

Coverage of the 2017
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APS CONVENTION HIGHLIGHTS



FRED KAVLI KEYNOTE ADDRESS

**Rome Wasn't Built in a Day
But Maybe Latin Was**

Lila R. Gleitman

University of Pennsylvania



Lila R. Gleitman will be featured in the Inside the Psychologist's Studio program at this year's convention. She will be interviewed by APS President Susan Goldin-Meadow.



BRING THE FAMILY ADDRESS

**What Makes the Human Mind
Special? Insights From
Nonhuman Animals**

Laurie R. Santos

Yale University



PRESIDENTIAL SYMPOSIUM

**Sense and Sensibility: How Our Bodies
Do — and Don't — Shape Our Minds**

Susan Goldin-Meadow (Chair)

The University of Chicago



How Our Bodies Shape How We See

Jessica K. Witt

Colorado State University



**Evaluating the Research on Postural Feedback:
Strong Evidence That Expansive Posture
Affects Feelings, Mixed Evidence That It Affects
Behavior and Hormones**

Amy J.C. Cuddy

Harvard University



**How Our Hands Help Us Learn: The Role
of Gesture in Cognitive Change**

Susan Wagner Cook

The University of Iowa



**The Emergence of American Sign
Language From Depiction and Embodiment**

Ted Supalla

Georgetown University

SPECIAL EVENTS

**Real-World Implications of
Implicit Bias**



Michelle N. Shiota (Co-Chair)

Arizona State University, Tempe



Elizabeth Page-Gould (Co-Chair)

University of Toronto, Canada



Modupe N. Akinola

Columbia University



Louis A. Penner

Wayne State University/Karmanos
Cancer Center and Research Center
for Group Dynamics



Naomi Ellemers

Utrecht University, The Netherlands

**APS-DAVID MYERS DISTINGUISHED
LECTURE ON THE SCIENCE AND CRAFT
OF TEACHING PSYCHOLOGICAL SCIENCE**



**Reflections on What I've
Learned From Walking (or
Running) a Step With
Students (N=9)**

Michelle "Mikki" R. Hebl

Rice University



CALL FOR NOMINATIONS APS RISING STARS

DEADLINE: SEPTEMBER 30, 2017

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 2017 nomination period is limited to individuals who received a PhD between January 1, 2012 and December 31, 2016.

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.

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FEATURES



GLOBE-SPANNING SCIENCE

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Perception and Play *How Children View the World*

The interactions among children's brains, bodies, and surrounding environments have tremendous effects on how they learn to speak and identify specific items in their field of view. APS Fellow **Linda B. Smith** shares her groundbreaking methods for examining these processes.

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Across the Spectrum

Geneticist **Thomas Bourgeron** details the various methods — including genetic analyses, brain imaging, mouse models, and even stem-cell applications — that he and his colleagues are using to identify the biological pathways that contribute to diversity in autism spectrum disorders.

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Humans Are Animals, Too *A Whirlwind Tour of Cognitive Biology*

Citing the bridge between evolutionary psychology and cognitive science, University of Vienna scientist **W. Tecumseh Fitch** shows how studying our animal relatives fosters our understanding of human cognition.

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Presidential Column *What Counts As Data?*

APS President **Susan Goldin-Meadow** argues that allowing different kinds of data to count in psychological science gives researchers ways to test a hypothesis using multiple approaches, thereby strengthening their conclusions.

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10 ***2017 Mentor Award Recipients***
 Recipients of the APS Mentor Award for 2017 include **David M. Buss**, University of Texas at Austin; **Randall W. Engle**, Georgia Institute of Technology; **Paul L. Harris**, Harvard University; and **Phoebe C. Ellsworth**, University of Michigan.

15 ***2017 Janet Taylor Spence Award for Transformative Early Career Contributions Recipients***
 Research by the latest recipients of the Janet Taylor Spence Award for Transformative Early Career Contributions includes romantic relationship initiation, the psychological processes that guide moral judgment, and the link between socioeconomic inequality and children’s cognitive and brain development.

17 ***Revision to the Common Rule Implications for Behavioral and Social Sciences Research***
 The various provisions of the US government’s revised rule on human subjects research will provide increased flexibility and less burden for behavioral and social sciences researchers. **William T. Riley** and **Farheen Akbar** from the Office of Behavioral and Social Sciences Research explain.

29 ***‘Hello From the Other Side’ at ICPS 2017***
 Psychological scientists are increasingly focusing on making their research programs more rigorous and impactful by integrating multiple areas of study and levels of analyses, but they face myriad challenges in doing so. Editors from some of the most esteemed journals in the field gathered to discuss their viewpoints on conducting and publishing integrative science at the 2017 International Convention of Psychological Science.

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Teaching Current Directions in Psychological Science

Featured Articles: “Understanding Mind From Matter: What Does Prehistoric Farming Say About Your Prefrontal Cortex?” and “To Err Is Human: The Psychological Science of Voting Mistakes”



What Counts As Data?



Susan Goldin-Meadow
The University of Chicago

There are times when data relevant to the truth need to be ruled out of court. Consider a doctor who has been accused of treating a patient with a practice that is now known to be associated with a morbid outcome — but was not at the time of treatment. Data that clearly establish a connection between the practice and the morbid outcome are deemed inadmissible in court, which seems perfectly reasonable given that the court’s goal is to establish the doctor’s guilt or innocence, not to establish the truth.

By contrast, our goal as scientists is to establish the truth. Yet we too have constraints on what we admit as data in pursuing that truth. Data often are inadmissible because of concerns about bias. But what I find interesting is that different fields worry about different types of bias and, as a result, rule different types of data out of court.

Every field constrains the data that it is willing to take seriously. For example, in psychological science, we typically favor situations where we have sufficient data on each individual and sufficient numbers of individuals to ensure that we have enough power to detect an effect of the size we are testing. In contrast, in linguistics, a single counterexample — if it directly violates a prediction — not only counts as data but can substantially weaken a linguistic theory. Psychological scientists typically don’t give single observations much weight, and even case studies of a single individual are less acceptable. But note that if there are enough observations of a single individual to analyze that individual’s data as a system unto itself (as in psychophysics), data from a small number of individuals are taken seriously. Moreover, many observations of a single individual can be theoretically important if the point of the research is not to generalize, but to make an existential claim. For example, we only need data from one child to argue that a child who is not exposed to language can introduce linguistic structure into his or her

communications (although we need enough data from that child to be certain that there is linguistic structure in his communications — a single instance in this case won’t do, e.g., Goldin-Meadow, Butcher, Mylander, & Dodge, 1994).

In 2006, Tanya Luhmann, an anthropologist now at Stanford University, and I taught a course at the University of Chicago called “What counts as data?” Our goal was to explore the systematic differences in the kinds of data that anthropologists and psychologists think need to be accounted for. We were ideal coteachers for this task: Luhmann is an anthropologist who uses psychological methods to test her hypotheses, and I am a psychological scientist who devotes much of my research life to observing behavior in naturalistic and unconstrained contexts (although I do feel it essential to develop coding schemes that allow me to make quantitative assessments of the behaviors I observe). The course focused on specific topics that the two fields have approached differently. For example, we looked at memory, which, in psychological science, is typically considered an individual phenomenon that happens largely inside our heads, and the data relevant to memory research typically stay within these bounds (e.g., Roediger & Gallo, 2005). In contrast, Cole (2001), an anthropologist, focused on why a community in Madagascar might appear to forget a punishing part of its history and, in so doing, enlarged the phenomenon of memory — and the relevant data — to include its social dimension.

More generally, an anthropological approach produces findings that reflect the informant’s perspective and are grounded in cultural validity. The resulting thick description of human behavior in context is an excellent way to generate grounded hypotheses that have face validity. But a psychological approach provides a precision of measurement and control that makes broader generalizations and comparisons possible across groups and across studies, and enables the exploration of implicit knowledge that violates cultural understandings (for discussion, see Gaskins, 1994; Astuti & Harris, 2008). Moreover,



documenting a quantifiable basis for our claims sets the stage for being able to use statistics to examine the strength of cross-group similarities or differences, and to explore mechanism.

Luhrmann's research on the Evangelical relationship with God is a good example. Using anthropological tools in her book, *When God Talks Back*, Luhrmann (2012) talks with people who say that they hear God speak to them. Some even develop an intimate relationship with God and put out an extra cup of coffee for Him. Having described the phenomenon of close personal relationships with God using anthropological methods, Luhrmann then turned to psychological methods to explore a mechanism by which people can achieve this intimacy with God, a mechanism that underlies prayer and that she calls absorption (Luhrmann, Nusbaum, & Thisted, 2010). Taking both an anthropological and a psychological approach to a problem adds a depth of significance, validity, reliability, and robustness to a research program that neither approach can guarantee on its own.

With the burgeoning tools available in psychological science, the issue of what counts as data comes to the fore even within our own field. Allowing different kinds of data to count in psychological science gives us ways to test a hypothesis using multiple approaches and thereby strengthen our conclusions.

What I am advocating is a respect for converging operations — for being open-minded (and clear) about the methods we use, and recognizing that different fields may, at times, come to different conclusions because they are looking at different data. ●

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Susan Goldin-Meadow will host the Presidential Symposium, "Sense and Sensibility: How Our Bodies Do – and Don't – Shape Our Minds," at the 2017 APS Annual Convention, May 25–28, in Boston.

THANK YOU TO OUR ICPS SPONSORS



American Academy of Arts & Sciences Elects 9 Psychological Scientists as Fellows

The American Academy of Arts & Sciences has elected APS Treasurer **Roberta L. Klatzky**, APS James McKeen Cattell Fellow **J. Frank Yates**, APS Fellow **Mary C. “Molly” Potter**, and several other psychological scientists as fellows, including them in a prestigious cadre of scholars and practitioners from academia, business, and government. These new fellows include:

Klatzky, a professor at Carnegie Mellon University in the psychology department, the Human-Computer Interaction Institute, and the Center for the Neural Basis of Cognition, is renowned for her research in cognition and perception. Using both real and virtual environments, Klatzky has examined how we think about and perceive our spatial environments. Her findings have contributed to the development of programs in image-guided surgery, telemanipulation, navigation aids for the blind, and neural rehabilitation.

Yates, a professor of psychology and marketing at the University of Michigan, researches judgment and decision-making, focusing specifically on cross-cultural variation, affective forecasting, and applications of cognitive psychology to improve judgement accuracy and decision-making.

APS Fellow **Russell H. Fazio**, the Harold E. Burt Professor of Psychology at The Ohio State University, studies attitude formation, attitude change, and social cognition, specifically targeting the relationship between attitudes and behavior. Fazio applies his research to the study of emotional disorders, political psychology, racial prejudice, and much more.

APS Fellow **Edmund W. Gordon**, professor emeritus at Yale University and Columbia University as well as director emeritus of the Institute for Urban and Minority Education at Teachers

College, Columbia University, is known for his many contributions to clinical and counseling psychology.

APS Fellow **Megan R. Gunnar**, Distinguished McKnight University Professor and Director of the Institute of Child Development at the University of Minnesota, specializes in developmental processes, investigating how children and adolescents regulate stress and emotions.

Potter, professor emerita at the Massachusetts Institute of Technology, is an expert in the rapid processes involved in perceiving, comprehending, and remembering meaningful information in words, sentences, and pictures.

APS Fellow **Eldar Shafir**, a professor in behavioral science, public policy, psychology, and public affairs at Princeton University, researches decision-making, cognitive science, and behavioral economics. He was a member of President Barack Obama’s Advisory Council on Financial Capability and is currently Vice-Chair of the World Economic Forum’s Global Agenda Council on Neuroscience & Behaviour.

APS Fellow **Michael Tomasello**, a professor of psychology and neuroscience at Duke University, studies social cognition, social learning, cooperation, and communication from developmental, comparative, and cultural perspectives.

Robert T. Knight, a professor of psychology and neuroscience at the University of California, Berkeley, studies attention, memory, neuropsychology, neurophysiology, and cognitive neuroscience. His lab uses fMRI and behavioral techniques to study patients with frontal-lobe damage, seeking to understand mechanisms of cognitive processing.

APS Among Partners in March for Science

Thousands of people, many wearing knitted “brain” caps, braved persistent rain on April 22 to participate in the flagship March for Science, held on the National Mall in Washington, DC. APS was one of many scientific organizations serving as partners for the event, as well as for satellite marches around the world.

The march represented the first step in the global movement to defend the vital role science plays in everyday life, including in health, safety, economies, and governments.

APS joins such organizations as the American Association for the Advancement of Science, Society for Neuroscience, Consortium of Social Science Associations, Union of Concerned Scientists, and dozens of others in partnering with the organizers of the event.



Photo by Lucy Hyde, APS Staff

Cohosted with the Earth Day Network, the march and preceding rally were a call for the implementation of science-based policies, as well as a public celebration of science and the enormous public service it provides in our democracy, our economy, and our daily lives.

The march continues at www.marchforscience.com.

APS Fellows Elected to National Academy of Sciences

Five APS Fellows, including APS Past President **Henry L. “Roddy” Roediger, III**, have been elected to the National Academy of Sciences (NAS) in recognition of their distinguished and continuing achievements in original research.

APS Fellows **Baruch Fischhoff**, **Robert M. Seyfarth**, and **Michael Tomasello** are also among the 84 newly elected members, and APS Fellow **Gergely Csibra** has been elected an NAS foreign associate.

Election to NAS is one of the highest honors in science, with members serving as advisors to the nation on science, engineering, and medicine. Each year, current NAS members elect a new class of scientists to join their ranks. The psychological scientists elected in 2016 included APS William James Fellows **Hazel R. Markus** (Stanford University) and **Steven A. Pinker** (Harvard University); APS Fellows **Jennifer L. Eberhardt** (Stanford University) and **Paul Slovic** (University of Oregon and the nonprofit organization Decision Research); and Nobel Laureate **John O’Keefe** (University College London).

Roediger, the James S. McDonnell Distinguished University Professor of Psychology at Washington University in St. Louis, has spent his career studying human learning and memory, particularly those processes involved in memory retrieval. His recent research has focused on the power of retrieval as a mechanism for improving learning and retention and the potential for applying this work to educational settings. In addition to serving as APS President from 2003 to 2004, he is a recipient of the APS William James Award for his lifetime of intellectual contributions to the basic science of psychology.

“I was surprised to receive the telephone call with the news,” Roediger said about being elected to NAS. “This is a wonderful honor.”

Fischhoff, a renowned expert on risk perception and analysis, is the Howard Heinz University Professor in the Department of Engineering and Public Policy within the Institute for Politics and Strategy at Carnegie Mellon University. He is perhaps best known for his work developing the first experiment that directly tested hindsight bias — the cognitive bias that leads people to overestimate their ability to have predicted an outcome that could not possibly have been anticipated.

Seyfarth, a University of Pennsylvania psychology professor, studies the social behavior, vocal communication, and cognition of animals in their natural habitats. His research aims to clarify the differences between nonhuman primate communication and human language, explore the adaptive value of primate social relationships, and examine the cognitive mechanisms that underlie close social bonds.

Tomasello, codirector of the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany, and professor of psychology at Duke University, takes a variety of perspectives — from developmental to comparative to cultural — to investigate social cognition, social learning, cooperation, and communication in human children and great apes.

Csibra, a professor in the Department of Cognitive Science at the Central European University in Budapest, employs various behavioral and neuroimaging methods to study how infants understand actions, social exchanges, and mental states, and also how they learn from others.



Facts. Accuracy. Truth They’ve Never Been More Important

More than 3,300 psychological scientists and their students have joined the **APS Wikipedia Initiative (APSWI)**.

Students are learning about scientific writing by improving Wikipedia articles about psychological science instead of writing traditional research papers.

Get Started With Your Class

For classroom resources, APS has partnered with the WikiEd Foundation. For more information, visit www.psychologicalscience.org/apswi



APS Journal on Research Practices and Methods Launches

APS's new journal devoted to research methods and practices now has an editorial team in place and will be accepting submissions in May.

Advances in Methods and Practices in Psychological Science (AMPPS) is APS's sixth journal. AMPPS will be published quarterly, initially both in print and online, and will also use the "Online First" publication practice employed by other APS journals. The first issue will appear in early 2018.

Daniel J. Simons (University of Illinois at Urbana–Champaign) has been named Editor-in-Chief of the new publication, and has assembled a team of Associate Editors that includes **Pamela Davis-Kean** (University of Michigan), **Alex O. Holcombe** (University of Sydney), **Michael Inzlicht** (University of Toronto), **Frederick L. Oswald** (Rice University), **Jennifer L. Tackett** (Northwestern University), and **Simine Vazire** (University of California, Davis). (Vazire is also an APS Board Member.)

AMPPS also will be served by an advisory council of scientists who represent the extensive spectrum of research interests and methods of the APS membership. The advisory council will provide guidance and suggest topics for the publication, and includes **Dorothy V. Bishop** (University of Oxford), **Anna Brown** (University of Kent, United Kingdom), **Lorne Campbell** (University of Western Ontario), **Chris Chambers** (Cardiff University, United Kingdom), **Charles Randy Gallistel** (Rutgers University), **Ellen Hamaker** (Utrecht University, the Netherlands), **Moritz Heene** (Ludwig Maximilians University of Munich), **Alison Ledgerwood** (University of California, Davis), **Betsy Levy Paluck** (Princeton University), **Russell A. Poldrack** (Stanford University), **Victoria Savalei** (University of British Columbia), **Yuichi Shoda** (University of Washington), **Barbara A. Spellman** (University of Virginia), **Sanjay Srivastava** (University of Oregon), **Eric-Jan Wagenmakers** (University of Amsterdam), and **Rolf A. Zwaan** (Erasmus University Rotterdam). (Gallistel is APS Past President.)

Submission guidelines are available on the APS website at psychologicalscience.org/ampps. The editorial scope of the journal will encompass the breadth of psychological science, with editors, reviewers, and articles representing a balance among diverse disciplinary perspectives and methodological approaches.

Consistent with APS's mission, AMPPS also will bridge and integrate conversations on scientific best practices in various areas of psychological science, including practices that can apply across subfields, from clinical to social to neuroscience. It also will make methodological advances available and accessible to the full range of APS members, not just expert methodologists and statisticians, Simons noted.

"Experts likely will find the contents interesting, but the primary audience will be the broad spectrum of psychological scientists: people who want to improve their own research practices and are looking for resources to help them do so," he said.

APS President **Susan Goldin-Meadow** said the journal will strive to be the leading resource for peer-reviewed, widely accessible information and insights on research methods and practices.

"We're proud to be in the vanguard of the changes that are taking place in our field," Goldin-Meadow

said. "AMPPS marks a momentous step forward in APS's commitment to promoting strong research practices, innovative methodologies, and open science."

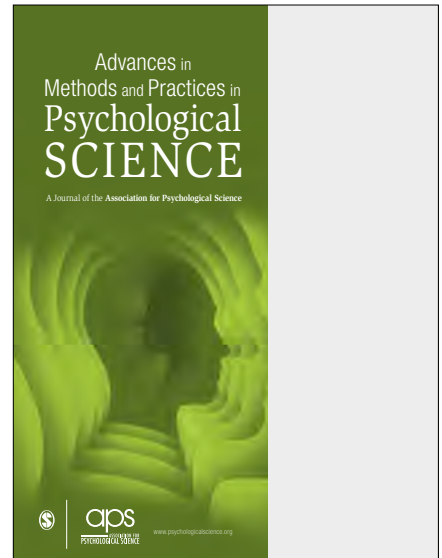
AMPPS will have two main sections. The Empirical section will include new research adopting innovative methodological approaches. APS's Registered Replication Reports (RRRs) — large-scale, multicenter replications of important findings aimed at giving more precise estimates of effect sizes — will migrate from *Perspectives on Psychological Science* to this section of AMPPS. Other forms of multilab collaborations will be published in the journal as well. The Research Practices section will include tutorials, metascience papers, simulation and modeling papers, commentaries, information about new research tools, debates about best practices, and more. Occasional special sections with commentaries, debates, and other articles also are planned.

AMPPS is the latest in a series of initiatives that APS has taken in recent years to strengthen research practices. In addition to the RRRs, these include:

- awarding badges in recognition of open science practices in *Psychological Science* and *Clinical Psychological Science*, an incentive now being adopted by other scientific journals; and
- signing onto the Transparency and Openness Promotion TOP guidelines, a multidisciplinary initiative to promote open science practices in all areas of scientific research.

AMPPS will take those efforts further by serving as a go-to source for information and insights about improving standards and approaches to empirical research.

"This journal will be unique in the field, will complement APS's existing journals, and will reflect APS's leadership in strengthening psychological science findings through innovation and change," said APS Executive Director **Sarah Brookhart**.



2017 APS Mentor Awards

The APS Mentor Award recognizes those who have fostered the careers of others, honoring APS members who masterfully help students and others find their own voices and discover their own research and career goals. Four psychological scientists have been selected to receive the 2017 APS Mentor Award.



David M. Buss
The University of Texas at Austin

David M. Buss, one of the founders of the field of evolutionary psychology, has mentored graduate students for more than 3 decades at Harvard University, the University of Michigan, and the University of Texas at Austin. He is renowned among his graduate students for the time, effort, and enthusiasm

he invests in them. Roughly 70% of his graduate students have attained tenured or tenure-track positions at institutions ranging from high-powered research universities to small elite liberal arts colleges. Many have gone on to distinguished careers in psychology and are themselves mentoring graduate students, and three have become Chairs of their psychology departments.

An APS Fellow, Buss has written, cowritten, and edited nine books on various topics in the discipline, including human mating strategies, individual differences in personality, sexual conflict, and power dynamics. He has published more than 300 scientific articles. Buss received his PhD in psychology from the University of California, Berkeley, and took professorships at Harvard University and the University of Michigan. He currently chairs the Individual Differences and Evolutionary Psychology Area at the University of Texas.

Buss's mentorship style places tremendous value on high-quality hypothesis generation.

"In his graduate seminar he held a contest each year in which students worked to generate a new hypothesis, which they presented in class," Martie Haselton, a former student of Buss and now professor at University of California, Los Angeles, says. "The students then voted on the best hypothesis and David awarded the winner with a recent science book on a timely topic. One student went on to pursue the idea developed in David's class as a focus of his career!"

Buss also places tremendous value on developing the writing and communication skills of his mentees. "David provides extraordinary feedback on students' drafts of papers, both suggesting possible edits and explaining the reasons why the edits improve the paper, thereby helping us to apply the advice to our future writing," Haselton says. "My first big research paper must have gone through three dozen drafts (yes, that many!). But it paid off."

And Buss emphasizes the critical importance of replication using different samples, different cultures, and diverse

methods — especially important given the current replication crisis in some areas of psychology. Former students have gone on to conduct exceptional cross-culture research projects, deploy tightly-conducted laboratory experiments, and link hormonal assays with human mating strategies (e.g., Haselton).

Although he is passionate about his field of expertise, Buss has welcomed people from a wide range of backgrounds into his lab. While she was a PhD student in anthropology at the University of Texas, Sarah E. Hill, now an associate professor of psychology at Texas Christian University, discovered the program was not a good fit for her. She sought out alternative classes while she figured out what she wanted to pursue, and eventually settled on Buss's evolutionary psychology graduate seminar after reading his evolutionary psychology book in an undergraduate anthropology course.

"His textbook had fundamentally changed my way of seeing the world and I couldn't believe my good fortune to have the opportunity to take a class with the man who wrote it. This turned out to be a pivotal moment in my life," she remembers. "I owe David a debt of gratitude for being willing to take a chance on me and allowing me (a wayward anthropologist with no psychology background) to join his lab."

Buss also is known for holding his graduate students to high standards.

"I will never forget the insightful and inspiring comments he made on [a particular] paper, including an invitation to work together and collect data to test the ideas (our work was eventually published as sexual strategies theory)," David P. Schmitt, now Caterpillar Inc. Professor of Psychology at Bradley University, recalls. "He culminated his comments on my term paper with the phrase, 'there is much work to be done.' That phrase gave me chills, and it changed my life."

Perhaps one of the most impressive aspects of Buss's mentorship style is his encouragement of students to build their own research program rather than following strictly in his footsteps. His mentees say they appreciate his faith in their development and pursuit of rigorous projects using methodologically sound methods.

Buss "doesn't coddle his students — he sets high expectations for them to develop important ideas themselves, but provides the feedback and guidance to bring those ideas to fruition," writes Cari Goetz, assistant professor of psychology at California State University, San Bernadino. "That experience of having to build my own research program from scratch as a graduate student has molded me into an independent researcher."

As APS Fellow Michael Domjan, professor of psychology at the University of Texas at Austin, wrote in his nomination letter, “One cannot attract graduate students to an emerging field without also nurturing excitement for the discipline among undergraduates. Buss has been a master at doing that.”

Buss’s key textbook, *Evolutionary Psychology: The New Science of the Mind*, now in its 5th edition, has inspired undergraduates and graduate students alike. Buss sees the future of the field as resting with nurturing the talent of the young. He envisions continuing to mentor graduate students in the foreseeable future, and currently maintains an active lab inhabited by four promising graduate students.



Phoebe C. Ellsworth *University of Michigan*

APS James McKeen Cattell Fellow Phoebe C. Ellsworth is a leading scientist in the field of emotion. She is one of the originators of the appraisal theory of emotion, which postulates that emotions are made up of people’s appraisals of their situation along clearly specified dimensions, and that changes in emotions correspond

to changes in appraisals. The theory has been applied to individual and cultural differences, evolutionary psychology, neuroscience, and more. She has also applied psychological science to the practice and understanding of law and the US criminal justice system. Her influential research on jury decision-making, attitudes toward capital punishment, and the relation between social science and law have had long-lasting, real-world impacts on the understanding of how people are affected by the law. Ellsworth, the Frank Murphy Distinguished University Professor of Law and Psychology at the University of Michigan (UM), has earned many accolades as a researcher and extensive praise as a mentor.

“Graduate school in Social Psychology at the University of Michigan starts and ends with Phoebe Ellsworth,” says Patricia Chen, an assistant professor at the National University of Singapore and advisee of Ellsworth. “Precocious first-years begin their methodological training as social psychologists under her wings; dissertating last-years bring their job market aspirations along with their insecurities to her job outplacement class. And in between, Phoebe has played the role of advisor, mentor, lecturer, consultant, and counselor to numerous students who have walked through the halls of our department.”

Ellsworth has been teaching and mentoring graduate students since 1972 at Yale University, Stanford University, and UM. Her advisees have advanced in their careers to positions at Harvard University, The University of Chicago, the Office of Policy and Strategy at the US Citizenship and Immigration Service, the Michigan State University College of Law, the National University of Singapore, and more. Described as being able to cite a Wil-

liam James passage, a book from the 1960s, and a relevant article published in *Psychological Science* as recently as last week and all within 5 minutes, Ellsworth is regarded by her advisees as one of the most knowledgeable researchers in the field.

Igor Grossmann, now an associate professor of social psychology and the University of Waterloo, Ontario, Canada, says Ellsworth is known for her warmhearted approach to mentorship and teaching. Grossmann writes that he has heard from many students, including a large number of international students, that Ellsworth has supported intellectual development while also helping many students work through concerns that often do not have simple answers.

“I believe this norm of getting ‘Phoebe’s advice’ was established way before she became a program chair and — as I have recently heard from the current UM students — it continues until the present day,” Grossmann says.

Ed O’Brien, a former Ellsworth advisee and now an assistant professor at The University of Chicago Booth School of Business, describes a unique quality about Ellsworth’s temperament and advice: her ability to listen. “It sounds simple but it’s so rare in academia,” he adds. In a world where “everybody seems to want to talk the loudest and sound the smartest,” Ellsworth listens to her advisees and asks about their research and their personal lives, showing a true investment in the both their academic studies and their growth as human beings.

“What amazes me most about Phoebe is that her treatment of me isn’t unique,” he continues. “I would leave her office and the next student would pop in, and hours later they would be laughing and chatting and looking at new data.”

Stephanie J. Rowley and Fiona Lee, both of the University of Michigan, Ann Arbor, say that “Dr. Ellsworth is the rare type of mentor who allows young scholars to express [feelings] of inadequacy, and amazingly turns [those] feelings into energy for generating exciting questions and research avenues.”

Despite being a renowned and prolific researcher, Ellsworth has not forgotten what it is like to be a struggling graduate student and is always willing to help, her advisees attest.

Ellsworth “is a role model for all of us,” Rowley and Lee conclude, “and her mentoring excellence has created a more supportive mentoring climate for the entire department and profession.”



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Randall W. Engle
*Georgia Institute of
 Technology*

Over the past few decades, psychological science research has expanded dramatically, resulting in ever-increasing choices for graduate students seeking opportunities both inside and outside of academia. Although working in labs and publishing articles are important components of this process, so,

too, is networking with peers who might be interested in future collaborations or discussions about research. APS Fellow Randall W. Engle understands the importance of such interactions, and one of his goals as a mentor is to ensure that his students are always able to make as many connections as possible. In his nomination letter, APS Fellow Michael J. Kane, professor of psychology at the University of North Carolina at Greensboro, notes that Engle's foremost motivation is to see his students succeed professionally, "regardless of whether it is as an academic in a teaching-oriented college, in a high-pressure research university, or in an industrial lab setting."

Engle, a first-generation college graduate who received his PhD from The Ohio State University, is attuned to the fact that taking such initiative does not come easily to everyone. Kane lauds Engle's efforts to bring his graduate students to conferences and to adequately prepare them for the experience: "Before departing, Randy provides them with concrete lessons on how to meet and get to know people in the student's area of interest. He teaches them, explicitly, how to actually approach someone to begin a conversation, the types of questions to ask, and how to follow up with an email after the meeting."

On his website, Engle notes that as an undergraduate he focused almost as much on zoology and math as on psychology, and suggests that this unique combination of study areas led him to a research career in experimental psychology. APS Fellow David A. Balota, Professor of Psychological & Brain Sciences and Professor of Neurology at Washington University in St. Louis, believes Engle's own career trajectory influences his encouragement of students to pursue their own interests. "I eventually did a dissertation that was relatively far afield from Randy's interest, but he fully supported this work and was very helpful in all aspects of the dissertation process," writes Balota. "Clearly, Randy was remarkable in nurturing my research interests and development as an independent researcher. I should note that when Randy and I overlap at conferences, I can see these traits continuing. ... Randy often seems like a proud parent."

Like most accomplished academics, Engle has a busy schedule to maintain (among other things, he is Editor of the APS journal *Current Directions in Psychological Science*). Nevertheless, his students remember him as someone who took the time to foster their professional development and who generously shared his own research experiences. Anne

C. McLaughlin, director of the Learning, Aging, & Cognitive Ergonomics Lab at North Carolina State University, writes, "I'm astonished at how much effort and time he put into mentoring. He genuinely seemed to enjoy hashing out research designs [and] interpreting outcomes, [giving] me access to his database of pretested low- and high-working-memory capacity research participants, and freely [sharing] the measures he developed in his lab." This generosity extends outside of the lab to his inclusion of students at conferences; another letter writer noted that he not only prepares his mentees in advance but takes time during the meeting itself to introduce them to others with similar lines of research.

Engle goes above and beyond with his mentorship by giving his students — and students outside his lab who often seek him out — thoughtful and wide-ranging career advice. Thomas S. Redick, head of the Purdue Applied Cognition Lab, remembers that Engle was "a fantastic source of information about nonscholarship topics, including applying and interviewing for jobs, navigating through department politics, and searching for funding avenues." Balota adds that Engle continues to take an interest in his career: "The mentoring clearly did not stop at the end of graduate school. I have asked for his advice over the years, and I know he has been supportive of my career."

Former students also praised Engle's commitment to a sound, methodologically rigorous science and the importance he placed on good writing. Redick writes, "Randy's directness, his honesty, is probably what I appreciate most about him — you always know where you stand with him. That meant when he returned a manuscript to me with feedback that it wasn't my strongest work, I knew he truly thought I could do better." This aspect of his mentorship, while perhaps daunting for young graduate students, served them well in the long run; Redick added that when Engle suggested he apply for a prestigious academic position, he knew it meant Engle thought he was up to the job.

In all, Engle's mentees paint a picture of a caring, generous, and exacting adviser who always keeps his students' long-term goals in mind while still managing to focus on their current projects. In this role, he contributes invaluable resources to future psychological scientists.

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Paul L. Harris
Harvard University

APS Fellow Paul L. Harris is one of the world's most recognized theoreticians and researchers in developmental psychology. His work examines children's understanding of their own emotions and the critical role of imagination in children's cognitive development. He currently is studying whether children rely on

their own observation or trust instead what others tell them, as well as when and how children become aware of conflicting information.

In letters supporting his nomination for the award, Harris's former students and mentees consistently point to his honesty, openness, and his generosity of time.

"From seemingly simple things like answering every single email I have ever sent him, to providing consistently insightful and incredibly constructive feedback on countless drafts of our papers, he has proved to be exactly the kind of exceptional mentor he is reputed to be," writes APS Fellow Cristine Legare, a cognitive scientist at the University of Texas at Austin who first sought Harris's help on a research project in 2007.

APS Fellow Melissa A. Koenig, who directs the Early Language and Experience Lab at the University of Minnesota's Institute of Child Development, recalls her experience seeking Harris's assistance when she, while preparing for her dissertation, was developing a postdoctoral research proposal for the National Institutes of Health.

"Paul responded immediately with enthusiasm and, from there, we began a collaboration that has been the most fruitful,

encouraging, and stimulating of my career," Koenig says in her letter of support.

Mentees remarked on the indispensable guidance Harris provided in improving their writing. They describe him as an exacting editor who provides not only broad, conceptual comments but also line edits focusing on word choice.

"Paul has immense editorial skills that he used on any piece of writing that I submitted," says APS Fellow Denis Mareschal, a former student of Harris and now codirector of the Centre for Brain and Cognitive Development at Birkbeck, University of London. "However preliminary they might have been, all my drafts were carefully edited for clarity and readability. This was invaluable in helping me hone my scientific writing skills, but also clearly demonstrated that he devoted considerable time to the material that I produced."

All of the scientists who wrote letters in support of the nomination credit Harris with inspiring their mentoring approaches with their own students.

"The fact that Paul's approach to mentorship is being emulated across the world highlights Paul's remarkable impact on the development of young scholars," Koenig and Boston University scholar Kathleen H. Corriveau note in their letter.

Many of Harris's mentees also describe his guidance as thoughtful and reverent.

"As a student of Paul's, there is an inescapable truth with which you are routinely confronted: You are worthy of respect," wrote Marc de Rosnay, a Senior Lecturer at the University of Sydney, who was Harris's supervisee at both the University of Oxford and at Harvard University. "Paul's conduct and attitude have an insidious and pervasive effect ... it infuses the expectations that you hold for yourself. It also trickles down across generations as you try to emulate such standards for your own students." ●



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2017 APS Janet Taylor Spence Awards for Transformative Early Career Contributions

Five psychological scientists whose research aims to illuminate some of the most fundamental aspects of human life — from romantic relationships to moral judgment, from eating behavior to cognitive development — have been awarded the 2017 APS Janet Taylor Spence Award for Transformative Early Career Contributions. Their areas of study may span many lines of inquiry, but these researchers share a unique talent for bridging disciplinary boundaries, using various methodological approaches to investigate their questions through an integrative lens.

The Janet Taylor Spence Award, named for APS's first elected president, recognizes early-career scientists whose cutting-edge work promises to advance psychological science. This year's recipients spoke with APS about their ongoing investigations, the events that led them to research in the first place, and the questions they hope to answer in the future. The awards will be presented at the 2017 APS Annual Convention, May 25–28, in Boston, Massachusetts. To view the full award profiles, visit www.psychologicalscience.org/r/spence-2017.



Paul Eastwick University of California, Davis

pauleastwick.com

My research investigates the process of romantic relationship initiation and the manner in which relationships unfold and develop over time. The process by which two people shift from complete strangers to romantic partners has always fascinated me. Yet historically, it has been challenging to study the relationship arc in its entirety — from the first interaction through the process of initiating and then maintaining the relationship across time. It seemed to me that a good way to begin bridging that divide was to bring together the evolutionary psychological literature (much of which examined initial attraction) and the literature on close relationships (much of which examined relationship maintenance).

These days, I am working on two primary lines of research. The first examines relationship trajectories across time and attempts to identify the factors that differentiate long-term from short-term relationships; the second area of study examines the structure and function of people's preferences for particular qualities in romantic partners. At a broad level, my work strives to build connections between the fields of close relationships and evolutionary psychology.



Kimberly Noble Teacher's College, Columbia University

em3177.wixsite.com/needlab

My research aims to understand how socioeconomic inequality relates to children's cognitive and brain development. This work takes a developmental framework, examining both neural and cognitive development across infancy, childhood, and adolescence. Our lab is particularly interested in (1) understanding the developmental origins of social and economic disparities in cognition and brain structure and function, as this has critical implications for *when* to screen and intervene, and (2) the modifiable environmental experiences that account for these disparities, as this has critical implications for *how* to screen and intervene.

Our 2015 *Nature Neuroscience* paper was the largest study to date to examine socioeconomic disparities in brain structure. This work received a good deal of attention in the popular press — it was fun to see my work shared on social media by friends who didn't know it was mine! More importantly, this paper propelled issues regarding inequality and the brain into the national spotlight, and provided the opportunity to reach the public and policy makers in new ways.



A. Janet Tomiyama University of California, Los Angeles

dishlab.org

I study why we eat. Hunger — the obvious reason — is actually one of the least important causes of eating, which I find fascinating. My lab focuses on two main drivers: stress and weight stigma. We take a biobehavioral approach, meaning we care equally about the biology of people (e.g., metabolic health, stress hormones) and their behavior (e.g., dieting, comfort eating). I want to find ways for people to eat healthy without being tortured about it — that is, avoiding the agony of dieting and going ahead and doing a little comfort eating, but in a healthy way. I also want to find a way to eradicate the antifat attitudes that are running rampant in today's society.

I am very proud of my NSF CAREER grant. It funds my research on weight stigma for 5 years, but equally importantly, it funds a summer research intensive program for underrepresented minority students at community and 2-year colleges. These students are rarely exposed to psychological research, and the program also provides career development training. We need to get more underrepresented students into the research pipeline, and hopefully this program will help.



Elliot Tucker-Drob

The University of Texas at Austin
labs.la.utexas.edu/tucker-drob

I study individual differences in psychological development, particularly in the areas of cognitive ability, academic achievement, personality, and psychopathology. My work combines approaches from developmental psychology, psychometrics, behavioral genetics, and human ecology. I have long been interested in dynamic feedback processes by which individuals sort themselves into different environments on the basis of their interests, aptitudes, and proclivities, that in turn affect their trajectories of psychological development. In the future, I hope to more precisely chart these dynamic processes.

When we arrived at the University of Texas in 2009 for our very first jobs, Paige Harden and I came up with the ambitious idea of starting a large-scale multivariate multimodal twin study of child and adolescent development. Somehow, we were successful: We started the Texas Twin Project. To date, we have collected a wealth of detailed, multivariate in-laboratory data from a racially, ethnically, and socioeconomically diverse sample of approximately 2,000 individual twins. Data from the Texas Twin Project has served as the basis for several important papers.

Photo credit: Gary Gilbert



Liane Young

Boston College
moralitylab.bc.edu

The overarching aim of my research program is to understand the psychological processes that guide human moral judgment and behavior across distinct social contexts. Much of the work I currently do with my students and collaborators focuses on qualitative and quantitative differences in how people deploy Theory of Mind across different social and moral contexts. My research group has become deeply interested in moral cognition in context (i.e., the contexts of cooperation vs. competition, the contexts of ingroup vs. outgroup interaction). We are exploring which features of mental states are differentially encoded by the social brain across such fundamental contexts. In another line of work, we are interested in characterizing when ingroup violations are

more unexpected and more salient, and perhaps elicit more punishment, compared with outgroup violations, and, on the flip side, when ingroup violations are discounted, consistent with accounts of automatic ingroup bias. We also want to know whether this depends on the nature of the norm violation. ●



Teaching of Psychology

Editor: Andrew N. Christopher, *Albion College*



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Revision to the Common Rule

Implications for Behavioral and Social Sciences Research

By William T. Riley and Farheen Akbar

Much has changed about the conduct of research in the past quarter century, including the expansion of biospecimen collection for genetics and various assays, the rapid proliferation of consumer technologies used to obtain research data, the increase in data repositories and digital records to facilitate data sharing and integration, and the growing role of the research subject as an actively involved participant in research. The evolving nature of research was a catalyst for the revision of the Federal Policy for the Protection of Human Subjects (federalregister.gov/documents/2017/01/19/2017-01058/federal-policy-for-the-protection-of-human-subjects), also known as the Common Rule, originally promulgated in 1991.

The revised Common Rule becomes effective on January 19, 2018, although one key provision, the mandate for using a single institutional review board (IRB) in cooperative research, takes effect 2 years later. Highlighted here are some of the key changes in exemptions and in the IRB and consent procedures of the revised Common Rule that are particularly relevant to behavioral and social sciences researchers. We refer to the Common Rule that is still in effect today as the “pre-2018 Common Rule.”

Expanded Exemptions Categories

One of the most significant changes in the revised Common Rule is the expansion of categories of human research exempt from IRB review. Under some exempt categories, limited IRB review would be required to ensure there are adequate privacy safeguards for potentially identifiable information, but these revised and expanded exempt categories have important implications for behavioral and social sciences research.

Nearly all of the prior exempt categories from the pre-2018 Common Rule are maintained with some revisions, including research conducted in educational settings (§____.104(d)(1)),* research involving surveys, interviews, observation of public behavior, or educational tests (§____.104(d)(2)), research and demonstration projects examining public benefit or service programs conducted or supported by a federal department or agency for program evaluation purposes (§____.104(d)(5)), and taste and food quality evaluation and consumer acceptance studies (§____.104(d)(6)). Although most of the revisions to these exemption categories are minor, behavioral and social

sciences researchers engaged in these categories of research should familiarize themselves with the revised Common Rule language.

Another set of exempt categories involves secondary use of identifiable data. The pre-2018 Common Rule limits this exemption to existing data that are either publicly available or recorded in a manner in which subjects cannot be identified. Under the revised Common Rule, this exemption is expanded. Secondary research involving information regulated under the Health Insurance Portability and Accountability Act (HIPAA) is exempted. Research conducted by or on behalf of a federal department or agency, involves the use of information gathered by a federal department or agency for nonresearch activities, and is subject to federal privacy protections, also is exempted (§____.104(d)(4)). Two new exemptions require limited IRB review for secondary research use of identifiable information in which broad consent is obtained and there is no plan for return of results to subjects, unless required by law (§____.104(d)(8)), and for the storage and maintenance of this information (§____.104(d)(7)) for secondary research use. The definitions of “identifiable private information” and “identifiable biospecimens” are to be reviewed by federal departments or agencies at least every 4 years to keep pace with changing technical capabilities for identification. These exemptions expand the ability of behavioral and social sciences researchers to use existing data sets for their research.

The new and most relevant exemption for behavioral and social scientists is the exemption for research involving benign behavioral interventions on adult subjects, in which the subject prospectively agrees to the intervention and information collection (§____.104(d)(3)). The Rule defines benign behavioral interventions as “brief in duration, harmless, painless, not physically invasive, not likely to have a significant adverse lasting impact on the subjects” (§____.104(d)(3)(ii)). The investigator also must have no reason to think the subjects will find the intervention “offensive or embarrassing.” Research that uses deception as to the nature or purpose of the research is not considered exempt unless the subject authorizes the deception. The data collected also must be limited to verbal or written responses (including data entry) or audiovisual recording and be protected by safeguards approved under limited IRB review if the information identifies the subjects and is potentially sensitive. Under the pre-2018 Common Rule, many laboratory-based studies that manipulated an independent variable (e.g., studies of cognition, attitudes, learning) would have required IRB review, which often could be expedited. Under the

William T. Riley earned his PhD in Clinical Psychology from Florida State University and has been Director of the Office of Behavioral and Social Sciences Research (OBSSR) since August 2015. **Farheen Akbar** leads the Policy and Evaluation team at OBSSR. They can be reached via apsobserver@psychologicalscience.org.

revised Common Rule, these studies now can be exempt from IRB review. That said, behavioral and social scientists should continue to adhere to ethical guidelines of their respective disciplines and, if in doubt as to whether the proposed study meets this benign behavioral intervention exemption, seek consultation from their IRB or other designated institutional official.

New IRB and Informed Consent Revisions

The revised Common Rule includes revisions of IRB and informed consent processes that should facilitate the increasing complexities of modern behavioral and social sciences research while protecting participants. One change, mentioned previously, is the addition of broad consent for secondary research usage (§____.116(d)). The broad consent can be used as a stand-alone consent or in conjunction with seeking consent for a specific study. This broad consent should facilitate data sharing and integration consistent with open science initiatives and leverage the data obtained from participants for more than the specific study for which it was collected. The revised Common Rule has a number of specific requirements that must be met (e.g., the need to specify the time period for use [which could be indefinite], the right to discontinue participation, the types of data included, the need to be informed about future research and return of results) when seeking broad consent, which behavioral and social sciences researchers should be aware of if they are to consider broad consent in their study.

The second relevant revision is the requirement to use a single IRB for certain multisite or cooperative research being conducted at more than one institution (§____.114(b)) in the United States. Researchers involved in multisite or cooperative trials now typically must obtain IRB approval from each institution to conduct the research, sometimes with conflicting

requirements from different IRBs to obtain approval. With the single IRB for cooperative research, the various institutions would document this reliance (e.g., execute a reliance agreement with the institution whose IRB will serve as the single IRB for the study). This provision should facilitate the IRB approval of multisite behavioral intervention trials and other cooperative studies involving multiple institutions.

In addition to the broad consent and single IRB provisions in the revised Common Rule, there are other important changes to the consent and IRB process. For example, a new element of consent will require investigators to inform subjects if their biospecimens may be used for commercial profit and if they will or will not have a share in such profits. Another will require the consent information to state whether clinically relevant research results, including individual research results, will be disclosed to the subject and, if so, under what conditions. The revised Common Rule removes the requirement for IRBs to conduct continuing reviews of expedited review protocols or of protocols that have completed all study interventions and are in the data analysis phase.

For behavioral and social sciences researchers, the various provisions of the revised Common Rule will provide greater flexibility and less burden, especially for low-risk studies, while ensuring the rights and welfare of study participants. Any change of policy, especially one that has been institutionalized such as the Common Rule, takes time to implement, but becoming familiar with the revised Common Rule before its effective date will allow researchers to take these changes into account as they plan grant submissions and research protocols for projects beginning in 2018. ●

* § refers to section within the Common Rule.

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Coverage of the International Convention of Psychological Science

They traveled to Austria from as far away as Burundi and Brazil. They represented academic fields ranging from computer science to neurobiology. And, in the end, they discovered how their individual scientific perspectives can be integrated to address social issues ranging from economic inequality to the cognitive health of a rapidly aging population.

Nearly 2,100 scientists from 70 countries attended the 2017 International Convention of Psychological Science (ICPS) held March 23–25 in Vienna. The highlights of this event, held under the auspices of APS, were the Integrative Science Symposia, in which researchers from a wide variety of scientific perspectives discussed critical topics, including loneliness, exclusion, and integration; cognitive enhancement; and bringing lab discoveries into the real world. Connected to these symposia were workshops that covered some of the methods used in these areas of research.

In the coming months, the *Observer* will report on these individual symposia. But this issue is devoted to some of the most prominent features of the event, including the keynote presentations and the opening statement that APS Past President Walter Mischel, who co-chairs the Integrative Science Initiative Steering Committee, delivered to kick off the program.



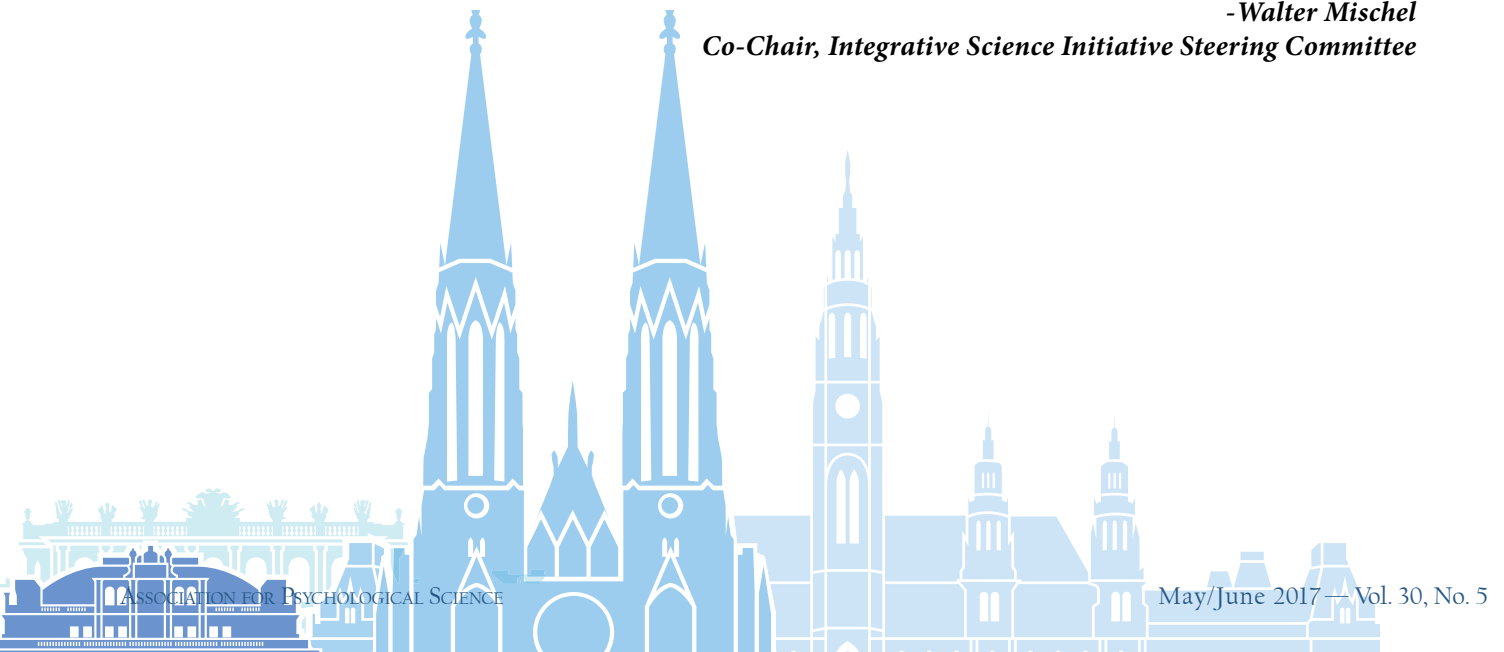


APS Past President **Walter Mischel** chats about his life and career with APS Past President **Mahzarin R. Banaji** for a recording of the APS video series “Inside the Psychologist’s Studio.”

“In world politics today, we’re facing a time of rapidly closing boundaries and borders, of building walls and fences. It’s a time and a trend poisonous to the growth of science, particularly psychological science. And we’re also facing shrinking funding, shrinking support. Ironically, this comes at a time when our science is moving forward in new, exciting, boundary-crossing ways, making the brain–mind–behavior connection much more than a promissory note, and pointing to links between our biology and our psychology and the environment that open new windows into who we are and who we can become.

This convention in Vienna, I hope, will illustrate how much can be gained when psychological science overcomes not just geographic boundaries, but also loosens some of the disciplinary boundaries and constraints within which we usually do our scientific thinking and research. In most conventions, we go to talks in our specialty areas and meet with our friends and close colleagues. That’s fine, of course, and so is the sightseeing. But in this convention, I hope people will connect with researchers in areas at least one level of analysis away from their own. And I hope that our more senior researchers will be alert and sensitive to how they might help younger scientists move forward in boundary-crossing directions. Postdocs, visiting researchers, and teaching positions in cross-area international research teams, struggling together to get money, are some of the things that come to mind. But perhaps most important is the sharing of tools and goals and information and even data sets, in order to build a science that becomes ever deeper and broader and, I hope, increasingly consequential to the real world. With boundaries and borders closing in so many ways and in so many places, the world needs us and we need each other.”

-Walter Mischel
Co-Chair, Integrative Science Initiative Steering Committee





icps2017

INTERNATIONAL CONVENTION OF
PSYCHOLOGICAL SCIENCE

VIENNA
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During the Integrative Science Symposium “Bridging the Lab and the Real World,” APS President **Susan Goldin-Meadow** discusses how her studies of children in their homes revealed that early gesture predicts later vocabulary size.

APS Secretary
Gün R. Semin,
Co-Chair of the
Integrative Science
Initiative Steering
Committee



APS William James Fellow **Hazel R. Markus** discusses the teaching of culture at the ICPS Pre-Conference Teaching Institute.



Attendees gathered over coffee breaks to discuss their interdisciplinary research with colleagues from countries around the globe.



Tal Shafir of the University of Haifa responds to astute questions during one of the many informative poster sessions.



Speakers at an Integrative Science Symposium titled “Better Minds: Understanding Cognitive Enhancement” included, from left, **Daphné Bavelier**, University of Geneva; **Iliina Singh**, University of Oxford; APS Fellow **E. Glenn Schellenberg**, University of Toronto; APS Fellow **Arthur F. Kramer**, Northeastern University; and **Lorenza S. Colzato**, Leiden University, the Netherlands.



The Integrative Science Symposium “Who’s In, Who’s Out? Loneliness, Exclusion, and Integration” included presentations from **Alan R. Teo**, Oregon Health & Science University (far left); **Taciano L. Milfont**, Victoria University of Wellington, New Zealand; APS Fellow **Stacey Sinclair**, Princeton University; APS Fellow **Frosso Motti-Stefanidi**, National and Kapodistrian University of Athens; and APS Fellow **Silvia H. Koller**, Universidade Federal do Rio Grande do Sul, Brazil.

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Perception and Play

How Children View the World

Developmental scientists typically study the behavior of children through the lens of adult experience, but APS Fellow Linda B. Smith has taken a new approach to this line of inquiry: She is attempting to see the world through children's own eyes.

Smith, an Indiana University Bloomington (IU) psychological scientist renowned for her studies on the development of language and object recognition in infants and young children, was a keynote speaker at the 2017 International Convention of Psychological Science in Vienna. Her speech, "How Infants Break Into Language," focused on the intersection of object identification and linguistic learning in children between the ages of 3 weeks and 24 months.

Smith has steadily pursued new ways of examining the infant brain and body, especially as they relate to learning both language acquisition and object cognition. Her current line of research explores the role of environment in young children's growth processes, with special focus on pivotal developmental time periods and the mechanisms of change that play crucial roles during those periods.

"We do not yet have a theory or a computational understanding of the implications of the ordered sequence of experiences that babies create for themselves," Smith said, noting that babies have several simultaneously evolving developmental systems. "What the brain does determines what the body does, and what the body does changes the environment ... these changes that we make in the world come back to the brain through the body."

Smith has made it a priority to analyze the dynamics of the interactions between a child's brain, body, and surrounding environment. These interactions, she says, can have tremendous effects on how kids learn to speak and to identify specific items in their fields of view, thereby shedding light on the developmental pathways of both linguistic development and object learning. To achieve this goal, she has conducted several studies examining babies wearing head cameras. The Home-View Project, an initiative developed with support from the National Science Foundation, thus far has gathered data from 75 children ranging in age from 3 weeks to 24 months, with 4 to 6 hours of head-camera video recordings for each child.

The Eyes Have It

A general rule of thumb when studying sensorimotor systems, Smith said, is that "when you have people moving in the world — be they babies or be they adults — they tend to view the world with heads and eyes aligned." That is, when we see something we truly want to focus on (rather than just glance at), we turn our entire head in the direction of the object; this movement, Smith explained, takes approximately 500 ms. However, children at different ages go about this process in different ways. Three-week-old infants can see only what is held in front of them



APS Fellow Linda B. Smith studies the way children learn about language and object identification with an approach that employs head cameras, head-mounted eye trackers, motion sensors, audio recordings, and multiple room cameras.

and therefore focus their gaze directly ahead, while 1-year-old toddlers are "driving new kinds of flow and optic information, and when that movement starts ... that actually is driving very important changes in the visual system."

A baby's increased ability to move its head (and subsequently its entire body) results in a correspondingly increased visual field, Smith noted. Data from head cameras attached to infants showed that they viewed faces 15 minutes out of every hour — an extremely high proportion of the time they were awake. They also saw those faces at close ranges of approximately 2 ft., likely because parents were leaning in quite closely to look at their children at that age.

One-year-old children, however, saw faces only 6 minutes per hour and also viewed them from farther away, instead focusing more of their attention on hands and objects.

"It's faces that decline with age, not people in view," Smith explained. "When a 2-year-old is looking at somebody's body in the natural viewing, it's unlikely to be a face, but when a 3-month-old has a body in the view, it's likely to be a face."

This creates a systematic shift regarding which body part is most salient to a child's physical learning experience due to the way kids perceive hand function at that age: Whether a child is an infant or a toddler, 70% of the time they spend looking at hands, those hands are holding objects.

Playing With Perception

To zoom in on this critical developmental period, Smith, in collaboration with her colleague, APS Fellow Chen Yu, conducted a multisensory project that used head cameras (or head-mounted

eye trackers for infants), motion sensors, audio recordings, and multiple room cameras. In a larger project, Smith and Yu recruited nearly 200 children from 9 to 36 months of age, as well as one parent of each child, and asked the parents to play with their children for 1.5 minutes using specific objects. By closely examining the interactions between the parents and their children as they played, they hoped to glean insights into the ways kids learn about language and object identification.

The psychological scientists gave the parents six objects with specific names to use as toys. The parents were not told to teach the children the names of the items; nor were they told the children would be tested after play. (This ensured that they would not intentionally try to turn the session into a lesson.) After the interactions, Smith and her colleagues measured the children's knowledge of each object name twice by presenting the child with three options and asking them to choose the one being named. If a child chose the right object, the researchers reexamined the dynamics of the play session.

Smith and Yu found that for children 24 months and younger, objects came into and out of view rapidly during play, and also that one object usually was much closer to a child's eyes than were others. (This suggested that the parent had perhaps held that object in front of the child's face.) Equally as important, the parent often named the object that was largest in the child's field of view. For Smith, this raised the question: "Is this type of play an optimal moment for learning object names?"

They noted that successful object recognition occurred when an object was physically close to, and centered on, a baby's face. "Toddlers learn objects names when the referent is visually salient, bigger in the view, [and] more centered than the

competitors," Smith explained. "This is a direct consequence ... of how toddlers' bodies work."

In addition, the experimenters discovered that naming moments were likely to happen when babies were holding the object themselves and when their heads were stable (i.e., focused on the object). "What all this means is that in the toddler, visual attention and learning involves the whole sensorimotor system," Smith said. "It emerges in the real-time coupling and self-organization of head, eyes, and hands. At this point, learning object names is about the coordinated focus of eye, head, and hands, the stabilized visual attention that brings about, and the reduction of visual competition that holding an object brings about."

Smith is encouraged by these consistent findings and believes they could be relevant for researchers seeking to delve more deeply into the intersection of language learning and object cognition of young children. She explained that each age provides novel insights into this process: When children are 18 months old, they learn things completely differently than they did when they were younger (e.g., they are coordinated enough to grasp and hold objects, thereby encouraging parents to name them).

"Development also brings the accomplishments of the past forward," Smith concluded. "What happened earlier will shape what happens later." •

-Mariko Hewer

To watch video of Linda Smith's keynote address, visit www.psychologicalscience.org/r/play.



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Across the Spectrum

In scientific research, we often deal with aggregates and averages, trying to get a picture of what a trait, process, or condition *typically* looks like. But in Thomas Bourgeron's Human Genetics and Cognitive Functions lab at the Institut Pasteur in Paris, the concept of "typical" just doesn't apply.

The lab, populated by scientists who span a variety of disciplines, currently is focused on trying to understand one of the most perplexing developmental disorders: autism. Once thought of as a singular disorder, autism is now understood as a wide range of disorders connected by two shared features: difficulty with social interaction and restricted interests. Outside of these core features, individuals with autism spectrum disorder (ASD) diagnoses show incredible variability in many domains: Some may have severe cognitive impairment, while others seem to have extraordinarily high IQs; some may have no language, while others show quite advanced verbal ability. When we talk about autism, Bourgeron explained in his keynote address at the 2017 International Convention of Psychological Science in Vienna, we are really talking about many different autisms.

During his talk, Bourgeron detailed the dimensional approach his interdisciplinary team is taking to better understand this complex spectrum of disorders. Together, the researchers are using various methods — including genetic analyses, brain imaging, mouse models, and even stem-cell applications — to identify the biological pathways that contribute to the phenotypic diversity that characterizes ASD.

Missed Connections

So far, the team's findings suggest that some important clues can be found in genes that underlie the structure and function of synapses. In one study, for example, Bourgeron's team examined the genetic profiles of three siblings — one child with ASD, one child with Asperger's syndrome, and one child with no diagnoses. The genetic profiles of the affected siblings revealed mutations to genes associated with the presynaptic protein neuroligin. While the children's mother carried the same mutation, her second X chromosome seemed to shield her from any downstream effects.

These results didn't reveal *the* gene for autism, Bourgeron emphasized, but they did illuminate a potential pathway. If neuroligin genes are involved in ASD, the team speculated, maybe genes for related proteins also are involved.

Indeed, subsequent work pointed to a link between ASD and mutations on genes that code for SHANK proteins, proteins that serve a scaffolding function at the synapse. They also found evidence of mutations on genes that code for postsynaptic neurexin proteins. These proteins are all essential to synaptic function: Neurexin binds to neuroligin, resulting in a "handshake" that connects two neurons and actually forms the synapse.

The neurexin-neuroligin-SHANK pathway was one of the first genetic pathways to be implicated in ASD, and it opened up a whole field of genetic possibilities. This kind of work — identifying candidate genes — is labor



Thomas Bourgeron and his team use various methods — including genetic analyses, brain imaging, mouse models, and even stem-cell applications — to identify the biological pathways that contribute to the phenotypic diversity that characterizes autism spectrum disorder.

intensive; Bourgeron noted that each of his presentation slides on genetic mutations represented approximately 5 years' worth of work. But as the field of genomics has burgeoned, so have candidate genes. Some of these genes are known to underlie synaptic function, but others are involved in DNA transcription and translation or in various other processes.

Previously, critics might have argued that genetics research was fruitless in the context of ASD because there "is no gene for autism" — now, Bourgeron said, the criticism is more likely to be that there are *too many* genes for autism. While two individuals with ASD may share some mutations, it's equally likely that they don't share any.

From One to Many

Bourgeron noted that in some individuals, ASD could be monogenic, linking specifically to one gene or even alterations to a single *copy* of a gene. In one study, the team examined genotypic and phenotypic variation in a pair of siblings — the girl had lost a copy of the SHANK3 gene, while her brother had an extra copy. The girl was severely affected, with virtually no ability for speech; her brother, on the other hand, began speaking at a very young age and had developed a huge vocabulary, though he showed the characteristic difficulties with social interactions and restricted interests that many people with ASD display. These results highlight not only the possible role of SHANK3, but also its apparent dose-dependent nature.

"At the synapse, it looks like very tight gene dosage can [result in] autism or Asperger's," Bourgeron explained.

Data from thousands of individuals suggest that SHANK3 mutations may be one of the most robust genetic links to

ASD, occurring in about 2% of individuals with ASD and intellectual disability.

In many cases, however, ASD is most certainly not caused by a single gene mutation but emerges instead as the additive effect of mutations to many different genes.

In a study led by graduate student Varun Warriar (University of Cambridge), the research team looked at genome-wide associations with psychological traits related to ASD. Posting a questionnaire on the website for the popular genetics testing company 23andMe, the researchers gathered data from tens of thousands of participants. Drawing from APS Fellow Simon Baron-Cohen's empathizing-systemizing theory, the team used this massive trove of both genetic and psychological information to examine genetic links to participants' ability to empathize, thought to be lower in ASD, and their orientation toward systems, thought to be higher in ASD.

Their analyses indicated that about 11% of the variance in participants' empathizing scores and about 12% of the variance in their systemizing scores could be explained by genetic variation. But there was no evidence that any single nucleotide polymorphisms — differences in a single base pair in a DNA sequence — were correlated with either trait in the genome-wide analyses.

The takeaway from this and other work, Bourgeron said, is that “you can capture part of the variance by looking at the genome, but each gene will really contribute a very small effect.”

Out of Sight, Out of Mind

Identifying the diverse genetic pathways that contribute to a complex spectrum disorder is difficult enough, but Bourgeron and his team are also contending with the reality of the file-drawer problem. Not knowing how many times researchers have tried and failed to find a particular genetic association that has been published in the literature, scientists often end up on a resource-intensive wild goose chase. The consequences are especially problematic given that genome-wide analyses are a major undertaking — researchers must be able to marshal huge sample sizes to be able to detect relatively small effects.

These issues became particularly salient for Bourgeron's team when they decided to look at brain volume in individuals with ASD. Previous research had suggested that, relative to their peers, individuals with ASD tend to have lower volume in the corpus callosum, the bundle of fibers that connects the left and right hemispheres of the brain. But after collecting brain-volume data from several hundred participants, the research team couldn't find any evidence of such a difference. When they went back to the literature, they discovered that many of the previous studies had samples that were probably too small to reveal subtle differences, which led Bourgeron and his team to question the robustness of the finding.

In talking to colleagues and other researchers, they found that many had conducted the same investigation and achieved the same null results, never publishing their findings.

“I think it's really a problem in the field of genetics, and in psychology, that we don't know what's going on because

people have difficulties [with sharing their] data and [achieving] enough statistical power,” Bourgeron said.

He worries that without data sharing, existing theories that are conceptually appealing may collapse when they undergo further scrutiny. To help combat this problem, members of his lab are developing tools intended to facilitate open science at multiple levels of investigation.

At the genetics level, the lab has developed a tool that identifies all the mutations in a person's genome and maps those mutations onto a protein-protein interaction network. The tool should help users construct a bigger and clearer picture of the roles that affected genes play in contributing to phenotypic profiles, and can be found at bit.ly/2pM4Frk.

Expanding on mouse-model work spearheaded by post-doctoral student Elodie Ey, the lab also is developing a tracking tool that can keep tabs on a “little society” of mice. The tool, which depends on machine learning, enables users to identify and track each mouse so they can not only examine what each individual mouse is doing, but also monitor how the mice cooperate and act together.

The proliferation of open-source tools and promotion of data sharing ultimately will help researchers achieve a more detailed portrait of a complex constellation of features, Bourgeron said. More software and tools are available on the Human Genetics and Cognitive Functions lab website at bit.ly/2oy90wv.

Embracing Chaos

One conceptual knot that Bourgeron hopes to untangle in future research is understanding genetic risk and resilience in ASD.

“Some people are highly sensitive and a small number of rare variants will make the person autistic,” he noted. For others, “the genome is very robust and very resistant and you need a very strong mutation, like SHANK3, to have autism.”

Bourgeron wants to understand how some people seem to be unaffected despite having such strong mutations. Ultimately, his aim is to collect more data on patients and their genomes — but instead of aggregating these data to make group-level comparisons, he wants to focus on a variety of phenotypic dimensions to be able to stratify their analyses even further.

“I think we're doing a lot of barplots with a little star and we have to think [of the] more dimensional aspects,” Bourgeron said.

In other words, the days of looking for a straightforward causal story are long gone — to make progress, researchers must appreciate the individual variation inherent in ASD.

Quoting the renowned autism researcher Lorna Wing, Bourgeron noted that “if you have seen one child with autism, you have seen one child with autism.”

It's time to “accept a little chaos and complexity,” he concluded. ●

-Anna Mikulak

To watch video of Thomas Bourgeron's keynote address, visit www.psychologicalscience.org/r/asd.



'Hello From the Other Side' at ICPS 2017

Editors Answer Researchers' Questions About Publishing Integrative Science

P psychological scientists are increasingly focused on making their research programs more robust and impactful by integrating multiple fields and levels of analyses. However, in doing so they face numerous challenges, including the need to master the language and literature of several areas. When these researchers then look to publish their integrative findings, they face similar obstacles.

A panel of editors from some of the most respected journals in psychological science gathered at the 2017 International Convention of Psychological Science (ICPS) in Vienna to discuss their viewpoints on conducting and publishing integrative science. They also answered questions from audience members and from moderators Gabriella Vigliocco (University College London) and APS Fellow Qi Wang (Cornell University), both cochairs of the ICPS Program Committee, regarding the role of integrative science in the journals.

The panel of editors included D. Stephen Lindsay, Editor in Chief of APS's flagship journal *Psychological Science*; Barbara L. Finlay, Editor of *Behavioral and Brain Sciences*; Randall W. Engle, Editor of *Current Directions in Psychological Science*; and Rebecca F. Schwarzlose, Editor of *Trends in Cognitive Sciences*.

The editors reflected on how the recent explosion in the number of articles being published, largely due to the rise of online publishing, has been both a boon and an obstacle to disseminating integrative science. The increase in specialized knowledge about individual subjects makes it more difficult to be an expert in a whole field, much less across multiple disciplines. Even someone who has been working in an area of study for decades can't possibly know all the findings related to that area.

This "integration as disintegration," as Engle called it, requires new approaches in order to produce science that is rigorous and sound across several fields of study. Engle stressed the importance of collaboration and teamwork in approaching integrative studies, and Lindsay advocated for a movement away from the so-called "great man" approach to science, which relies on individual experts with considerable sway in a field, toward a more team-based model in academia that mirrors what is commonly seen in industry settings.

The panelists concurred that securing reviewers in multiple areas of expertise is a major hurdle to publishing integrative articles.

"This is one of the challenges for editors if we're going to increase the rate at which we're putting out high-quality integrative science," Lindsay said. "We're going to need to have

more reviewers, because we need a wider range of expertise than ever before."

Asked about the issues that arise when an integrative article falling short of standards in one of the fields represented is published, Finlay responded that "there's an upside — the immediate irate response from the injured field. So I think it has some amount of self-correction built into it."

Finlay knows this from first-hand experience as the editor of *Behavioral and Brain Sciences*, a journal with a unique Open Peer Commentary format in which novel and often controversial findings are published alongside 20 to 40 commentaries from experts within and across the fields of psychology, neuroscience, behavioral biology, and cognitive science, as well as the original authors' responses. This model of publishing allows for people with multiple viewpoints to discuss and respond, and, sometimes, to reach — or at least approach — a general consensus.

The editors advocated for early-career scientists to strive for theoretical and experiential breadth. Schwarzlose encouraged early-career researchers to practice their communication skills, especially by writing short reviews or commentaries as a means of expanding their thinking and honing their skills effectively through writing. Finlay advised young scientists to make themselves indispensable by becoming translators between two areas of study, fluent in multiple methodologies and theoretical viewpoints.

All the editors called for increasing interactions with members of other fields to gain not only the technical knowledge of those fields, but also the cultural knowledge that cannot be gleaned from the scientific literature; as Lindsay put it, "so you can absorb from them things that they couldn't tell you because they only know them implicitly — things they know but don't know they know."

Faced with a question about the difficulty of publishing integrative work in top-tier journals and the potentially negative impact that trying to do so could have on career advancement, Schwarzlose was optimistic.

"If your question is important, then I think that should actually be a bonus for you," she said. "The challenge for people doing this kind of research is to communicate — to the editor, to the reviewers, to the reader — why these questions you're asking are so important and why they require the approach that you are coming with. If you can communicate that, then you're going to have them hooked, because it's the question and the impact of that question that's going to be important for getting the piece published and read." ●

-Amy Drew

Humans Are Animals Too

A Whirlwind Tour of Cognitive Biology



Language appears to be a trait that only humans possess, but most of its component parts are shared with other species, W. Tecumseh Fitch says.

For a very long time, there have been two main camps on animal behavior and animal cognition: exclusivists, who focus on the differences between animals and humans, and inclusivists, who concentrate on similarities between humans and the rest of the animal kingdom. This long-running debate goes back millennia, with philosophers like Aristotle and Descartes arguing that humans are the only animals capable of higher-order cognition such as rational thought and language, and equally distinguished thinkers such as Voltaire, Charles Darwin, and David Hume arguing that it is self-evident “that beasts are endow’d with thought and reason as well as man.”

Straddling the bridge between evolutionary biology and cognitive science, University of Vienna cognitive biologist W. Tecumseh Fitch has demonstrated that studying our more distant animal relatives is vital to understanding human cognition.

“The core message I want to get across to you today is that in a sense, both of these sides are correct,” Fitch emphasized during his keynote speech at the 2017 International Convention of Psychological Science in Vienna. “And from a modern biological point of view, we really need to turn these ideas on their head and recognize a very simple biological fact: It’s a truism, but people are animals, too.”

A Biology of Shared Fundamentals

The basis of humans’ biology contains an immense amount of shared fundamentals with other animals: Every living

thing from bacteria to daffodils shares our basic genetic code, and our nervous system structure is shared with lower-order animals such as flies and worms as well as closer relatives such as bonobos. But of course every species is unique.

In Fitch’s field of cognitive biology, researchers attempt to make connections between basic evolutionary biology (e.g., Darwin) and the cognitive sciences (e.g., Noam Chomsky and B. F. Skinner). But cognitive biology is not the same field as evolutionary psychology, Fitch clarifies. While evolutionary psychology focuses on the human mind over the relatively short period of the last 6 million years, cognitive biology adopts a more expansive approach that goes back much earlier in human evolution.

Along with this highly comparative approach, cognitive biologists break down complex traits, such as language or music, into multiple basic components, some of which may be shared among humans and other animals, and some of which may be unique to a particular species. Cognitive biologists call this the “divide and conquer,” or multicomponent, approach, Fitch explained. Based on the presence or absence of these components, we can map a phylogenetic tree that allows researchers to rebuild the evolutionary past of particular cognitive abilities.

Homologs and Analogs

Humans share many traits with our nearest relatives, the great apes. We share large brains, large body size, long lives, and prolonged childhoods because our common ancestor, which was not a chimp or a gorilla or a human, also had those characteristics. This evolutionary process is called homology: Different species share a set of common traits because they were inherited from a common ancestor. The beauty of homology, Fitch said, is that we can use it to rebuild the past by looking at living species.

In contrast is the process of convergent evolution, in which different species independently adapt similar features. For example, humans and birds are both bipedal, but not because we shared a common two-legged ancestor. Humans and birds adapted to walking on two legs for different reasons at different points in time.

Fitch also pointed out that evolution is often circuitous rather than linear, with adaptations arising and disappearing multiple times across a single given species. For example, most humans and some other primates are trichromats — we possess color vision thanks to three different types of cone cells in our eyes. Most other mammals, on the other hand, are dichromats lacking color vision. If we examined only mammals, it would appear that trichromacy is a highly advanced

adaptation that humans share with only a few other highly evolved species. But broadening the comparative net beyond mammals shows that birds not only have trichromacy, but actually possess four different cones — tetrachromacy, he explained.

Fish, reptiles, and amphibians also have tetrachromacy, suggesting that the common ancestor of all living vertebrates was in fact tetrachromatic, and that over time mammals lost the adaptation of color vision. Somewhere along the way, primates — at least some of us — regained back a sort of partial color vision, Fitch said.

Tool use is another adaptation that has evolved multiple times in different clades of animals. Chimps, our nearest living relatives, use tools to fish for termites and crack open nuts. Six million years ago, our common ancestor with chimps also probably used simple tools to perform similar tasks. Through homology, we can imagine the cognitive capabilities of our extinct ancestors.

But primates aren't the only animals capable of tool use. New Caledonian crows use sharp straight objects in their environment to dig hard-to-reach grubs out of tree trunks. Researchers at the University of Oxford have found that in the lab, these crows will make their own tools by bending pieces of wire into hooked shapes for scooping food out of containers.

"These are very smart animals, and they do have the capacity to solve tasks and to go beyond whatever their biological predispositions are in the same way that we can

as humans. That's how we can drive cars and make power drills," Fitch said.

Of course, Fitch added, our common ancestor with crows was not likely a tool user, but this analogous adaptation allows us to start asking important questions: Why does tool use evolve? And why has it evolved all these different times, and in all these different ways, across such distinct organisms?

Signals and Semantics

Along with tool use, humans share many cognitive abilities with other species, including the formation of memories and categories; basic emotions such as anger; planning and goal-setting; and rule learning. These kinds of basic nonverbal concepts likely predated language by many millions of years of evolution. Unlike tool use, language appears to be a trait that only humans possess. However, most of the component parts of language are shared with other species, Fitch said.

"The main difference that we have from other species is not that we have something to think about, but that we can communicate what we think about," he said.

Although some chimps and bonobos have learned to sign or communicate with a keyboard, none have ever learned to say "hello" or to sing "Happy Birthday." This is not because chimps aren't smart or aren't able to imitate, but because they have a very limited ability to control their vocalizations and mimic sounds from their environments.



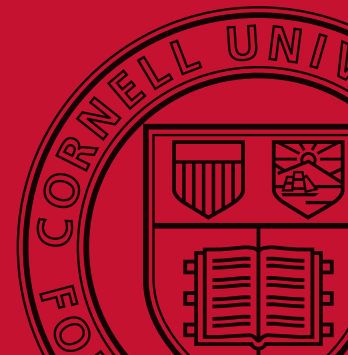
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One long-running hypothesis for primates' inability to speak is that they (and other animals) lack the descended larynx that humans possess. Most of the information about animal larynxes, however, has come from dissections of dead animals. As a postdoc, Fitch became interested in the way that living animals communicate. So far, all of the mammals he's examined lower their larynx to a human-like position while making loud vocalizations; when a dog barks, the larynx retracts down just for the moment of the bark and then it pops back up.

"What's unusual about us is not that we have a descended larynx, just that it's down all the time," Fitch explained.

This research suggests it's not the vocal anatomy that is crucial for language, but rather something in the brain. One long-standing hypothesis is that most mammals have only indirect connections from their motor cortex to the neurons that control the vocal tract, larynx, and tongue. Humans, too, have those neural connections, but also have direct connections from the motor cortex to motor neurons that control the larynx. This is the key that gives humans the control over our vocal tracts that chimps lack.

However, humans aren't the only animals capable of learning complex vocalizations; vocal learning has independently evolved in bats, elephants, seals, cetaceans, and several different clades of birds. By studying the neural correlates of vocal learning in a broad variety of species, researchers can test for this direct-neural-connections hypothesis. So far, studies have examined two clades of birds — song birds and parrots — and in both cases, the hypothesis held up. Birds with vocal-learning abilities have these direct connections, while birds that aren't vocal learners, such as doves or chickens, do not.

"My general conclusion here is that by taking a very broad comparative perspective on a wide range of different species, this really gives us a powerful tool to both develop hypotheses and also to test those hypotheses," Fitch explained. "We can test both mechanistic and functional evolutionary hypotheses."

Syntax: The Heart of Language

Delving deeper into the subject of communication, Fitch said that syntax, the set of rules that determines the meaning of a sentence, is really at the heart of language. Beyond the spoken word, humans are able to use language in many forms: Sign language and writing, for example, are possible because of our ability to use advanced syntax. Apes may not be able to talk, but they can learn and express hundreds of words through signs or keyboards. Despite mastering a large vocabulary, however, the level of syntax they obtain is approximately that of a 2-year-old child — basically, they have the ability to put two words together. Although it's a very limited level of syntax, it's still syntax, so there is something there in common with human language.

Humans don't interpret language as just a string of words in a sequence; crucially, we are able to interpret these

sequences as having a higher-order hierarchical structure. Fitch and colleagues are trying to determine which language components different organisms possess by examining their ability to learn simple grammar structures versus more complex ones.

So far, comparative experiments have shown that this ability to use hierarchical syntax may be unique to humans. In one series of experiments, researchers attempted to teach hierarchical grammar to two different species of birds: pigeons and keas. Keas are a type of parrot native to New Zealand, and they're known for being extremely clever. Rather than using recordings of speech, the researchers trained the birds to recognize different visual patterns of abstract shapes. Even the pigeons — not the smartest birds — were able to master the simple sequential patterns, but although they underwent weeks of intensive training, both groups of birds failed to learn the more complex "grammar."

"So where this leaves us right now is: Lots of different species have been shown to do very finite-state grammars [and] simpler sequential grammars, but right now, the only good evidence of going beyond that to the hierarchical grammar is for human beings," Fitch said.

What exactly allows humans to take this linguistic leap? Fitch suspects that humans have developed a cognitive proclivity for inferring tree-like structures from sequences that are difficult or impossible for other animals. According to his dendrophilia hypothesis, humans' unique aptitude with syntax comes from automatically interpreting sequences into branching hierarchical chunks. To get to this next level of grammar, humans may have evolved an additional form of abstract memory that allows us to keep track of phrases even after they're over, Fitch suggested. To enable this new adaptation, human brains may have beefed up the requisite neural structures for processing language. Fitch pointed out that Broca's area is seven times larger in humans than in chimps, making it the most expanded area of the human brain compared with chimps that we know about. In addition, it is far more interconnected to other brain structures in humans than in other primates.

"For me, the most exciting possibility is again in syntax," Fitch concluded. "We share a lot, but a relatively small difference in terms of brain architecture made a big difference in cognitive ability." ●

-Alexandra Michel

To watch video of W. Tecumseh Fitch's keynote address, visit www.psychologicalscience.org/r/language.



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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.

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Understanding Mind From Matter: What Does Prehistoric Farming Say About Your Prefrontal Cortex?

By C. Nathan DeWall

Coolidge, F. L., & Wynn, T. (2016). An introduction to cognitive archaeology. *Current Directions in Psychological Science*, 25, 386–392.

When Howard Carter entered the tomb of the Egyptian pharaoh Tutankhamen, he knew he had struck gold. Years of missteps and boondoggles had put the revered archeologist on the cusp of quitting, but Carter's persistence paid off. Discovering King Tut's treasure trove of intact artifacts led to a decade-long excavation that changed the face of modern archaeology. It opened a window into the culture and customs of ancient Egypt.

According to Frederick L. Coolidge and Thomas Wynn (2016), however, archaeologists often ignore the cognitive processes required to construct ancient artifacts. Enter cognitive archeology — what Coolidge and Wynn define as a new "approach to studying human cognitive evolution that applies theory and concepts developed in the cognitive sciences to archaeological remains of the prehistoric past" (p. 386). The value of King

Tut's sarcophagus may lie not only in its weight in gold, but also in understanding the complex cognitive processes humans would have needed in order to make it.

Coolidge and Wynn propose a four-part model that explains the basics of cognitive archaeology:

- *Observe* an artifact (or feature), such as an ancient tool or arrowhead.
- *Reconstruct* the techniques used to create the artifact.
- *Master the methods* that early humans used to create the artifacts.
- *Infer* what cognitive processes were available to our ancestors that enabled them to construct and use the artifacts.

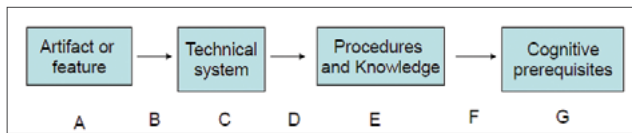
The second and third steps are tricky: Early humans had no libraries or social media, leaving modern scientists with little access to shared information about how to build the artifacts. Scientists often do the painstaking work of reverse-engineering ancient artifacts by experimenting with the procedures and knowledge that may have been available to our evolutionary ancestors (Stout, Schick, & Toth, 2009; Wadley, 2010).

To take this cutting-edge science into the classroom, students can complete the following activity, which illustrates how physical artifacts can help psychologists understand the psychological processes needed to produce such artifacts. Time permitting, instructors can cover one or two artifacts. In these situations, I often divide the class into two large sections and assign one topic to each section.



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Begin by showing students Figure 1 from Coolidge and Wynn (2016; below).



Walk students through each component of Coolidge and Wynn's model. Next, have students form groups of three and encourage them to discuss a series of questions related to each of the following topics. To increase engagement, instructors may encourage students to use their smartphones and create a Twitter hashtag (#) that will help organize the class's responses. You can use a large screen to display the Twitter feed. Ask the class to create the hashtag. Encourage them to use their creativity and humor. My students once created the hashtag #offdewall to curate their in-class Twitter responses. We had a good laugh.

Topic 1: Why Don't We Sleep in Trees?

- *Observe.* Homo erectus, our bipedal ancestors, left artifacts that suggest they slept on the ground — what archaeologists call terrestrial sleep — rather than in the trees. This was a major breakthrough because it enabled early humans to experience more quality sleep and REM sleep (Samson & Nunn, 2015).
- *Reconstruct.* What sorts of technical systems would have been in place to enable our early ancestors to build sleeping structures on the ground rather than in the trees?
- *Master the method.* What sorts of procedures would early humans have used to construct ground sleeping structures? What knowledge would they have needed to ensure that they would sleep safely?
- *Infer.* How might artifacts related to terrestrial sleep offer clues regarding the minds of early humans? For example, sleep quality predicts better physical health, mental health, memory, and concentration (Baglioni et al., 2016; Dement, 2000; Pace-Schott, Germain, & Milad, 2015; Prather,

Janicki-Deverts, Hall, & Cohen, 2015). Because terrestrial sleep enhances sleep quality, how might that help us understand differences in the psychology of early humans who did versus did not make the transition to terrestrial sleeping?

Topic 2: What Does Prehistoric Farming Say About Your Prefrontal Cortex?

- *Observe.* Nearly 12,000 years ago, humans started farming. Archeologists have observed several artifacts that confirm this transition from hunting and gathering to farming.
- *Reconstruct.* What sorts of technical systems would have been in place to enable our early ancestors to plant, cultivate, harvest, and store crops?
- *Master the method.* What sorts of procedures would early farmers have used? What knowledge would they have needed in order to ensure that they would farm enough to feed themselves, their families, and potentially larger communities?
- *Infer.* How might artifacts related to the advent of farming help us understand the psychology of early humans? For example, early farmers needed a sophisticated understanding of time, such as when to plant, how long certain crops would need to grow, and how different crops need different amounts of time to harvest. Coolidge and Wynn argue that early farmers also would have needed a powerful prefrontal cortex to help them to delay “the immediate gratification of eating seeds to planting them and harvesting them over varying lengths of time” (p. 389).

Archaeology makes sense of human activity from the materials ancient humans left behind. An ancient spear can tell us where people lived, what they did, where they went (or didn't), and when and why that movement happened. Cognitive archaeology tries to get into the minds of ancient spear-makers. By understanding the cognitive processes necessary to make certain artifacts, cognitive archaeologists can better grasp how our evolutionary ancestors thought, felt, and acted.

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To Err Is Human: The Psychological Science of Voting Mistakes

By David G. Myers

Kortum, P., & Byrne, M. (2016). The importance of psychological science in a voter's ability to cast a vote. *Current Directions in Psychological Science*, 25, 467–473.

Egocentrism — difficulty in taking another's perspective — is not just for preschoolers. We adults, too, can easily overestimate the extent to which others share our understandings. By assuming that what's clear to us also will be clear to others, we often exhibit “the curse of knowledge.” Some examples:

- Having explained that negative reinforcement \neq punishment, we teachers are astonished when students misremember what we think we have so clearly taught.
- Imagine rapping your knuckles on a table to convey a familiar tune, such as “Mary Had a Little Lamb” or “Happy Birthday,” to a friend. Thanks to the curse of knowledge, the tune seems obvious to us. But our seemingly dim-witted friend finds it incomprehensible (Newton, 1990).
- E-mail senders often are surprised when their readers don't discern their “just kidding” teasing and take offense (Epley, Keysar, Van Boven, & Gilovich, 2004; Kruger, Epley, Parker, & Ng, 2005).

Such “human perceptual and cognitive limitations also pose a serious and immediate threat” to democracy's voting systems, note Philip Kortum and Michael Byrne (2016). In case after case, the people who design and word ballots assume that what's clear to them will be similarly clear to all voters. Thus, when the Palm Beach County elections supervisor designed the infamous “butterfly ballot” for the 2000 election, it was perfectly clear to her that those favoring the second set of candidates should punch the third hole from the top. Alas, voter confusion caused enough Gore voters to punch Buchanan to flip the state outcome — and the presidency — from Gore to Bush ... thus altering the course of history (Fig. 1).

In addition to such perceptual fiascoes, Kortum and Byrne also note that voting procedures can yield ambiguously marked ballots. After 2.8 million Minnesotans chose between US Senate candidates Al Franken and Norm Coleman, fewer than 300 votes separated the candidates. The recount of several thousand ballots, such as the one shown in Figure 2, swung the vote to Franken.



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



Figure 1.



Figure 2.

Demonstrating Voting Mistakes

To illustrate the perceptual psychology of voting, instructors may wish to visit tinyurl.com/ballotpsychology, where they will find sample ballots created by Kortum and his colleagues and a scale for assessing their usability. Responding to several of the layouts will illustrate both clear and unclear alternative designs (civicdesign.org/fieldguides offers guidelines for clear ballots).

For a second activity, tinyurl.com/ballotpsychology2 will take students to a Minnesota Public Radio website that invites students to judge Franken versus Coleman voter intentions, and then to compare their judgments with those of more than 100,000 other respondents.

Identifying Other Human Errors

In the spirit of the Kortum–Byrne essay, instructors could invite students to identify other ways in which humans routinely exhibit either Murphy's Law (*anything that can go wrong, will go wrong*) or the curse of knowledge. Three examples:

Auditory processing. Hearing, like vision, occurs top-down as well as bottom-up. Therefore, misperceptions can color hearing, leading listeners to mishear what speakers perceive themselves as having plainly said.

It's a phenomenon that, as a person with hearing loss, I frequently experience. At a recent advisory council meeting of the National Institutes of Health's National Institute on Deafness and Other Communication Disorders, I was surprised to hear one of its executives repeatedly mention the Institute's "missionaries." Who are these people, I wondered — evangelists for hearing health? On about the fifth utterance, I recomputed: *mission areas*.

Much as Norwegians can tell Norwegian jokes to one another, so the hearing-loss community laughs over its own faux pas, as in the story of the three golfers with hearing loss. "It's windy," remarks one. "No," says the second, "it's Thursday." "Me, too," says the third. "Let's go get a drink."

But it's not just people with hearing loss. Depending on the context (such as happy or sad music playing), our meaning-making brains may mishear "morning" as "mourning," "dye" as "die," or "pane" as "pain" (Halberstadt, Niedenthal, & Kushner, 1995).

The power of framing. More than many people suppose, the mere wording of a proposition can shift people's expressed views. Voters have been more supportive of "assistance to the poor" than "welfare" (Time, 1994). They have favored cutting "foreign aid" but increasing spending "to help hungry people in other nations" (Simon, 1996). "Gun safety" initiatives, such as requiring background checks, elicit more public support than "gun control" (Steinhauer, 2015).

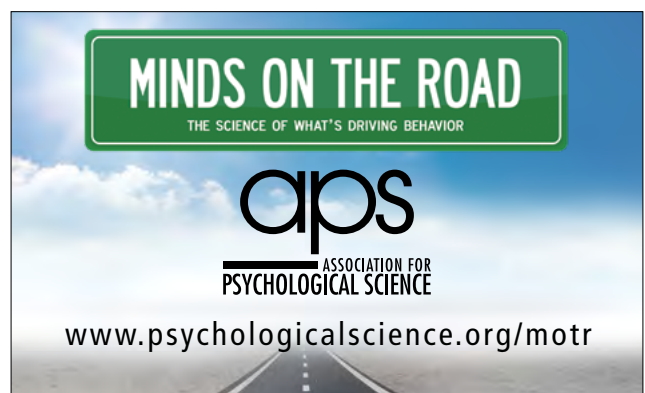
Misreadings. "The curse of knowledge is the single best explanation I know of why good people write bad prose," observes APS William James Fellow Steven A. Pinker (2014, p. 61). "It simply doesn't occur to the writer that her readers don't know what she knows."

Readers' misunderstandings or misinterpretations of my own written words led me to create Myers's first law of writing: *Whatever can be misunderstood, will be*, and its corollary second law of writing: *The reader is always right*. (If I am misread, the problem lies with the writing, not with the reader.)

The list of ways in which humans perceive or believe incorrectly goes on. Our thinking, while often accurate and generally adaptive, is vulnerable to perceptual set, selective inattention, change blindness, stereotyping, confirmation bias, belief perseverance, overconfidence, self-serving bias, overreliance on heuristics, false consensus, illusory correlations, priming effects, and much more. And that is why Kortum and Byrne are surely right to remind us that "human perceptual and cognitive limitations" can distort voting and to recommend universal ballot design principles that accommodate the human factor. ●

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Natural Selection: The Mentoring Edition

by Sikoya Ashburn

In today's society they may be hidden, but good shepherds do exist. They nurture. They guide. They use their foresight to keep their flock safe and ensure its survival. As graduate students, we often find ourselves members of such a flock, seeking guidance, knowledge, and survival skills from those who act as shepherds — our mentors.

A good mentor can ensure successful completion of your research project. Furthermore, healthy mentor–mentee dynamics facilitate a prosperous graduate experience. This article aims to define several attributes that characterize a good mentor and to encourage you to progress from flock member to shepherd status by becoming a mentor.

Attributes of a Mentor

There is no perfect formula for selecting a mentor, but below are three characteristics that scholars agree a mentor should have:

1. **Competency.** Your mentor should have expertise in your field and be willing to share this knowledge. Additionally, publications, successful grants, and previous experience mentoring graduate students are ideal. You should be able to have open conversations about these factors.
2. **Academic rigor.** Your mentor should challenge you. They should provide constructive feedback (both positive and negative) on projects and presentations. These discussions are crucial for personal growth and career development.
3. **Personal interest.** Your mentor must have a personal interest in your development. This requires you to define your immediate- and long-term goals. For example, do you hope to find internships, enter academia, participate in outreach activities, engage in teaching opportunities, edit for a science journal, or advocate for policy and ethics? Whatever your goals may be, your mentor should be informed about and encourage these goals while helping you remain realistic. Equally as important, your mentor must have a personal interest in, or at minimum a tangential attachment to, your research project.

Another factor to consider is what type of interactions benefit you the most. Time is an example: Are you the gradu-

ate student who needs to have weekly meetings and work side by side with someone? If so, you may need a mentor who spends more time on campus. Are you the graduate student who is most productive when left to their own devices for extended periods of time? In that case, you may benefit from a mentor who does not micromanage.

The Mentoring Network

Most people have only a primary mentor; however, it is beneficial to build a mentoring network. Think of this as your personal advisory team — each member has unique experiences that can be useful to you. This is not to be mistaken for a thesis committee, which can be comprised of mentors but has the primary function of assessing your research and progress as a graduate student. A mentoring network is composed of individuals who can give advice related to your specific life and research goals. One member of your network may provide guidance for teaching and instructional activities; another member may offer input on a particular experimental method.

Building this assembly of mentors can begin with simple daily interactions. You also can find potential mentors at educational workshops, networking socials, or specific programs geared toward diversifying science. An example of the latter is the Society for Neuroscience's Neuroscience Scholars Program. Although this may only be useful for women and/or minorities in cognitive and brain sciences, there are a number of similar programs targeting broader audiences.

Progressing From Mentee to Mentor

No one wants to be in the flock forever. The question remains, at what point have you been mentored enough? The answer is simple: never. There will always be someone who can serve as an advisor and guide you toward your goals; however, you can start to be a mentor yourself today. Whatever your current status may be — undergraduate, graduate student, teaching assistant — you have capabilities that someone else wants to benefit and learn from.

Consider what skills you have and who may find those skills useful. In addition, remember that you may be able to mentor someone who is not directly associated with your field. As a fellow graduate student, I understand that when you are asked what skills you have, imposter syndrome may sneak in, and the candid answer seems to be one of two extremes: nothing or (for our less modest colleagues)

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everything. Ask yourself this: Are you in a graduate program? Yes? Then you clearly know more than nothing. You have advice on how to survive the undergraduate experience and how to approach graduate school applications and interviews. One more question: Are you still in a graduate program? Yes? Then you do not know everything. You do, however, know more than enough to offer your current level of expertise to someone who may be an undergraduate or who is in earlier stages of your program. Becoming a mentor offers numerous opportunities:

- **Giving back.** Mentor within a community that has given to you: your university, science society, or neighborhood. If you choose a science community, perhaps you will build some research karma!
- **Achieving personal growth.** Fostering longstanding mentorships can allow you to learn from your mentee and refine your own leadership skills.
- **Facilitating career development.** The type of mentoring you choose may be specific to your career goals; for example, mentoring high school students in STEM may be useful if you are interested in a career focused on diversifying STEM fields, while mentoring an undergraduate may be useful if you plan to enter academia.

If you are convinced and ready to jump into mentoring, consider researching programs within organizations such as Human Brain Mapping, American Association for the

Advancement of Science, YWCA, or programs established within your institution. Those studying neuroscience and psychology can reach out to their local Society for Neuroscience or Psi Chi chapters; these organizations offer a vast number of outreach opportunities. Lastly, you can always pave your own path. Public schools often are open to creating either long-term or short-term mentoring programs.

Mentors of today ensure the success of future potential mentors, so regardless of your choice, keep in mind that when looking for a mentor, you should seek characteristics similar to those you hope to embody. Be a credible and positive role model who is genuinely interested in your mentee as an individual, and find a mentor who can do the same for you. ●

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Olivier Klein, Université libre de Bruxelles, Belgium, *Nature*, March 7, 2017: How Facebook, Fake News, and Friends Are Warping Your Memory.

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Simine Vazire, University of California, Davis, *Sacramento Magazine*, March 6, 2017: Know Thyself.

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Program Highlights

Michelle (Mikki) Hebl:
Mindbugs and Gorillas and White Bears, Oh My!

Simine Vazire: Teaching Psychology during the Replicability Crisis

Todd Heatherton:
Is Multitasking Responsible for the Rise in Childhood Obesity (and ADHD and GAD)?

Denise Park: Fragile Minds: Predicting Who Will Age Well

Antonio Puente: 125 Years of Teaching of Psychology: Lessons, Challenges, and Trajectories

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MEETINGS

29th APS Annual Convention

May 25–28, 2017

Boston, Massachusetts, USA

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10th Biennial Meeting of the Society for the Study of Human Development

October 6–8, 2017

Providence, Rhode Island, USA

www.support.sshdonline.org/conference-links/

Behavior, Energy, & Climate Change Conference

October 16–18, 2017

Sacramento, California, USA

www.beccconference.org/

58th Annual Meeting of the Psychonomic Society

November 9–12, 2017

Vancouver, Canada

www.psychonomic.org/page/2017annualmeeting

Minds for Business

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www.psychologicalscience.org/minds



GRANTS

Grants Announced for Child Care, Head Start, Family Strengthening, and Behavioral Intervention

The Administration for Children and Families is excited to announce that the Office of Planning, Research, and Evaluation has forecasted their intent to fund Child Care, Head Start, Family Strengthening, and Behavioral Interventions graduate student dissertation grants in 2017. Please visit grants.gov for more information.

NIH Announces Funding Opportunities

NIH's Office of Behavioral and Social Science Research (OBSSR), in conjunction with several other NIH institutes, is looking to support efforts to conduct intensive longitudinal analysis of health behaviors, with a focus on leveraging new technologies to understand health behaviors. OBSSR aims to establish a network of 5 separate projects, and 1 research coordinating center, "to collaboratively study factors that influence key health behaviors in the dynamic environment of individuals, using intensive longitudinal data collection and analytic methods." Another set of opportunities of potential interest: NIH's National Institute of Child Health and Human Development (NICHD) has invited researchers to examine the impact of human-animal interaction on typical and atypical child development and health, evaluation of animal-assisted intervention for children and adults with disabilities, and effects of animals on public health. Researchers can apply for research project grants, small grants, or exploratory/developmental grants in this area. See grants.nih.gov/grants/guide/listserv.htm for more information.

NAS Offers Awards for Partnership Proposals

The National Academy of Sciences (NAS) is offering two awards for \$37,500 each to build capacity for science communication and facilitate efforts of science communication researchers and practitioners to collaborate on projects related to a recent report titled, "Communicating Science Effectively: A Research Agenda." This report reviewed the state of scientific understanding on science communication and arrived at a to-do list for future research in the area. To apply, scientists should submit a 2,000-word proposal describing a partnership with a practitioner who communicates science. Teams should submit their proposal by June 1, 2017, and awards will be made in July 2017. In November 2017, the teams will present at a third convening of the NAS Arthur M. Sackler Colloquium on the Science of Science Communication. Visit sr.cd.org/about-us/news-announcements for more information.

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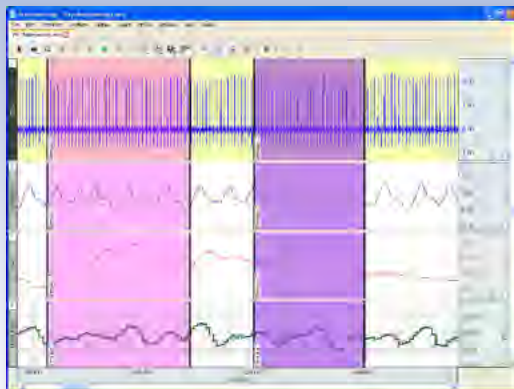
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