

The spillover effects of behavioral mind-set occur in a variety of contexts and influence a myriad of behaviors. Review these findings with your students:

- *Disagreement increases disagreement*: After reading statements likely to induce disagreement (e.g., "My university should raise tuition" or "Reading is bad for the mind"), participants gave less favorable ratings of a potential vacation

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destination than those who had read statements inducing agreement (Xu & Wyer, 2012).

- *Solving concrete, well-defined problems reduces creativity*: Participants who built a structure out of Legos with step-by-step instructions were less effective on a subsequent task requiring creative thinking (Moreau & Engeset, 2016).
- *Verbal processing disrupts visual processing*: Asking people to verbally describe a face they see impairs later face recognition for that face and for other faces, as verbal processes override visual perceptual processes (Dodson, Johnson, & Schooler, 1997; Schooler & Engstler-Schooler, 1990).
- *Activating a calculative mind-set increases deceit*: Participants who first solved GRE math problems were 4 times more likely to engage in "calculating" behavior and lie to a fellow participant to obtain money in a competitive game (Wang, Zhong, & Murnighan, 2014).

Break students into small groups and have them discuss the ways that spillover effects might affect behaviors in other settings. For example, ask how they might use this phenomenon to:

- create opposition to a political candidate?
- sign up for a meditation class?
- spend more money to purchase an eco-friendly car?
- get an extension from your professor on an assignment?

Finally, point out to students that the examples reviewed here reflect the spillover of a recent behavioral mind-set. It is also possible to see such spillover effects from behavioral mind-sets that are used frequently. What sorts of cognitive processes and thought patterns do students regularly engage in, and how might these affect their behavior, attitudes, and wellbeing? ●

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Emerging Identities of Graduate Students

By Urvi Paralkar

Many students find the transition from undergraduate to graduate education a difficult one. After all, it might be the first time individuals live away from campus and their childhood homes, cook for themselves, do their own taxes, and figure out how to get their own health insurance. It's a time associated with assuming adult responsibilities and independence as well as realizing one's true potential. In addition, success in graduate school is perceived as reflecting a student's future career trajectory. Given the many tasks that require our cognitive attention and eventual proficiency, the anxiety that arises during this time is to be expected.

Amidst juggling the different responsibilities and demands that graduate school entails, students also go through the process of identity confrontation and continuity (Nimbalkar, 2011). We are challenged to question our preconceptions and acquire new perspectives. One of the hallmarks of graduate education is critical thinking, which facilitates the challenging of one's assumptions, biases, and prejudices. It involves recognizing the different group and cultural identities with which one associates and being able to acknowledge and accept them.

Identity development is an ever-evolving process (Sokol, 2009). Graduate students display considerable insight and thoughtfulness. Embarking on an academic journey that is known to be difficult reflects courage, determination, and perseverance. As we start our education and assimilate more information about ourselves and our environment, we increasingly question ourselves; as we do so, we grow.

The salience of academics, work, and social and family life varies for different individuals at different points in their school lives. Students might endure several stages of confusion and crises. The ultimate hope is that we arrive at a point of stability, equilibrium, and harmony with self, as well as a unique solidification of one's identity. While securing a good GPA, gaining adequate research experience, and networking are graduate-school priorities, other factors are equally important. There are different components to this unique graduate-school identity, and they are important to highlight and consider.

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Self-Reflection

It is safe to assume that going through the rigorous process of graduate school entails some amount of self-reflection. After finishing the intense competitive process of applying to and interviewing for positions, receiving a letter of acceptance, and starting a program, school can soon get overwhelming. It is only natural to get disillusioned and disheartened when we perceive the expectations to exceed our resources or abilities. Questioning life decisions and choices is also natural and common. However, examining stress and anxiety may help students address their worries. How well we understand ourselves is crucial in determining how well we cope. Some students may find self-reflection to be fairly organic; others might develop this practice over time. Understanding oneself better allows for a keen awareness of choices and options. Self-reflection isn't a prerequisite to having a good learning experience, but it is probably one of the most beneficial qualities to develop during graduate school.

Cultural Sensitivity

Developing a culturally sensitive and humble approach is another significant part of being a well-rounded student. Individuals differ in their levels of acculturation and identity integration. Students are sometimes confronted with culturally complex situations and contexts with which they have no prior experience. Discussions around race, gender, sexuality, and socioeconomic status, among many other multicultural aspects, can be new and challenging. Navigating these uncomfortable and sometimes intense emotional experiences can lead us toward a true appreciation of the cultural diversity and richness around us.

Professionalism

A student's conduct in graduate school is often expected to be similar to that of a junior colleague; at times, it might feel like being under a spotlight. We might also experience culturally incongruent practices. For example, it is often considered standard practice to refer to professors by their first names in the United States. This is unfamiliar to students from different cultural backgrounds. Professionalism often means understanding and clarifying these expectations. In addition, graduate school can be a time when students learn the delicate practice of writing and expressing important information (including disagreement) over emails. Professionalism extends beyond the classroom and applies to the interactions we have with our peers. It includes learning about the appropriate boundaries that are preferred by the various people around us. Most importantly, it is learning how to be ourselves and simultaneously present ourselves in a respectful and approachable way.

Advocacy

While certainly not a requirement of most programs, advocacy is becoming popular within psychological science and other disciplines. The realization that voicing opinions can empower a cause is not unique to graduate students. However, addressing societal issues and discrimination and engaging with historically marginalized groups calls for a deep understanding of the issues we face nationally and globally. Advocating for what we believe in requires well-informed ideas and beliefs as a starting point. We begin learning to make informed choices at a young age, but graduate school can help us discover what we feel most strongly about.

The Art of Saying No

With the constant pressure to keep achieving more and more, we sometimes forget that we have the power to say no. It might be difficult to decline or pass over lucrative opportunities for the fear of missing out, but determining what we can and cannot do is an important skill to develop. Not only does it help in prioritizing and balancing schoolwork, it also helps us maintain work–life balance and care for our physical and mental health.

Graduate school enables us to flourish and discover more about ourselves as people and as students. In Maslow's terms (Maslow, 1968), it sets us on a route of self-actualization. We realize what we are capable of and might even identify ourselves as agents of change. It is important to be aware of these different factors and realize that, although overwhelming at times, graduate school is most certainly an enriching experience that molds us significantly and allows us to make a difference at what we chose to do. ●

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Ellen Braaten, Harvard Medical School, *The New York Times*, April 4, 2018: Homework Therapists' Job: Help Solve Math Problems, and Emotional Ones.

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ANNOUNCEMENTS

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GRANTS

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 EHR 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.

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

30th APS Annual Convention
May 24–27, 2018
San Francisco, California, USA
psychologicalscience.org/convention

Joint CAMBAM/NSERC-CREATE in Complex Dynamics Summer School
June 18–29, 2018
Montreal, Canada
www.medicine.mcgill.ca/physio/khadralab/public_html/summer.html

Administration for Children and Families' National Research Conference on Early Childhood
June 25–27, 2018
Arlington, Virginia, USA
nrcec.net/

25th Annual RAND Summer Institute
July 9–12, 2018
Santa Monica, California, USA
rand.org/labor/aging/rsi.html

Biennial International Seminar on the Teaching of Psychological Science
July 9–13, 2018
Paris, France
bistops.org

41st Annual National Institute on the Teaching of Psychology
January 3–6, 2019
St. Pete Beach, Florida, USA
nitop.org

3rd International Convention of Psychological Science
7–9 March 2019
Paris, France
icps2019.org

LANGUAGES' LAYERS

Ted Supalla, *Center for Brain Plasticity and Recovery at Georgetown University Medical Center*

One of your research interests is exploring universals in language. What fundamental features do signed and spoken languages have in common?
All languages have layers of structure, starting with a limited set of minimal contrastive formational features (sound contrasts in spoken languages; contrasts in handshapes and movements in signed languages) that combine into words, which then combine to form a potentially infinite number of sentences. This kind of grammatical productivity is found in both spoken and signed languages.

What misconceptions about signed language do people often have? What do you want them to know?
Research on sign language challenges the idea that speech is unique as the basis for human language. While many people have thought that language is what sets humans apart from animals, this has usually been attributed to the ability of speech to map arbitrary sounds to meaning, allowing one to convey abstract ideas. People have argued that nonverbal gesture is limited in its ability to express thoughts. However, the emergence and evolution of complex sign languages from these gestural roots shifts the definition of language to include any open-ended symbolic system for human communication, in either the auditory or visual mode.

How has our understanding of signed language changed over time?
People used to think signed systems were not languages, [that] they were pantomime or simple codes representing the surrounding spoken language. Then, starting 50 to 60 years ago, linguists began to show that sign languages were actually independent languages with structures of their own. This early research focused on the most basic properties of American Sign Language, showing, for example, that signs are composed of combinations of the features of location, movement, handshape, and hand orientation. Subsequent research has shown that mature sign languages (those with a long history of use among Deaf people) have much more complex structures at all levels, and that young sign languages in earlier stages of development can be studied to provide important information on how complex, mature languages develop over time.

You recently launched a massive open online course (MOOC). What drew you to the MOOC format? Have you noticed any particular advantages or disadvantages of teaching that way?
I appreciate that the MOOC format allows me to integrate introductory to advanced information about the structure and history of signed languages with instructional materials I have developed for upper-level undergraduate courses such as Brain and Language and the Structure of ASL for the departments of cognitive science, linguistics, and ASL at various universities. The MOOC format permits me to combine my lectures (in American Sign Language — since I am a native signer myself — and English voiceover with captions too) with PowerPoint slides outlining and illustrating what I am lecturing about, links to movies and demos of the material I am discussing, and homework exercises to give students practice in seeing the structure of signed languages. This multimedia format provides a rich learning environment, especially for the many interested students who are unfamiliar with such materials.

The overall point I want to convey to students is how languages — in this case, visual–manual languages — evolve over time to fit the human mind. I have therefore designed my MOOC as a vehicle for students to understand this point gradually, just as language learners develop their understanding — from the way novice signers first master word formation to the increased linguistic complexity that generally requires learning the language from childhood to achieve native competence. The multimedia technology of the MOOC can easily be combined with design principles for building incremental problem-solving heuristics through the course, to take students from simple aspects of sign language structure to much more complex design questions.

We have designed the course so that students from diverse backgrounds can all participate in this journey. Our students run the gamut from those who are native sign-language users to those who are not signers but are interested in learning about different languages of the world. The Sign Language Structure, Learning, and Change MOOC is hosted on the GeorgetownX site (bit.ly/2nV44Et). ●

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