Remembering John T. Cacioppo

Observer

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TEAMS IN SPACE

It Isn't Just Rocket Science

PLUS

Announcing the 2019 APS William James Fellows

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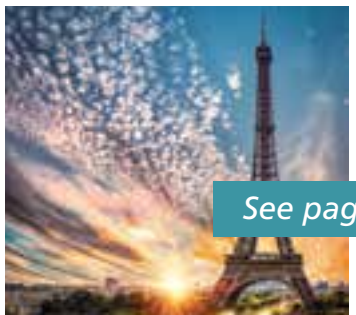

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The Objectivity Illusion in Medical Practice

Donald Redelmeier
University of Toronto
Sunnybrook Health Sciences Centre

Lee Ross
Stanford University

This month's column is written by two astute observers of the quirks, ironies, and inconsistencies of human behavior in the wild, and who bring those insights into the laboratory in inventive ways. One is from medicine and one from social psychology. The fact that both are Canadians may or may not be incidental. Each has a knack for finding captivating problems that have both practical significance and theoretical importance. Among other appointments, Don Redelmeier is Professor in the Department of Medicine, Canada Research Chair in Medical Decision Sciences, and Senior Scientist in the Institute for Clinical Evaluative Sciences at the University of Toronto and Sunnybrook Health Sciences Centre. APS William James Fellow Lee Ross is the Stanford Federal Credit Union Professor of Humanities and Behavioral Sciences and a founding member of the Stanford Center on International Conflict and Negotiation. Both have collaborated widely, including with each other. Here, they introduce the Objectivity Illusion, a bias that characteristically gives insight into human behavior in general and medical practice in particular.

-Barbara Tversky, APS President

Insights into pitfalls in judgment and decision-making are essential for the practice of medicine. However, only the most exceptional physicians recognize their own personal biases and blind spots. More typically, they are like most humans in believing that they see objects, events, or issues "as they really are" and, accordingly, that others who see things differently are mistaken.[1,2] This *illusion of personal objectivity*[3] reflects the implicit conviction of a one-to-one correspondence between the perceived properties and the real nature of an object or event. For patients, such naïve realism means a world of red apples, loud sounds, and solid chairs.[4] For practitioners, it means a world of red rashes, loud murmurs, and solid lymph nodes. However, a lymph node that feels normal to one physician may seem suspiciously enlarged and hard to another physician, with a resulting disagreement about the indications for a lymph node biopsy. A research study supporting a new drug or procedure may seem similarly convincing to one physician but flawed to another.

Convictions about whose perceptions are more closely attuned to reality can be a source of endless interpersonal friction. Spouses, for example, may disagree about appropriate thermostat settings, with one perceiving the room as too cold while the other finds the temperature just right. Moreover, each attributes the other's perceptions to some pathology or idiosyncrasy.

Medical experts encounter similar conflicts in discussions about alcohol consumption, diet, exercise, weight, sleep, or advanced-care directives. They may disagree about appropriate bedside manner (such as the balance between being honest with patients and giving them hope), to the point that they question each other's competence or behavior.

Further Consequences of the Objectivity Illusion

A well-documented consequence of the objectivity illusion is the *false consensus effect*.[5,6] People rarely undertake

formal surveys to assess the extent to which their judgments reflect a current community consensus. At most, they access the views of a few friendly peers or simply presume that reasonable people generally agree. Physicians, we suggest, succumb to this pitfall when they overestimate whether colleagues share their views, especially those colleagues who have different backgrounds, clinical training, or professional affiliations. As a result, a physician may too readily assume that a medical consensus exists for his or her own practices and too quickly dismiss alternative practices as atypical or uninformed.

Psychological science has demonstrated how individuals fail to give due weight to assessments different from their own. Such underweighting of peer input has been shown in the case of educated adults estimating economic facts, lawyers estimating awards in tort cases, and ballroom dancers estimating their marks from judges.[9,10,11,12,13] In each case, the participants achieved less accuracy than they could have by simply averaging their own and their partner's estimates. The same underweighting of collegial views and the same potential benefit from assigning those views more weight, we suggest, may apply in physician assessments such as in estimating the likelihood of an individual patient's recovery.

Perhaps the most noteworthy manifestation of the objectivity illusion occurs in the attributions made following a disagreement. The more discrepant one's own views are from those of a peer, the more the discrepancy tends to be attributed to cognitive or motivational biases rather than sound reasoning.[7] We believe the same tendency may occur in the attributions physicians make about each other's judgments regarding contentious issues such as the degree of blood-sugar control appropriate for diabetic patients, the advisability of frequent mammography for older women, or the likelihood that a particular intern will become an outstanding physician. The objectivity illusion may be particularly rampant in the absence of objective data.

Perceptions of partisan bias are yet another regular manifestation of the objectivity illusion. People on opposing political sides routinely complain that the mainstream media is biased in favor of the other side.[8] Similarly, medical professionals commonly allege bias in debates about medical negotiations about fees for specific services, the evidence linking skin diseases to environmental toxins, or the merits of various nontraditional treatments. Physicians on opposite sides of these debates feel that the other side's flawed arguments are given undue recognition while evidence supporting their own position receives unduly harsh scrutiny. Third-party mediation is often a thankless task and provides no simple solution to the objectivity illusion.

Implications for Better Practice

The illusion whereby a stick in the water appears to be bent due to refraction can be eliminated by removing the stick from the water; however, there is no analogous strategy for overcoming the objectivity illusion in medical judgments because clinical practice is an immersive experience. Although technology can sometimes provide useful objective data, physicians cannot fully avoid confirmation biases, overweighting of vivid personal experiences, or the other biases that distort all human decision-making. Moreover, physicians cannot avoid the conviction that their own assessments reflect sound judgment and experience.

The first piece of advice we would offer for physicians is to at least pause to reconsider their quick intuition. In the words of psychological scientist and Nobel laureate Daniel Kahneman, "think slow."[32] Specifically, consider alternative assessments, including those of colleagues who disagree. When delays in treatment could be lethal, physicians must rely on immediate impressions. More typically, however, there is time for consultation and it is a good idea to ask a colleague for feedback. Thinking slow may also involve reflecting more mindfully about the bases for one's own assessments. In this regard, we would urge physicians to learn more about classic pitfalls in reasoning and stay updated on research that challenges conventional wisdom.[33,34]

A separate collegial conversation may also be a second opportunity to consider situational influences on undesirable behavior that too often is attributed to dispositional flaws. Examples include gaps in medication adherence by patients or hand-washing practices by physicians. Consideration of nudges (e.g., checklists, reminders, appropriate defaults) that might help both patients and physicians translate good intentions into good actions may be another activity in which two or more heads are likely to be better than one.[35] The objectivity illusion can be a particularly beguiling pitfall because many patient cases have some objective features, yet the complete presentation has a great deal more margin for interpretation.

Disagreements, whether on single cases or general issues, are unavoidable, but we can suggest a third tactic used by dispute resolution professionals to reduce friction and disparaging attributions. This tactic, as employed in Northern Ireland and the Middle East negotiations, obliges opposing partisans to present the position of the other side until each party is satisfied that the other has faithfully captured its position. This procedure initially proves difficult. Yet when the two sides finally are satisfied with the efforts of their counterpart, greater trust ensues and common ground may materialize. Discussions of medical issues are rarely as hostile as exchanges in other social conflict situations, but some variant of this tactic is worth trying in fights over operating-room space or other heated disagreements in medicine.

Together, insights and collaboration between physicians and researchers may help advance both psychological science and medical practice. We believe the objectivity illusion and other pitfalls from social psychology are examples relevant to physicians. Ultimately, the gains could improve professional collaboration for better patient outcomes. ●

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AT RANDOM

"Showing correlations, even without evidence for a clear causal connection, can still be informative to determine how a link might exist between engaging in certain activities and improvements in cognition and a reduced likelihood of developing dementia."

-APS Fellow **Alan D. Castel**, University of California, Los Angeles, in his new book, *Better with Age: The Psychology of Successful Aging* (Oxford University Press).

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Psychological Sciences's Human Clientele: Beneficiaries or Victims?

Barbara Tversky's engaging article, "Seeing Psychological Science Everywhere" (*Observer*, September 2018), prompts a historical note and some (brief) reflections on the present and future.

- In 1978, a stellar group of scholars revisited George Miller's 1969 APA Presidential Address on "giving psychology away." The participants in that event (Kasschau & Kessel, 1980): William Bevan, James Jackson, Sigmund Koch, Michael Scriven, Sheldon White, Belvin Williams, and George Miller (who, rather than review his address and remember its dramatic setting[1], provided speaker introductions and some "Afterthoughts").
- Most relevant here — Koch's opening which, as its title suggests (above), involved a critical analysis of Miller's assumptions and substantive assertions:

"I had long wished to demonstrate the vacuity of the presumption that scientific psychology is a font of great 'gifts' (actual and potential) to the human race, and to show — via particular illustrations — that the force of modern psychology has been to coarsen or, indeed, obliterate many of the insights concerning the human condition which have slowly emerged in the humanities and, more generally, within human praxis … Miller's address had become something of a classic in relation to its themes — but had always impressed me as a classic in another sense: that of an exercise in celebrating the mainstream pretentions and objectives of a flawed and turmoiled discipline … bearing on a very grave set of issues," Koch wrote.

- In the heart of his chapter, Koch tied specific analyses to his conception of "The Psychological Studies" as necessarily encompassing scholarly efforts that range well beyond the conventionally scientific. (See, e.g., Kessel, 2013; 2017.) That leads to the question: In what ways could such a critical perspective inform the kinds of discussions Tversky is inviting?
- Noting her "dark clouds hovering," I suggest that we should ask whether the contributions of "psychological science" are necessarily beneficent; that we should temper the judgment that all our work is inherently "thrilling," even though — or *because* — it is ever more widely cited and adopted; and more generally, that at least some of us should engage in self-critical consideration of the normative, moral dimensions of our science and consistently consider the sociopolitical contexts of knowledge production and use.
- A current example: Several scholars (Kessel et al., 2018) argue that this is especially called for regarding research in several major areas of developmental psychology.[2] While still largely focused on WEIRD populations (Henrich et al., 2010), such research is being used to justify, as scientifically supported, large-scale, well-funded interventions aimed at improving parental practices in highly diverse sociocultural settings. The problematic political and ethical dimensions of how such supposedly well-established knowledge is being "given away" could provide the kind of important caution of humility that Miller himself recognized. Thus, I suggest that at least some discussions of giving psychology away could fruitfully address this challenge: Who decides, on what normative bases expressing which and whose values, what family practices — indeed, any cultural practices in particular and diverse settings — are "normal," "healthy," and "best"? And how do scientific data — of whatever scale and drawn from whichever (inter-)disciplines — fit, *or not fit*, into the consideration of any such complex, "very grave" issue?

-Frank Kessel
APS Fellow
Professor Emeritus, University of New Mexico

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[1]James Jackson's impromptu introduction to his presentation — about how he and others prevented Miller from beginning his address by taking over the podium with demands about the paucity of Black graduate students — was both humorous and a reminder of the tumult of those times.

[2]Attachment theory and the "word gap" are two primary cases in point.

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2019 William James Fellow Award Goes to Phelps, Gilbert, Nadel, Werker

APS Past President **Elizabeth A. Phelps** (Harvard University), APS Fellows **Daniel T. Gilbert** (Harvard University) and **Lynn Nadel** (University of Arizona), and **Janet F. Werker** (University of British Columbia, Canada) have been selected to receive the 2019 APS William James Fellow Award in recognition of their lifetime of intellectual contributions to the basic science of psychology.

Phelps is a professor of psychology and neural science who researches the relationships among learning, emotion, and memory. Her work extends animal models of emotional learning to human behavior to shed light on the neural systems underlying memory, in addition to connecting those basic mechanisms to decision-making and economics. She was elected to the American Academy of Arts and Sciences in 2012 and is a Fellow of the American Association for the Advancement of Science and the Society for Experimental Psychology.

Elizabeth A. Phelps

Daniel T. Gilbert

Gilbert is a professor of social psychology with a focus on how people use social inference and affective forecasting to make decisions, predict the emotional consequences of events, and sacrifice for the future. His bestselling book, Stumbling on Happiness, sold more than 1 million copies worldwide and was awarded the Royal Society's General Book Prize. Gilbert was elected to the American Academy of Arts and Sciences in 2008, and has received the Society for Personality and Social Psychology's Donald T. Campbell Award, among numerous others.

Lynn Nadel

Janet F. Werker

Nadel is an emeritus professor of psychology whose work has focused on how stress, sleep, and other states influence the reactivation and malleability of episodic memory. His cognitive map theory of hippocampal function and multiple trace theory of memory remain highly influential throughout the field of cognitive neuroscience. In 2005, he received the Grawemeyer Prize in Psychology; in 2006, he was granted the National Down Syndrome Society's Research Award for his work on the nature of intellectual disability. He is a Fellow of both the American Association for the Advancement of Science and the Society of Experimental Psychologists.

Werker, director of the University of British Columbia Infant Studies Centre, is a professor of developmental and cognitive psychology studying the perceptual foundations of language acquisition in infants. She is a Fellow of the Canadian Institutes for Advanced Research and the Royal Society of Canada and was elected to the American Academy of Arts and Sciences in 2014. Werker works with infants, toddlers, and adults using behavioral and neuroimaging studies to uncover the mechanisms that contribute to native speech and bilingual language learning. She has contributed to more than 150 papers and chapters in such publications as *Science*, *Nature*, and *Cognition*.

These scientists will be honored and deliver award addresses at the 31st APS Annual Convention, to be held May 23-26 in Washington, DC.

Social Class Determines Whether Buying Experiences or Things Promote Happiness

What is the best way to spend money to increase your happiness? It may depend, in part, on how wealthy you are, according to findings published in *Psychological Science*.

In a series of studies, researchers **Jacob C. Lee** of Ulsan National Institute of Science and Technology (UNIST), **Deborah Hall** of Arizona State University, and **Wendy Wood** of the University of Southern California found that only individuals who were relatively higher in social class showed the well-known effect of greater happiness from purchasing experiences, such as going to a concert or the movies, compared with purchasing material goods, such as a pair of shoes or accessories.

Lower-class individuals, on the other hand, did not show the same pattern — in some cases, they reported the same degree of happiness from experiential and material purchases, whereas in others they actually reported that material purchases made them happier.

The conclusion that buying experiences yields more happiness than buying tangible objects is known as the experiential advantage.

"However, this simple answer to the question of how to best spend your money does not consider the huge economic disparities in our society," Wood notes. "We reasoned that the basic motives that shape consumer decisions would vary between higher-class and lower-class consumers. Thus, we anticipated that the degree of happiness obtained from different types of purchases would also vary by social class."

Individuals of higher social class have an abundance of resources, which means they can afford to focus more on internal growth and self-development. Because experiential purchases are more closely related to the self than material ones, higher-class individuals should derive more happiness from an investment in an experience.

People who have fewer resources, on the other hand, are likely to be more concerned with resource management and making wise purchases.

"For lower-class consumers, spending money on concert tickets or a weekend trip might not result in greater happiness than buying a new pair of shoes or a flatscreen TV," Hall explains. "In fact, in some of our studies, lower class consumers were happiest from purchasing things, which makes sense given that material goods have practical benefit, resale value, and are physically longer lasting."

In an initial meta-analysis, the researchers examined data from over 20 studies investigating the experiential advantage among college students at private and public institutions. Consistent with the idea that social class moderates experiential advantage, students with higher tuition costs and those attending private institutions reported greater experiential advantage than did students with lower tuition costs and those attending public schools.

In their next study, Lee, Hall, and Wood had participants recall both an experiential and a material purchase they had recently made and indicate which purchase made them happier. Participants of higher social class reported that their recent experiential purchases provided greater happiness. Conversely, individuals of lower social class reported greater happiness from recent material purchases.

Another study, in which participants were randomly assigned to recall a recent purchase of either an experience or material good, also showed an experiential advantage for participants who had an annual household income of $80,000 or more and at least a bachelor's degree. In this case, participants who had relatively lower income and education (< $30,000 annual household income and a high school degree or less) reported similar levels of happiness, regardless of whether they thought about a recent experiential or material purchase.

But participants didn't actually have to have lower income to show this pattern of results. The final study revealed that those who simply imagined that their monthly income had just decreased by 50% reported feeling similar levels of happiness from recent material and experiential purchases that they had made. In contrast, participants who imagined that their monthly income had just increased by 50% reported greater happiness from experiential purchases. That is, the experiential advantage was muted or amplified in response to even momentary changes in consumers' mindset regarding their financial resources.

The pattern of results was similar regardless of how the researchers measured social class, whether by income, education, or participants' subjective judgments. Furthermore, the relationship between social class and purchase happiness seemed to hold over time, even months after purchases were made, and regardless of how much the purchases cost.

"The take-home message is that, when it comes to increasing one's happiness through discretionary spending, there is no single 'right' answer of what to buy," Lee says. People's available resources are an important factor when deciding whether to purchase experiences or material goods to be happier.

The authors are currently conducting additional studies to better understand the specific consumer motives that underlie class-based differences in the experiential advantage.

All data and materials have been made publicly available via the Open Science Framework. The complete Open Practices Disclosure for this article is available online. This article has received badges for Open Data, Open Materials, and Preregistration.

Kristina Olson Named 2018 MacArthur Fellow

APS Spence Award Recipient **Kristina Olson** has been named to the 2018 class of MacArthur Fellows for her innovative contributions to the scientific understanding of gender and the cognitive development of transgender and gender-nonconforming youth.

The prestigious John D. and Catherine T. MacArthur Foundation Fellowship, also known as the "Genius" Grant, is awarded annually to individuals who demonstrate exceptional creativity in their field. The "no strings attached" award, which includes a $625,000 stipend, is designed to enable recipients to follow their creative instincts in pursuit of future advancements in the sciences, arts, education, and other fields.

This marks the second major award for Olson this year. In April, she received the National Science Foundation's 2018 Alan T. Waterman Award (bit.ly/2RDKzxm), the nation's highest honor for early-career scientists, for her work on gender-related cognition in children. She was nominated for the honor by APS, and is the first psychological scientist to receive the award in its 43-year history.

In 2016, APS honored her with its Janet Taylor Spence Award for Transformative Early Career Contributions. Olson's research on transgender and gender-nonconforming youth, an increasingly visible yet largely understudied population, has focused on how these children's personal sense of identity can exist in contrast to the way they are perceived by others. Presently, Olson's lab is conducting one of the first large-scale, longitudinal studies of transgender child development following a cohort of over 300 children throughout the United States.

In the TransYouth Project's initial study, the results of which were published in *Psychological Science* (bit.ly/2E9LDXp), Olson and colleagues compared patterns of gender cognition in transgender and cisgender, or nontrans, elementary-aged children based on both self-reported data and implicit association tests. Olson found that transgender children's responses mirrored those of cisgender children of the same gender identity, rather than those of the same natal sex.

Kristina Olson

These findings are among the first quantitative demonstrations of the lived experience of transgender individuals. Furthermore, Olson's studies of socially transitioned children suggest that the increased rates of depression and anxiety among this population are not inevitable, but rather can be significantly alleviated by supporting children in living openly as their preferred gender. This may, in turn, reduce occurrences of suicidal behavior among transgender adolescents and adults.

Olson received her PhD from Harvard University and is a professor of psychology at the University of Washington.

See a video about Olson's award-winning work at bit.ly/2pJzRZu.

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Terrie Moffitt Elected to National Academy of Medicine

APS Fellow **Terrie E. Moffitt** has been elected to the National Academy of Medicine in recognition of her ground-breaking contributions to the understanding of human development. Moffitt, a professor of psychology and neuroscience at Duke University, is among 85 members elected to the Academy in 2018, one of the highest honors in the fields of health and medicine.

Moffitt's research on the development of antisocial behavior has been highly influential both in the clinical treatment of childhood conduct disorders and in the courtroom. In 2010, Moffitt's research on antisocial behavior in adolescence was an integral part of the United States' Supreme Court's Graham versus Florida ruling, which established that sentencing a juvenile offender to life in prison without parole for a non-homicidal crime constituted "cruel and unusual punishment" in violation of the Eighth Amendment.

In 2015, Moffitt was a keynote speaker at the inaugural International Convention of Psychological Science in Amsterdam, an event organized by APS. There, she highlighted her work as associate director of the Dunedin Longitudinal Study, where her team has been tracking the development of self-control in 1,030 New Zealanders since their birth in 1972. Longitudinal data from this study suggests that childhood measures of self-control may be predictive of everything from personal income to relationship outcomes and the pace of physiological aging in adulthood.

As one of 2,337 members of the National Academy of Medicine, Moffitt will provide analysis and advice on critical public policy decisions in health, science, and medicine. She also serves on the Advisory Council of the National Institute on Aging at the US National Institutes of Health.

Moffitt holds an appointment as Professor of Social Behaviour and Development in King's College of London's Institute of Psychiatry. She has been recognized with dozens of awards and honors, including the New Zealand Prime Minister's Science Prize for her role in the Dunedin Study. She is a member of the British Academy, the United Kingdom's national academy for the humanities and social sciences, and a recipient of the Royal Society's Wolfson Research Merit Award.

These Aren't the Bots You're Looking For

This summer, researchers in psychological science and other fields noticed a sudden increase in low-quality responses to surveys and other experimental measures posted to Amazon Mechanical Turk (MTurk). Many of the responses originated from a small set of geolocations, leading some researchers to suspect bots as the source.

Researchers raised concerns about the integrity of their data, leading Turk Prime to launch a thorough investigation of the issue. Their results, published online in mid-September, revealed that around 60 of these repeated locations could be traced to server farms. In light of this, Turk Prime launched two tools that allow researchers to block known suspicious locations and duplicate locations.

To learn more, Turk Prime also recruited 140 respondents from known server-farm geolocations and 100 nonfarm respondents to complete a new survey. The results showed that farmers did not provide typical responses to a Big Five personality trait measure, a "trolley problem" moral dilemma, or an anchoring task compared with findings reported in previous research and responses from nonfarmers. In addition, farmers' answers to open-ended questions were almost all grammatically incorrect and low quality.

Intriguingly, both farmers and nonfarmers successfully completed tasks intended to catch bots, but farmers were less likely to pass an English proficiency screener and specific cultural checks.

Based on this evidence, the Turk Prime researchers concluded that the low-quality responses have been coming from humans with limited knowledge of English.

"Our goal throughout the summer and this investigation has been to identify the source of low quality data on MTurk and then to erect strong and intelligent safeguards for the research community," they write. "People seeking fraudulent access to restricted portals are a problem as ancient as Troy, and no platform, whether physical or virtual, is impenetrable."

In addition to the two tools for blockings respondents with suspicious or duplicate locations, TurkPrime has recently developed a "Universal Exclude" feature, which allows researchers to add workers to a persistent exclude list with one click.

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Cattell Fund Projects Include Explorations of Sensory Processes, Memory

The 2018–2019 James McKeen Cattell Fund Fellowships have been awarded to APS Fellows **Cynthia F. Moss** and **Seth D. Pollak**, **Steven Franconeri**, and **R. Shayna Rosenbaum**. Presented in partnership with APS, the fellowships allow recipients to extend their sabbatical periods from one semester to a full year. The four researchers plan to pursue diverse research projects, outlined below, during their sabbaticals.

Cynthia F. Moss

Johns Hopkins University

For more than 30 years, I have pursued research in experimental psychology with an emphasis on the biological basis of behavior. As an undergraduate and graduate student, I conducted experiments on sensory processing in subjects ranging from blowflies to humans to frogs and cats. An early focus of my research was spatial vision in mammals, and for my dissertation, I studied auditory specializations in frogs. As a postdoc, I continued to pursue my interests in sensory processing and spatial perception, but chose an animal model that relies on hearing to guide its behavior: the echolocating bat. The bat produces ultrasonic vocalizations and uses information contained in echo returns to build a three-dimensional representation of the world. This animal has served as the cornerstone of my research, as its active sensing system offers an exceptional tool to directly measure the sensory signals that inform spatially guided behaviors. It is my broad goal to apply data from studies of the echolocating bat to identify general principles of sensory processing, sensorimotor integration, spatial perception, attention, and memory.

For my sabbatical, I plan to revisit my early research interests in spatial vision and work with collaborators at the Hong Kong University of Science and Technology to bridge studies of active sensing through echolocation and vision. One of my proposed sabbatical projects will involve computational modeling of active sensing with engineering faculty member Bertram Shi. Specifically, we will develop a modeling framework to investigate the sensorimotor feedback system that supports spatial representation through active sensing by echolocation. We will also extend this work to identify general principles of sensorimotor feedback processes that are integral to spatially guided behaviors in other species. In another project, I plan to conduct experiments on the neural basis of prey capture in larval zebrafish with neurobiology faculty member Julie Semmelhack. We will combine quantitative behavioral analyses, two-photon imaging, and optical manipulations of neural activity to map circuits for visually guided prey capture. We also will carry out computational modeling of visually guided prey capture in zebra fish that incorporates knowledge of active sensing obtained from other organisms, including bats. These empirical and computational modeling studies will inform and inspire new directions in my research on sensorimotor feedback and spatially guided behaviors in freely behaving animals.

Seth D. Pollak

University of Wisconsin-Madison

I plan to use my sabbatical year to extend my research program on children's emotional development. One project will focus on development of new empirical paradigms to address problems that psychological scientists have had measuring children's subjective emotional experience in the laboratory. To do so, I will integrate contemporary knowledge about the interface of emotion and the brain with humanist perspectives. While we are now learning a tremendous amount about the physiology, genetics, and hormonal factors that contribute to emotions, it is difficult to integrate these laboratory-based studies with people's everyday emotional experiences. My goal is to complement many of the techniques I have developed to study how children perceive, recognize, and regulate emotions with

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humanistic perspectives on subjective experience. Artists and architects use sensory methods to inspire reflection and affect; writers and composers select linguistic and musical triggers to elicit emotional reactions. Increasingly, computer scientists and engineers are seeking to integrate these kinds of devices to advance emotion research as well. My hope is that these types of cross-disciplinary links can foster development of new kinds of laboratory paradigms.

Additionally, with my second project I will attempt to forge a new perspective on understanding children's emotional development through the lenses of machine learning and contemporary learning theory. I will re-examine the sensitivity and specificity of emotion cues (e.g., facial movements, auditory signals, body postures, subjective experiences) with a focus on children's learning. How might new perspectives in learning inform our understanding of the ways children can use cues in their social environments to make predictions about other people's behaviors? I hope this line of work will generate hypotheses about specific developmental mechanisms that account for the changes we observe in human emotion with increasing maturity and social experience.

Steven Franconeri

Northwestern University

During my Cattell Fellowship, I plan to write a book that synthesizes three research literatures: visual cognition, graph comprehension, and data visualization. These research communities often study similar questions and utilize highly complementary expertise and styles of inquiry, yet they too rarely interact. I will serve as an ambassador among these fields by abstracting over jargon, motivating methodologies, and explaining models from one field to the others.

My background is in visual cognition. For the past 20 years, I have studied the power and limits of the visual system as people monitor, memorize, track, or count sets of objects, and have sought mechanistic explanations for the roots of those visual processing limits. Over the past 10 years, this work has increasingly benefitted from cross-pollination by new research literatures, including graph comprehension and data visualization. The majority of our lab's current work is on the perceptual underpinnings of data visualization, and I serve as a papers cochair for a major information visualization conference. These interdisciplinary connections inspire our basic research in psychology. When we attempt to address real-world problems from other fields, we find that we fail more often than we succeed. That allows us the perspective of seeing what our current theories cannot answer, so that we can ask new basic research questions to find out why.

R. Shayna Rosenbaum

York University

My research program takes a multimethod approach of combining cognitive, patient-lesion, eye tracking, and neuroimaging methods to investigate the role of the hippocampus in episodic and spatial memory, and how these forms of memory relate to one another and to nonmnemonic abilities such as future decision-making. This work presents major challenges to classic theories of hippocampal function, which do not distinguish between different forms of declarative memory and do not view a role for the hippocampus that extends beyond memory. The Cattell Fund Fellowship will allow me to engage in interdisciplinary and international collaborations to examine two interrelated questions:

1. What are the roles of the hippocampus and neocortex in episodic and spatial memory?

2. To what extent is episodic memory needed for decision-making?

To address the first question, we are continuing to develop a novel software suite to produce first-person simulations of real-world spatial environments and to track eye movements and moment-by-moment involvement of different brain regions when a route is novel versus familiar or when changes to routes are introduced. This research takes an interdisciplinary approach with collaborators in the Vision: Science to Applications (VISTA) program at York University and at the Rotman Research Institute at Baycrest. The second question will be addressed with interdisciplinary tasks from behavioral economics in patients with episodic memory impairment. Together with international collaborators at Washington University in St. Louis and at the University of Bologna, we will assess the ability to decide advantageously about monetary rewards while cuing individuals to imagine specific events or to reflect on the intensity of their feelings associated with receiving the reward. Findings will be used to devise tools to detect and remediate areas of deficit in the patients.

For more than half a century, the James McKeen Cattell Fund has provided support for the science and the application of psychology. The deadline for applications for the 2019-2020 awards is January 15, 2019. Applications and letters of recommendation must be submitted via the online portal. To learn more, go to bit.ly/2PH4zOn.

Make Your Voice Heard: Tell NIH You Oppose the Classification of Basic Human Subjects Research as Clinical Trials

BASIC RESEARCH ≠ CLINICAL TRIALS

The US National Institutes of Health (NIH) is still at it: If you've been following along, you know that NIH has been attempting to classify basic behavioral science research as clinical trials. Just on principle, this reclassification is offensive. But there are practical implications as well. Among other things, psychological scientists funded by NIH will have to satisfy many additional rules and regulations that may make sense for true clinical trials — but not for basic research. And NIH has tried to justify this move by connecting it to efforts to increase registering and reporting of research studies. Simply put, this makes no sense.

APS and many other scientific and academic organizations and thousands of individual scientists were unanimous in telling NIH that they opposed the definition. But NIH was unreceptive to the community's concerns and continued to move ahead with implementing the objectionable redefinition amid widespread confusion within and outside NIH about its purpose.

At a loss, APS and other groups turned to Congress to express our disappointment with NIH's policy changes; Congress, recognizing our concerns were valid, instructed NIH to delay its policies and consult with the scientific community.

And that's where we are now. At the direction of Congress, NIH has issued a Request for Information (RFI) (bit.ly/2x8zAn8) asking the community to weigh in on a number of questions related to basic behavioral science. The title would lead you to believe that that the focus of the RFI is on registration and reporting, but you'll see that NIH has used the RFI to double down and is treating the redefinition of basic research as clinical trials as a done deal.

NIH needs to hear from individual scientists like you that basic human subjects research should not be classified as clinical trials.

APS has weighed in, and you can read our response to NIH's RFI below. Feel free to use it as a model for your own RFI response; the bottom line is that it is critically important to let NIH know you do not accept a redefinition of basic research with human subjects as clinical trials.

To respond individually to NIH's RFI, you should:

- Read APS's response to NIH's RFI, shown on the next page
- Access NIH's RFI — don't be distracted by the title, which only captures part of the broader issues raised by the RFI
- Enter your comments into whichever individual comment boxes that you feel you are able to address
- Submit the RFI form **prior to November 12, 2018**, 11:59 PM EDT
- Encourage your colleagues to weigh in as well
- Feel free to share your response with APS by emailing it to aps@psychologicalscience.org with the subject line "NIH RFI."

After submitting your response to NIH's RFI, treat yourself to "The Basic Research Blues" (bit.ly/2QS6Aav), a song on this issue written and performed by Sarah Brookhart, APS Executive Director. You may even want to do your own version of the song — be sure to share it with APS if you do!

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Below follows APS's response to the NIH RFI on clinical trials.

RFI Topic: Strengths and weaknesses of potential alternative platforms that might function as conduits for timely registration and reporting of prospective basic science studies involving human participants

APS: A wide variety of platforms exists for timely registration and reporting of basic research with human subjects. As one example, APS advises its journal submitters to visit the Registry of Research Data Repositories (re3data.org) to find the right repository for their data. We have found that setting expectations for data and materials reporting and registration and letting researchers use the platform that is right for them has been effective in encouraging increased registration and reporting. Alternatively, NIH could develop a new portal for registration and reporting of the outcomes and findings of basic research, including basic research with human subjects.

We recommend that NIH consult APS's current initiatives supporting transparent reporting and registration of basic research with human subjects. Further information is available on our website (https://www.psychologicalscience.org/publications/open-science). Preliminary evidence (e.g., Kidwell et al., 2016, *PLOS Biology*; Giofrè, Cumming, Fresc, Boedker, & Tressoldi, 2017, *PLOS One*) suggests that APS policies introduced in 2014 are linked with improved rates of reporting within our journals. We have since seen similar organizations adopt similar policies modeled after our own.

Given our experience in encouraging registration and reporting, we further recommend that NIH undertake a comprehensive, broad survey of the basic human subjects research community to determine what platforms currently are being used for the purposes of registering and reporting research. This survey should not be connected to current NIH clinical trials definitions and policies, which we believe to be a separate topic. A panel of experts should be convened to determine the criteria for assessing these platforms, and the quality of the platforms should be thoroughly examined. APS would be willing to facilitate a convening of such a panel. The results of this survey should be made publicly available at the earliest opportunity.

RFI Topic: Additional data elements or modification to existing data elements that could be applied to ClinicalTrials.gov to better meet the needs of the public and of researchers in assuring timely registration and results information submission of prospective basic science studies involving human participants

APS: As noted in our response to the first prompt, we do not believe that ClinicalTrials.gov is an appropriate platform for registering and reporting basic research with human subjects, given that APS and the basic human subjects research community do not agree that basic research should be subject to the current clinical trials policies at NIH.

We are willing to engage in a discussion about appropriate data elements for inclusion in existing platforms for reporting basic research findings, or about elements for inclusion in potential new platforms that are appropriate for basic research with human subjects.

Fundamentally, APS believes that the question of which data elements are appropriate for reporting and registration of basic research with human subjects is entirely separate from the issue of whether basic research with human subjects should be classified as clinical trials. As always, APS is supportive of efforts to strengthen registration and reporting of basic research with human subjects, which we believe is a core aspect of ensuring rigorous and reproducible science.

RFI Topic: Other existing reporting standards for prospective basic science studies involving human participants and how such standards would fulfill the aims described in the NIH Policy on the Dissemination of NIH-Funded Clinical Trial Information

APS: It is inappropriate to address this question in the context of this RFI, which needlessly combines the question of whether basic research with human subjects should be defined as clinical trials — which APS and the entire basic research community opposes — with recommended reporting and registration standards for basic science research. Please see our answers to the second and third prompts for more.

RFI Topic: Any other point the respondent feels is relevant for NIH to consider in implementing this policy for timely registration and reporting of prospective basic science studies involving human participants

APS: NIH must halt its efforts to define basic research with human subjects as clinical trials. The basic human subjects research community, academic institutions and organizations, and other groups are unanimous in opposing this definition. It is entirely unclear to APS and the community why NIH is persisting in its efforts, especially given that including basic research with human subjects in the definition of clinical trials will not solve the problem of the underreporting and lack of registration of true clinical trials.

Moreover, APS requests that NIH's clinical trials definition and associated policies, case studies, and other guidance be reverted to their 2014 status, prior to the introduction of the expanded definition of clinical trials to include basic research with human subjects, and not permit directly or indirectly by implication or reference a definition of clinical trials that includes basic research with human subjects. The definition of clinical trials must be clear so as to not automatically classify basic research with human subjects as clinical trials.

As noted by Congress in its message to NIH, "Fundamental research is critical to the NIH mission and of value to the public, and there is concern that policy changes could have long-term, unintended consequences for this research." We agree with this assessment and ask that NIH make a fresh start and engage in a process that is focused on designing policies that are appropriate for basic research with human subjects to meet the goals that we share with NIH with regard to ensuring transparency and rigor in research.

Lupia Comes to Washington

New SBE Chief at NSF Values Science Communication

The National Science Foundation (NSF) has selected Arthur "Skip" Lupia to head the Directorate for Social, Behavioral, and Economic Sciences (SBE), which oversees most of NSF's funding for psychological science research. Lupia is the Hal R. Varian Collegiate Professor of Political Science at the University of Michigan, a Carnegie and Guggenheim Fellow, and is well-known for his expertise in decision making and science communication. In a Q&A with the Observer*, Lupia talks about future directions for behavioral science at NSF.*

During your career, you've been in the vanguard of leadership in science policy. Now, you are the highest-ranking SBE scientist at NSF, and you will have a seat at the table when critical budget decisions are being made. How do you envision making the case for stronger support of our sciences in this process?

Thank you for asking this question. First, we need to better articulate the value proposition. I think that SBE science has never been stronger than it is today — in terms of the range of data we collect, analyze, and interpret; the increasing diversity of our scholars and methods; and the increasing influence of our work on so many facets of life. Yet few of us were trained to describe the benefits of our research to nonspecialists. Moreover, the topics of SBE science are so familiar that some people have a hard time believing that science can produce valuable and nonobvious insights. So we need more people who can tell these stories more effectively. When more nonscientists can tell themselves stories about how SBE science was the critical ingredient in producing important outcomes, it is easier for them to be our allies. So I am working to create strong, iconic, human-scale narratives about the transformative power of SBE science.

Arthur "Skip" Lupia

While some members of Congress seem to view behavioral science as a liability, many understand the value of the work we do — as evidenced most recently by APS Past President Mahzarin Banaji and her colleagues receiving the Golden Goose Award, which recognizes federally funded basic research that leads to major breakthroughs. How will you leverage that and similar support among policymakers on behalf of the field?

First, I want to join everyone else in congratulating Mahzarin Banaji, Tony Greenwald, and Brian Nosek on their incredible honor. I attended the ceremony. The importance of basic research in the SBE sciences received multiple endorsements and shoutouts. Big night for them and for all of us in the SBE community.

Now to the question of support. At NSF, we work for the country as a whole and Congress funds us. We are grateful for their support. To build support for basic research, my approach is to first listen. I will listen to any member of Congress's concerns and work diligently to help our organization find ways to address their needs through NSF's vital mission. In many cases, when I listen to a member of Congress, particularly when they are describing how they want to serve our country, I am able to link their concerns to basic SBE research and describe ways that it is improving the lives of their citizens, helping improve safety and security, helping to make farms, offices, and factories more efficient, and helping a wide range of public- and private-sector entities deliver critical services more effectively. I often find that when we can demonstrate value to them, they are happier to support us.

Increasingly, we are seeing the SBE Directorate focus on supporting cross-directorate initiatives (e.g., NSF's 10 Big Ideas). What does this mean for core programs in psychological science and related areas?

The Big Ideas are a big deal at NSF. They are an attempt to address critical concerns. They are structured in ways that encourage broad interdisciplinary collaboration. These attributes of the Big Ideas have captured the attention of many people in Washington and are helping more than a few more forcefully articulate the importance of supporting basic research. In this new program are amazing opportunities for scholars who want to do transformative cross-disciplinary or interdisciplinary research. That said, basic research is the organization's calling card. That work happens in disciplines. Core programs are not going away. They are the heart and soul of the place.

Recently, President Trump selected meteorologist and former National Science Board (NSB) member Kelvin Droegemeier to head the White House Office of Science and Technology Policy (OSTP). As a member of the NSB, Droegemeier voiced strong support for behavioral science, and the NSB recognized APS Fellow Kristina Olson with the Alan T. Waterman Award, NSF's top honor for early-career scientists. (We're pleased to note that APS nominated her.) How do you plan to engage Droegemeier, OSTP, and the NSB during your tenure at NSF?

Great question. I think that Professor Droegemeier is a great choice. He is not only a groundbreaking scholar in his field, but he has a very broad intellect. He is an outstanding leader and collaborator. I know this because he brought me into one of his projects several years ago — an intellectually diverse group — and managed it with spectacular effectiveness. Thinking I might be managing a bigger endeavor someday, I was taking notes on his leadership style. It was a master class.

With Professor Droegemeier, OSTP, and NSB, my initial approach is to learn as much as possible about what they need and to be as helpful as possible to their respective missions. With this approach, understanding evolves and collaborations emerge. I already have relationships with a number of people in these organizations and I enjoy working with them.

As you know, APS has a long history of advocating for behavioral science — in fact, we even led efforts to establish the SBE Directorate. We very much look forward to working with you in your new role. What can organizations like ours do to support you and SBE?

This is an opportune time for me to thank your organization and all of its members, not just for supporting SBE, but for all that you do on a daily basis to advance science, teach the next generations, and serve society. Sometimes, I think that we can get lulled into taking one another for granted — I want to avoid that. I am deeply grateful for what your organization does. Building a means for you to accomplish even bigger things in the future motivated me to come to Washington.

How to support us? Send great proposals. We can't fund proposals that we don't get. If you are not sure about how to approach NSF, contact one of our program officers. They know how our review processes work and about foundation priorities. I have met nearly all of them at this point. They work really hard and are all highly motivated to fund that next study that will transform science.

Although you've spent plenty of time in the Washington policy arena, this is the first you've worked in government full-time. How's the transition from academic life going? What are some of the big differences between academia and life inside the Beltway?

The biggest difference is the pace. I tell people that my welcome mat was a tidal wave. My average day is a 10-hour sprint. I do this for two reasons. One: There's a lot of work to do. Second: I want to show my support for NSF's staff and let them know that I'm "all in." Our staff is amazing. They are so dedicated. They make everything work.

I think that the transition is going well. I want to be as effective as possible and sooner rather than later. That keeps me focused and has made the transition easier.

How did you get the nickname Skip?

Parental compromise. I have the same name as my father, so I was going to need a nickname right from the start. My dad's best friend was a man named Orick Manson. He was the goalie on my dad's hockey team. His nickname was Skip. After a week of testing other nicknames, they tried that one. It stuck. I publish under my given name, but Skip is what my friends call me.

Again, thank you for all of the ways that you advance science and serve others.

To learn more about the establishment of the SBE Directorate, read "NSF Directorate: Yes!" from the November 1991 issue of the APS Observer at bit.ly/2CWWbra. ●

APS Award Address

Cognitive Crossroads

Jonathan D. Cohen Tackles the Mysteries of Multitasking

Why is it so difficult to concentrate on two things at once? Despite decades of research, psychological scientists aren't quite sure.

During his APS William James Fellow Award Address at the 2018 APS Annual Convention in San Francisco, Jonathan D. Cohen of Princeton University discussed exciting evidence that he has brought to bear on the vexing mysteries of multitasking.

For Cohen, multitasking is intertwined with humans' powerful ability to exercise cognitive control. Our species has a unique capacity to "guide behavior in accord with internally represented goals or intentions," particularly when doing so "involves overcoming otherwise compelling response tendencies." For example, when humans have an urge to scratch an itch, a compelling response tendency, they can use cognitive control to stop themselves from scratching. This ability isn't found among any of our fellow animals, at least not without extensive training. Yet people can do it with a single instruction.

Despite our incredible ability to use cognitive control, it is well known that people in many situations perform poorly when they attempt to simultaneously complete two tasks that both require mental concentration. Paradoxically, in daily life, feats of multitasking abound: To drive a car, one must monitor road conditions, approaching vehicles, speed, and sometimes revolutions per minute. Skilled drivers may be able to stay abreast of all of these factors while listening to a podcast, minding the behavior of young passengers, or even abstaining from scratching an itch. Yet under other circumstances — for example, if the road conditions deteriorate — multitasking becomes challenging even for experienced drivers.

Despite our incredible ability to use cognitive control, it is well-known that people in many situations perform poorly when they attempt to simultaneously complete two tasks that both require mental concentration. Paradoxically, in daily life, feats of multitasking abound.

Early work on cognitive control contrasted it with automatic mental processes that happen so naturally they can be difficult to repress. People who know how to read, for instance, have a hard time ignoring written words' meaning, as demonstrated by the Stroop task (see Posner & Snyder, 1975). As kindergarten teachers and driving instructors can attest, automatic processes such as reading and driving don't start out as automatic. It can take painstaking practice for controlled processes to become automatic ones.

Multitasking is intertwined with humans' powerful ability to exercise cognitive control, says APS William James Fellow **Jonathan D. Cohen**. This ability isn't found among any of our fellow animals — at least not without extensive training — but humans can do it with a single instruction, he adds.

Beginning in the 1970s, many psychological scientists used the analogy of a computer's central processing unit (CPU) to explain the "seriality constraint" that makes it so hard to do two attention-intensive tasks at once. Cohen, however, is skeptical of this CPU analogy. After all, the human brain's prefrontal cortex contains approximately 30 billion neurons. "Thirty billion cores, and you can't do two two-digit arithmetic problems at the same time?" Cohen asked in San Francisco. "That just doesn't seem right."

What if, Cohen began to wonder, cognitive control isn't a *limitation* on the brain's processing capacity but rather a way to *harness* the power of shared cognitive representations that are necessary for making sense of complex information? Take the Stroop task. When we see the word *red* printed in yellow ink, we're only seeing one object, but that one thing has two purposes: It conveys information about both a color and a word. To sort out all this data, the brain needs a control signal that helps us decide which possible representation — linguistic or chromatic — we need to use. If we gave both the linguistic and chromatic representation the "go ahead" at the same time, we might say "rellow" or "yed" in response to a Stroop item. Could cognitive control be akin to a traffic signal that referees activities in the human mind, preventing "accidents" from occurring when mental processes intersect with one another?

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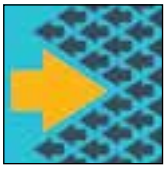

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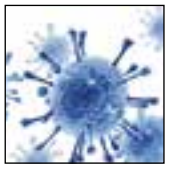

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Cohen became convinced that the question of how these conceptual crossings affect traffic flow in the brain was key to understanding cognitive control. Previous models rooted in a multiple-resources theory of attention — including APS Fellow David E. Meyer and David E. Kieras's EPIC model and Niels A. Taatgen and Dario D. Salvucci's threaded cognition model — had already begun to address this question. Nonetheless, in Cohen's estimation, these models left crucial questions unanswered: How does the number of crossings, or the frequency of sharing of representations in psychological terms, affect the overall parallel-processing capacity of the system or the demands for control? How does that scale with network size? And, perhaps most importantly, if such crossings pose problems, why do they exist? Why doesn't the brain build the equivalent of overpasses and underpasses that allow different activities to occur without interfering with one another?

Cohen suggests that sharing mental representation between tasks actually creates important cognitive advantages: Shared representations help us learn faster, more efficiently, and with greater flexibility.

Using computer modeling, Cohen and his team constructed networks that simulated simultaneous decision-making processes under conditions where a reward would motivate the decision-maker to choose the correct option. The team designed their model to include shared representations such as the ones that Cohen believed might hypothetically exist in the brain. Introducing 20% overlap among the processes responsible for decision-making — a figure that Cohen considers a reasonable estimate of pathway overlap in the human brain based on our current understanding of it — radically limited the model's capacity to multitask.

"Once you get to about 20% overlap," Cohen found, "it doesn't matter how big the network is … There's a fixed number of maximum processes that [the network] can do." Cohen explained, "A network of 60 or 1,000 or by extension a million or a hundred billion … can really only do about 10 to 15 things at once in order to maximize reward." Adjusting some of the model's underlying assumptions could, by Cohen's estimation, reduce the system's multitasking capacity to even fewer concurrent tasks, perhaps as few as one or two at a time — a conundrum familiar to many of us who struggle to multitask. Cohen asserted that cognitive control is not responsible for this problem; rather, it is there to manage it, ensuring that for tasks that share representations, only ones that won't interfere with each other are executed at one time. Saying that the capacity for cognitive control is limited is like blaming firemen for the fire: Although they are often seen at the scene of a fire, they are not responsible for it; they are there to put it out.

If Cohen is correct that sharing representations among tasks restricts multitasking severely, and requires cognitive control to manage it, why should such shared representations exist in the first place? Wouldn't it make sense for evolution to endow us with a more efficient information-processing network? Of course much of the brain is in fact more like that, allowing us to multitask in many situations.

Cohen suggested during his award address that sharing mental representation between tasks actually creates important cognitive advantages: Shared representations help us learn faster, more efficiently, and with greater flexibility. In computer science, cutting-edge deep learning techniques rely on shared representations to do what more traditional algorithms can't, namely allowing programs to generalize and categorize according to nuanced similarities between subjects.

It isn't a perfect system. Cohen used a Stroop-style task to show the audience that, while shared representations allow us to learn novel tasks quickly, they can sometimes trip us up. When asked to point left upon seeing the word *red* and right upon seeing the word *green* (a novel task) at the same time as naming the color in which the word was written (which didn't match the color *named* by the word itself), the audience struggled. In this situation, the audience was being asked to do two tasks that, in principle, it should be possible to do at the same time — verbally respond to the color and manually respond to the word. However, processing the word uses the same representations that are used to name it (that is, respond to it verbally), which interferes with the verbal response to the color.

This problem would have been avoided if, in learning the manual response to the word, different representations were used than for naming it. Such a dedicated representation would have taken time to develop (a process not unlike the time-consuming work of learning to read, drive, or use sheet music to play a piano concerto). So, for Cohen's audience, sharing the representations of words allowed a new task to be learned quickly but caused interference with another task (color naming). Cognitive control "is there to solve that problem," Cohen said, like a traffic signal that says, "Don't try and do these two things at once, or you're going to get in trouble."

Understanding the close relationship between cognitive control and shared representations, Cohen said, has implications for other problems in psychological science and allows for a more nuanced understanding of the differences between controlled and automatic processing, the trajectory by which controlled processes become automatic, and the means by which old knowledge can interfere with new learning. And, of course, it brings psychological researchers one step closer to understanding why an organ as powerful as the human brain is so darned bad at doing two things at once.

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To watch video of Jonathan D. Cohen's award address, visit www.psychologicalscience.org/r/cognition.

TEAMS IN SPACE

It Isn't Just Rocket Science

All it may take for a team of the most highly trained, courageous astronauts to fall apart in the vacuum of space is a squabble over Nutella.

During a situational experiment designed to model the conditions necessary to support long-duration space exploration (LDSE), participants were given a finite amount of the popular hazelnut spread to last them the entire "trip," said APS Fellow Steve Kozlowski, a Michigan State University scientist who studies teams working in extreme environments and who heard about the incident. One member of the group, however, ate more than their share — and refused to "fess up."

The seemingly minor incident caused an almost irreparable rift in the group, seriously impeding collaboration and teamwork throughout the project, he explained.

Kozlowski is among a growing cadre of behavioral, industrial/organizational, and human-factors psychological scientists studying human behavior, specifically how we function in teams, in space. He has partnered with NASA to track 32 LDSE experiments since 2009.

"It's a totally immersive experience," he said of LDSE simulations. "Once you're there, you're there. Your connections with the rest of the world are very limited or nonexistent, and your social world is much smaller, [down] to the people who are in the same environment confined with you."

Ever-Evolving Entities

Although Kozlowski's team can only study a few people at a time — LDSE environments such as habitats with limited space, food, and contact with the outside world are designed for small groups —they can glean a wealth of information from those individuals, he says. The participants submit daily journal entries for study, offering the researchers hundreds of data points that paint a picture of a team as an ever-evolving entity.

"We have data from three missions that were longer than 6 months," he explained. "In every single one of them, there's no 'Boom' [moment], but somewhere between 4 and 7 months, one or more members start to desynchronize. We see these teams of six people break into two or three subclusters," and the group begins to fracture.

These three missions, which Kozlowski said represent "rough replications" due to their similar natures (size of group, duration, environment), are helping psychological scientists predict — and potentially prevent — stressful phenomena.

> "It's a totally immersive experience … Once you're there, you're there. Your connections with the rest of the world are very limited or nonexistent, and your social world is much smaller, [down] to the people who are in the same environment confined with you."
> -Steve Kozlowski

The US administration's new "Moon to Mars" initiative includes several goals, such as conducting a "crewed flight sending Americans around the Moon in 2023," that could have a major impact on psychological scientists' LDSE research because those journeys will require teamwork across even longer stretches of time and distance.

According to NASA, a trip to Mars would take approximately 9 months — and an even longer duration for the return trip due to travel restrictions such as having to wait for the appropriate launch time — and involve more than one organization's oversight.

For example, Kozlowski said, "there is this myth in the community of a 'third-quarter effect,' in which astronauts report getting most down in the third quarter [of their missions]. We really want to understand what the experience is like and what kinds of cycles might be present in the data … that's an obvious thing where you'd want to have countermeasures in place."

Wearing Your Heart on Your Sleeve

One such countermeasure might take the form of wearable technology. Psychological scientists studying industrial/organizational behavior are experimenting with sensors that measure peer interactions, both physical (triggered by the sensors) and virtual. In this case, bioinformatics helped alert researchers to participants' bodily reactions to communication — both positive and negative — from other teammates.

In a 2009 study, a team of psychological scientists gave 22 employees at a German bank "sociometric badges" designed to measure face-to-face interactions, proximity to others, physical activity levels, and speech. The employees wore the badges for 20 days and each day answered questionnaires about their levels of productivity, job satisfaction, and group interactions; their email communications also were monitored.

By comparing the information from the badges, self-reports, and emails, the researchers were able to identify factors affecting workplace positivity, peer interactions, and organizational management. They found, for example, that the more total communication (email and face-to-face) a person engaged in, the lower they rated their level of job happiness. In addition, they discovered that individuals with the most central roles in the organization (i.e., those with less autonomy and creative opportunities) had decreased job satisfaction compared with their less centralized peers.

The psychological scientists say this experiment could have implications for team building, company structure, efficient methods of workplace communication, and performance.

"These tools can begin to fuse the information together to help us figure out which teams are more effective and why they are more effective," said Kozlowski, who has been incorporating wearable badges into his LDSE missions to measure team members' stress levels in their interactions. "This could then be a way in which to train people and create protocol. The badge just opens up new tools along with these other digital traces. To me, that's one of the neat things."

The Isolation Factor

Teams working in remote environments (or simulations thereof) are not so different from more routine collaborations, said Jay C. Buckey, a former astronaut who participated in the 16-day NASA Final Spacelab Mission and studies space physiology and medicine. But the solitude creates particularly difficult conditions such as increased physical and mental stress.

"In our daily lives, we face a lot of the same psychological challenges that long-duration astronauts do," such as differences in "outlook, expectations, and past experiences," Buckey said. "The isolated and confined environment magnifies their importance tremendously."

The International Biomedical Expedition to the Antarctic (IBEA), an investigation of environmental stress conducted

in 1981, offers one such example. Twelve biomedical scientists and technicians underwent a mission consisting of 142 days of physiological, psychological, psychophysiological, microbiological, immunological, and sleep experimentation in Sydney and the Antarctic to see how they would react to such testing in extreme conditions. Although these professionals were prepared to undergo an invasive series of studies by an outside team that accompanied them, the scientists suffered from several stressors, including lack of contact with the outside world, fatigue, and resentment due to unequal work load.

> [T]eams that used debriefs were consistently more effective than teams that did not, showing an average performance improvement of 20% to 25%. Debriefs tended to be more effective when they were structured and when an outside facilitator lead them.

One of the main reasons the IBEA team suffered difficulties was their lack of understanding of team cohesion, psychological scientists Anthony J. W. Taylor and Iain A. McCormick concluded in a 1985 paper evaluating the success of the mission.

"[D]espite their previous experience, few of the scientists had any real understanding of group dynamics or of procedures by which subjects could be humanely and carefully treated," Taylor and McCormick wrote. "In fact, it was the intervention of the senior author that enabled the group to ventilate and solve some of its problems, build group cohesion, and ensure the continuation of the project."

A variety of outlooks, expectations, and past experiences can be a source of strength for a group, but these differences can also be points of conflict and ongoing friction.

"Each person in the group has to know how to manage that tension," Buckey added.

Asking the Right Questions

Dorothy Carter, an industrial/organizational psychologist working at the University of Georgia, is partnering with NASA to ensure that their missions don't suffer similar breakdowns in group cohesion.

"To achieve their mission objectives, the members and component teams comprising spaceflight multiteam systems will need to develop and maintain effective patterns of psychological relationships (e.g., shared understanding, trust/influence) and behavioral interactions (e.g., information sharing, coordination) within teams (i.e., teamwork) and across teams (i.e., multiteamwork)," Carter explained. She noted, however, that effective patterns of communication and interaction often do not emerge seamlessly. Teams — and the combinations that comprise them — are ever-changing and complex, so breakdowns that negatively affect performance can occur often.

Carter is at work on Project FUSION (Facilitating Unified Systems of Interdependent Organizational Networks), an applied research project that began in February 2018. A team of psychological scientists is conducting field studies, agent-based modeling, virtual experimentation, and lab testing to discover what elements of LDSE missions most strain team dynamics. Their research will include interviews, focus groups, and observations with NASA personnel as well as experiments with the newest crew living in NASA's Human Exploration Research Analog, a confined environment designed to "mimic the hazards of life in space," according to Carter.

NASA asks, "How can we help ensure that a single-, four-, or six-person team can function seamlessly throughout the duration of a mission with unprecedented challenges?" Carter said of her work with the organization. "The team will be multicultural and interdisciplinary, working in uncomfortable and dangerous conditions while at an extreme distance — up to 128 million miles — from ground control teams back on Earth (roughly the equivalent of 142 trips to the moon!)."

No One Size Fits All

Marissa Shuffler (Clemson University) is an industrial/organizational psychologist who works with Carter to study NASA's extreme teams. She says one of the most important aspects of team building can be counterintuitive — there is no one right way to build a team.

"There are many different types of what we more broadly refer to as 'team development interventions,' each of which can affect certain aspects of teams," Shuffler explained. "When we think about developing extreme teams, it is important to match the specific types of interventions to specific team attitudes, behaviors, and cognitions that may need to be improved or developed. For example, a team debrief after an intensive training preparation exercise for a crew of astronauts can really help the crew to hone in on what they did well as a team, as well as areas for improvement."

Indeed, a 2013 meta-analysis indicated that a 15-minute debrief can lead to robust improvements in performance for teams of professionals ranging from astronauts to accountants. APS Fellow Scott Tannenbaum and his colleague Christopher Cerasoli at the Group for Organizational Effectiveness, a global consulting firm, conducted a meta-analysis of 31 studies on debriefs comprising a total of 2,136 participants. Their results indicate that on average, debriefs improved effectiveness over a control group by around 25%.

Their extensive review on the literature identified four essential elements to an effective debriefing:

- Active self-learning — Participants engage in some form of active involvement rather than being merely passive recipients;
- Developmental intent — A clear, primary intent for improvement or learning that is nonpunitive rather than judgmental;

- Specific events — Involves reflection on specific events or performance episodes rather than general performance or competencies; and
- Multiple information sources — Includes input from multiple team members or from a focal participant and at least one external source, such as an observer or objective data source.

"By pairing active learning with multiple information sources to improve situational understanding and by identifying lessons learned and establishing specific future plans and goals, debriefs are designed to give individuals and teams a systematic, credible method for improving their performance," the researchers write in the journal *Human Factors*.

Overall, they found that teams that used debriefs were consistently more effective than teams that did not, showing an average performance improvement of 20% to 25%. Debriefs tended to be more effective when they were structured and when an outside facilitator led them. Although the results were robust, the researchers urge caution before making any causal inferences.

These kinds of debrief techniques are already being incorporated into plans for a future trip to Mars, as Tannenbaum, Kozlowski, APS Fellow Eduardo Salas (Rice University), and colleagues report in a 2015 article in *Current Directions in Psychological Science*.

Communications between Earth and Mars will have a lag of at least 20 minutes each way, so psychological scientists are working with NASA to develop automated debrief protocols that don't rely on outside facilitators. One tool is already being tested with teams living and working together in isolated confined environments that simulate life in space.

"The tool gathers and analyzes crew input to produce a customized debrief guide for each team, with a focus not only on team and task work but also on factors that might affect team resilience," lead author Salas and his colleagues wrote.

The Premium Blend

Another factor that concerns NASA officials, and that psychological scientists are helping them understand, is team composition. LDSE mission success depends on selecting crew members who can work well together. But research shows that traditional personnel-selection models, which focus on individual qualifications for designated roles, don't necessarily mesh with missions where collaboration and teamwork are at a premium, Salas and his coauthors say. The space agency is funding research by psychological and other organizational scientists to identify the optimum crew composition, with examinations of role preferences, collective orientation, living-style preferences, and other attributes of team members.

Shuffler also works with the US military, which has given her a novel perspective on how each team varies. While she noted that, as with extreme-environment teams, military personnel face unique challenges, she also lays out some real-world interventions and solutions.

"We know from research with military units, aviation crews, and similar extreme teams, if we can provide the tools and resources that can help teams create and sustain necessary conditions — such as clear roles and responsibilities, shared knowledge of the team's goals and how they are going to coordinate, appropriate conflict management strategies, and a psychologically safe climate for admitting errors and rewarding team successes, to name a few — they can be successful," she said.

Kozlowski, who also has worked with the military, agreed.

"No two teams do things exactly the same way … and the army can't tell you what is the best way to do this," he concluded. "It's all about asking questions. We're on the cusp of a potential revolution by badges, digital traces, and other things like that to augment questionnaires. It gives us new insights to open up and unpack these process dynamics, like movies instead of snapshots." And LDSEs missions focused on space, said Kozlowski, are one of the most engaging, interesting, and valuable ways to do that. ● **–Mariko Hewer and Scott Sleek**

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Remembering APS Past President John T. Cacioppo (1951–2018)

Richard E. Petty
The Ohio State University

John T. Cacioppo was an extraordinary scientist whose incredible mind and determination transformed several areas of psychological science. When I first met him at age 22, when we were both starting graduate school in social psychology at The Ohio State University (OSU), I had no idea how lucky I was or how important John would become to me and to the field in general. Our very first meeting was at the home of our anticipated first-year faculty advisor, Tim Brock. We were sitting around the dinner table conversing when Tim's wife, Sheri, brought out a large tray with the evening's main course — a roast of some sort. As she entered the room, she tripped on the edge of the carpet and the roast flew into the air. John leapt upward, catching the roast with one hand and then offering his other hand to our hostess to prevent her from falling down. While sitting frozen in my chair, all I could think was, "Who is this guy?" Over the next 45 years of our collaboration and friendship, I saw many such incredible (and I mean literally unbelievable, but true) feats that ranged from the academic to the athletic to the personal.

As the world now knows, that 22-year-old budding scholar turned into one of the most recognized psychologists of our generation. I was fortunate to have had a front-row seat to watching John develop from a young and promising graduate student to an international scientific superstar. John is one of those once-in-a-lifetime psychologists whose impact is felt broadly and deeply within the field. His cumulative accomplishments are stunning. Over his all-too-short career he published more than 500 scholarly papers and authored or edited 20 books, and his work has been cited well over 100,000 times. More importantly, many of these works are so inseparable from the field that it is hard to imagine contemporary psychology without them. As one might imagine, his research has been continually funded by millions of dollars' worth of grants from federal and private sources. He gave invited lectures and keynote addresses all over the world, and he won the top awards that psychology has to offer: the APS William James Fellow Award and the American Psychological Association's Distinguished Scientific Career Contribution Award. He has also won top awards from organizations such as the Society for Personality and Social Psychology (SPSP), Society for Psychophysiological Research (SPR), Society for Consumer Psychology (SCP), and the Society for Social Neuroscience.

John is not just the recipient of accolades; he also served the profession in critical ways. For example, he was elected president of numerous societies broad and general, from APS to the more specialized SPR, SPSP, and SCP. Although presidencies are sometimes merely honorific, to John the role of president provided an opportunity to do great things. At APS, he wrote powerful thought pieces (presidential columns) and organized international exchanges with various countries, most notably China. At SPSP, he started what became the leading theoretical journal in that field, the *Personality and Social Psychology Review*. As president of SCP, he founded their flagship outlet, the *Journal of Consumer Psychology*. Yet he never took credit for these journals, and most people in these fields have no idea that John was the originator of these now-essential publications.

John's most important early research contributions were efforts in which the two of us were eager collaborators. We spent many nights arguing and debating the postulates of what became the *elaboration likelihood model* (ELM) of persuasion, outlining thoughtful and nonthoughtful mechanisms by which evaluative decisions were made. We disagreed on who was higher in *need*

➡

for cognition, a scale we developed aimed at assessing individual differences in the motivation to think (the obviously correct answer is John — despite his protestations). Although we continued to work on aspects of these ideas together until very recently, he mostly moved on to other topics.

Among John's most notable and enduring subsequent contributions were his production of the highly influential multiedition *Handbook of Psychophysiology* (with Lou Tassinary and Gary Berntson). In fact, Berntson became one of John's most important collaborators (and friends), and they jointly worked on notable papers outlining the importance of multiple levels of analysis in psychology, presenting bivariate models of both autonomic as well as evaluative space and, perhaps most profoundly, introducing the world to a new discipline they called social neuroscience. When John first began to write and talk about studying the brain in connection with social behavior, many in the field were quite skeptical. But John was simply ahead of his time. Now, studies of the brain and social behavior are mainstream and even trendy. This burgeoning interdisciplinary area now has its own society and its own journals and is thriving. Virtually every major psychology department over the past several years has wanted to add someone who works in this area to its faculty.

> "All the memories that follow are from people who played an important role in John's academic life … but most also had a vital role in his personal life."
> -Richard E. Petty

In the post-Berntson period, John met and fell in love with Stephanie Cacioppo, and this inseparable power couple collaborated in a new domain that John came to call his research passion (though whatever John was working on at the time was pursued with passion) — the psychology of loneliness. John's case for the importance of social neuroscience and multilevel analysis is shown convincingly in this domain of inquiry.

Given these fundamental contributions, it is incredible that John almost didn't become a psychological scientist at all. Indeed, his undergraduate major at the University of Missouri was economics. It was a near-random encounter with social psychologist Lee Becker, an Ohio State social psychology graduate, that ultimately led John to the social psychology program at OSU for grad school, and the rest (as they say) is history. In grad school, John blazed his own path, becoming not only an expert in social psychology (advised initially by Bob Cialdini and Tony Greenwald) but also psychophysiology (mentored by Curt Sandman). Thus, right from the start John was cutting across traditional boundaries, and he continued to do so until the very end.

The last time I saw John, in October 2017, he was looking good and was incredibly happy. He seemed to have beaten his cancer, and the University of Chicago was giving him one of their highest honors — the Phoenix Prize. Many of John's current and former students and collaborators were present, and the event served as a sort of oral festschrift — an opportunity to honor (and as it turned out, say goodbye to) John during his lifetime.

One can't capture John's brilliance, sense of humor, or complexity in a short essay, but the remembrances below illustrate some of his many qualities and contradictions. In personality, he could be very tough with nearly impossible standards, yet he could also be so incredibly kind and gentle. In personal interests, John loved OSU football, but he also reveled in the fact that the University of Chicago abandoned the sport to focus on academics (a justification he raised repeatedly for leaving OSU for Chicago). All the memories that follow are from people who played an important role in John's academic life (these are academic remembrances, after all), but most also had a vital role in his personal life. They paint, in my view, an accurate portrait of a creative and hard-working genius who transformed not only psychological science, but also some of the notable people who engage in it. The full text of these comments appears at www.psychologicalscience.org/r/cacioppo.

Barbara Andersen

The Ohio State University

He was younger than 30 when he came, a bit of a lonely soul at the time. Yet Iowa is a beautiful place, Iowa City a small, lovely university town, and there was family. His interests in psychophysiology were strong then and growing by the day. He made the case to the National Science Foundation that training in this new area of study would be vital to the field. Amazingly, NSF funded a series of four summer "boot camps" for established investigators interested in learning "social psychophysiology." There were always greater sights on the horizon, however, and in 1988 he became the "spousal hire" (target of opportunity) for the advertised position in clinical that I was offered at OSU. All told, this was a very clever maneuver by the social area and enabled John to continue working with Rich and move more intensely into psychobiology with colleagues Gary Berntson, Martin Sarter, and John Bruno.

Gary Berntson

The Ohio State University

John and I collaborated well and I think we significantly contributed to the (at least partial) rapprochement between the social and biological perspectives, and we formalized the discipline of social neuroscience. That was no small feat back then. These days, everyone is a neuro-something. But at that time, there was a tremendous stovepipe animus between social and biological psychologists. John and I recognized the value added by an integrated approach.

Mary H. Burleson

Arizona State University

John practically radiated brainpower. His capacity to integrate diverse information from multiple domains and theorize meaningfully at amazing speed — even during spontaneous conversations — was legendary and awe-inspiring.

Stephanie Cacioppo
University of Chicago
Some say that "Mozart did not die; he became music." I believe John T. Cacioppo did not die; he became theory. My husband's legacy will live on through his seminal work, through all of us whose minds had the privilege of his influence and through our forever-lasting love. John Cacioppo will remain the love of my life, my intellectual hero, my inspiration, and my role model in life and science.

Robert Cialdini
Arizona State University
John stood out as possessing a pair of traits that rarely go together. The first was eagle-eyed attention to detail in all sorts of things. For instance, I was about to send to a key editor an important letter (in which I had abbreviated my professional title) until I showed it to John, who noticed that signing the letter "Robert B. Cialdini, Visiting Ass. Professor" might not be best. I am still grateful to him for that.

Josh Correll
University of Colorado
John demanded a lot of people. But he was also wonderfully compassionate and gentle. I felt blessed to work and argue and just spend time with him, hoping to absorb some of that sparkle. To me, he was a patient guide and constant, formidable guardian.

Stephen Crites
University of Texas at El Paso
There were also the countless times when I or one of my peers left the lab around 2:00 a.m. and saw John's office light on because he had returned to work and the instances when we sent him an email at midnight and received a response 5 minutes later. As I sit here now, I cannot recall a single time when John asked any of us to work harder (and he certainly never asked us to work as hard as he did). What I recall was his passion for science, dedication, and high standards.

Jean Decety
University of Chicago
John inspired many students and colleagues to adopt the multilevel perspective (from genes to societies) that he advocated so intelligibly for and applied to his own work. He had a clear vision for psychology, which he liked to describe as a "hub discipline" with a great deal to offer to (and learn from) other disciplines such as biology, medicine, economics, sociology, and political science.

John Ernst
Thomas More College
When I joined John's lab I was excited to meet the author, with Lou Tassinary (1990), of "Inferring psychological significance from physiological signals." I didn't know then that it would be the foundation for my thinking on teaching research methods for 20 years.

Wendi Gardner
Northwestern University
John was not a foodie until later in his life (a development credited to Stephanie). The usual academic reward of a meal at a high-end restaurant with visiting scholars was thus clearly less rewarding for John. Fortunately, he was always intellectually (even if not culinarily) omnivorous. Whether their expertise was Buddhist tradition or evolutionary biology, John was as delighted with his table partners' ideas as he was disinterested in dinner.

Susan Goldin-Meadow
University of Chicago
Sarah Brookhart
Association for Psychological Science (APS)
John's influence was evident across all APS activities, but among his most lasting contributions are his presidential columns, in which he wrote about psychology as a hub science, the importance of interdisciplinary research, and the evolution of our field into "an integrative, multilevel science."

His column "A Letter to Young Scientists" was one of the inspirations for a similarly-named column launched by the American Association for the Advancement of Science. John's insightful, elegantly composed essays were prescient regarding the directions psychological science and science more generally have taken in recent years, and they remain relevant and instructive today.

Anthony Greenwald
University of Washington
I last saw John in 2017 when he and Stephanie showed me their laboratory. I saw once again what many others have had the pleasure of witnessing — John's smiling enthusiasm as he explained how the latest EEG technology was achieving never-before-possible understanding of the brain's operation. Combined with the many imprints John left in publication form, the memory imprints he left in the minds of colleagues and students, as he did in mine, will long survive.

Louise Hawkley
NORC at the University of Chicago
From John, I learned many lessons about being a scientist — one of the most frequently repeated being the admonition to work from a theoretical foundation so that the bricks (individual studies) would, as stated by Platt (1964), contribute to the temple of science and not be left lying in the brick yard. But probably the most important lesson was what he taught me about perseverance. John did not tolerate "I can't do that."

Tiffany Ito
University of Colorado
There was also nothing like a research meeting with John, who had the ability to think about an issue from every angle *simultaneously.* You get a glimpse of this in the comprehensiveness of his written work, but that does not do justice to what it was like to watch it unfold before you within a few short minutes.

Jeff T. Larsen

University of Tennessee

A week after he died, I listened to a podcast interview with John. I heard the passion and the brilliance and I could almost see that big smile. I will admit that I yelled at him once or twice as I listened to the podcast. I wish he could have yelled back. Our 8-year-old was confused and taken aback when my partner tried to explain that John was something of a father to me, but that's how it is. Or how it was.

Greg Norman

University of Chicago

Although I witnessed countless examples where John's almost superhuman brilliance was on display, I was equally impressed by his willingness to do the most menial of tasks if that was what a project called for. For example, while traveling for a project with the US Army, John came past my hotel room while I was organizing paperwork for the next day of data collection. Without hesitation, he canceled his dinner plans and sat in the room with me for hours placing stickers on documents and licking envelopes. That was John, one of the most brilliant minds in all of science who was not above sitting on the floor and stuffing envelopes if he thought it would help progress the science.

Catherine Norris

Swarthmore College

At the University of Chicago, I was the first student to go through comprehensive exams in the social program. By the time it ended and I was asked to leave the room, I was convinced I had failed and they were going to ask me to leave the program. Almost immediately I was welcomed back in with a smile and a firm handshake from John. "Congratulations!" he said. "Do you want to know why we kept you so long? You were doing so well, we wanted to see how far we could push you." I've come back to this moment often lately, and after tough meetings have told my own students that I push them because John pushed me — and it made me better.

Howard Nusbaum

University of Chicago

When John joined the Department of Psychology at the University of Chicago in 1999, he found himself at home in the intellectual intensity of the university. When he joined us, our goal was to rebuild social psychology, which had not existed for decades. John came to build an exemplary program in experimental social psychology from scratch.

Joseph Priester

University of Southern California

I had the good fortune of taking John's undergraduate attitudes class at the University of Iowa. The enthusiasm with which he presented the history of attitudes, persuasion, influence, and other areas that he believed should be understood from an attitudes perspective (viz., all of social psychology) was inspiring. The final week of class, during which he integrated everything presented thus far into the elaboration likelihood model, was breathtaking, transfixing, and transformative.

Cacioppo presented a summary of his research at a 2013 White House workshop, co-organized by APS, that influenced the Obama Administration's creation of the Social and Behavioral Sciences Team to help the government translate scientific findings into solving practical policy problems.

Curt Sandman

University of California, Irvine

In the mid 1970s, a charismatic young man swaggered into my Ohio State office and asked if I would teach him how to measure muscle activity. He was interested in the motor theory of thinking and believed that susceptibility to persuasion was a function of the strength of subvocalized counterarguments. He believed subvocalizations could be detected with facial muscles. I agreed with the caveat that he would participate in our psychophysiology studies. He enthusiastically agreed and I gave him hands-on instruction by adding EMG to our studies. Several weeks into his "internship" he brought me a 100-page manual he had written to document details of collecting muscle activity. We published papers from that collaboration describing the consequences of controlled autonomic-nervous-system activity on perception and thinking.

Gün Semin

Utrecht University

We shall remember John by the science he has created together with friends and colleagues with whom he collaborated, the research projects he initiated and pushed, the generous contributions he made to the careers of others, and

his exceptional gift of sharing. He may no longer be with us, but his presence cannot be forgotten.

Louis Tassinary

Texas A&M University

John accepted me into his lab as a postdoc based on the recommendation of a colleague and a proposal I'd written, and we worked together closely for nearly 6 years. Our first paper took 8 hours to write and every second was a struggle, an impassioned donnybrook over the right concept, the right context, the right word, the right citation. Our last collaboration, together with Gary Berntson, involved far less drama but no less focus. It was always about getting it right.

Bert Uchino

University of Utah

Through his words and actions, John reinforced the importance of hard work, intellectual curiosity, high standards, self-improvement, integrity, compassion, and the need to support others. If I had the space, I could go into multiple instances of how he taught and modeled these lessons. To me, John has a much broader legacy that goes well beyond his scholarship and academic training.

Eric Vanman

University of Queensland

In 1981, during the summer before I started as an undergraduate at the University of Iowa, I learned that my freshman advisor (assigned at random) was John Cacioppo. I didn't know who he was, and there wasn't a way for me to learn more about him back then. I wrote a letter to Professor Cacioppo expressing my excitement about our first advising session. Amazingly, John wrote a kind letter back saying he looked forward to meeting me. His kindness to a freshman who knew nothing about the field, and his constant encouragement over those next few years, have had a profound impact on my own career in psychology.

Bill von Hippel

University of Queensland

John was a force of nature who brought the same intensity to everything he did. When we talked about research he was a buzz of ideas well past the point when my brain was empty and I was just nodding at everything he said.

Adam Waytz

Northwestern University

For John, failure never even felt like failure; it was all fun. A study that yielded confusing or disappointing results was an opportunity to develop a new hypothesis, a new study, a new method, or, as was often the case for John, an entirely new field.

Piotr Winkielman

University of California, San Diego

Obviously, John did groundbreaking work on fundamental questions using razzle-dazzle methods. But what stays with me is how mixed he felt about his brainchild — social neuroscience. John was simultaneously excited by its successes and pained by its excesses. He knew how complicated biology is, how naïve it is to look for simple correlates of anything in the body and the brain. He expressed concerns about replicability of splashy social neuroscience findings. In his domain of emotion physiology, he initiated rigorous meta-analyses that debunked widespread beliefs (e.g., physiological emotion specificity). ●

The full text of these comments appears at **www.psychologicalscience.org/r/cacioppo.**

Current Directions in Psychological SCIENCE

Teaching Current Directions in Psychological Science

Edited by C. Nathan DeWall and David G. Myers

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

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

Visit David G. Myers at his blog "Talk Psych" (www.talkpsych.com). Similar to the APS *Observer* column, the mission of his blog is to provide weekly updates on psychological science. Myers and DeWall also coauthor a suite of introductory psychology textbooks, including *Psychology* (*12th Ed.*), *Exploring Psychology* (*10th Ed.*), and *Psychology in Everyday Life* (*4th Ed.*).

A Handy Way to Study the Mind

By C. Nathan DeWall

Freeman, J. B. (2018). Doing psychological science by hand. *Current Directions in Psychological Science, 27*, 315–323.

When you look at a hand, what do you see? We use our hands to shake, strum, bake, eat, and signal pleasure or disdain. But, according to Jonathan Freeman (2018), a hand offers more than a behavioral tool to complete our everyday activities. Understanding a hand's movements unlocks a map into the mind's inner workings.

Psychological scientists have long studied hand movements to understand dynamic decision-making processes. Computer-based techniques for assessing fine-grained changes in hand movement speed and trajectory have contributed to this literature's growth (e.g., mouse-tracking [www.mousetracker.org]; Freeman & Ambady, 2010). For example, when you go shopping your hand may reach for the tasty marshmallows faster than the healthier mangos. Although this finding may seem trivial, the speed of hand movement trajectories can identify people prone to problem eating (Sullivan, Hutcherson, Harris, & Rangel, 2014). Unusually fast hands can predict an unhealthy future.

A hand movement's speed tells only part of the story of how it relates to dynamic decision-making. The trajectory of a hand's movement — the directness of its flight path toward an object — also signals how people make decisions. For example, imagine going to a voting booth and being presented with two candidate options. Both candidates are women who seem equally competent. Your hand wavers as you make your decision. After exiting the poll, a psychologist approaches you and asks, "How much did the candidate's femininity influence your vote?" "Not at all," you say. "I voted for the most qualified candidate."

APS Fellow **C. Nathan DeWall** *is a professor of psychology at the University of Kentucky. His research interests include social acceptance and rejection, self-control, and aggression. DeWall can be contacted at nathan.dewall@uky.edu.*

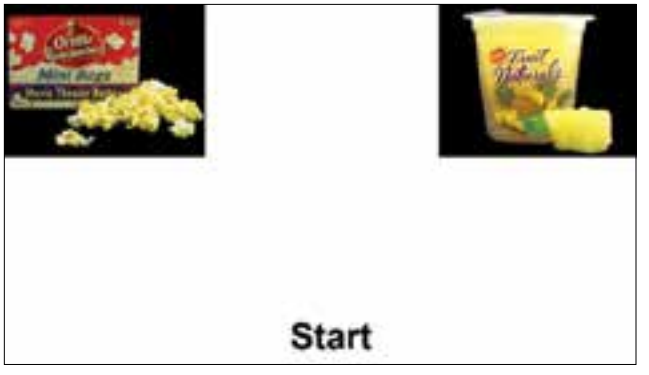
Or did you? In one study, participants viewed a series of political candidates and indicated whether the candidate was masculine or feminine (Carpinella, Hehman, Freemnan, & Johnson, 2016). Unbeknownst to participants, the computer mouse recorded the trajectory of their hand movement when making their decision (visit bit.ly/2NE7ryz for a video demonstration). What did the researchers find? Unlike Democratic candidates, Republican female candidates benefited from being perceived as feminine. Hand movements that veered toward a judgment of masculinity tended to predict lost elections.

To bring this cutting-edge psychological science into the classroom, students will complete a demonstration of mouse-tracking (based on Sullivan et al., 2014). Ask students to think of their favorite foods. In my experience, you won't have to try hard to get discussion going — students love thinking and talking about food. Did students first think of tasty foods? Healthy foods? Or foods that are both tasty and healthy?

Now that you have primed students to think about food, ask them to place their dominant hand in the center of their desk. Let them know that they will need to move their hand to the left corner or the right corner of their desk as they make some decisions. Using the following slides, ask students to move their hand to the food that they would prefer as quickly as possible.

Slide #1

Slide #2



Next, ask students to answer the following questions about their self-control (Brief Self-Control Scale; Tangney, Baumeister, & Boone, 2004) using the following scale: 1=*not at all like me* to 5=*very much like me*.

1. I refuse things that are bad for me.
2. I am lazy.
3. I say inappropriate things.
4. I do certain things that are bad for me if they are fun.
5. I have trouble concentrating.
6. I often act without thinking through all the alternatives.
7. I am good at resisting temptation.
8. People would say that I have iron self-discipline.
9. Pleasure and fun sometimes keep me from getting work done.
10. I have a hard time breaking bad habits.
11. I am able to work effectively toward long-term goals.
12. Sometimes I can't stop myself from doing something, even if I know it is wrong.
13. I wish I had more self-discipline.

Students can score their responses to the self-control scale by first reverse-scoring items 2, 3, 4, 5, 6, 9, 10, 12, and 13. They can sum their responses across all items in order to compute their overall self-control score. Were students' self-control scores greater or less than the average score of about 39 (Tangney et al., 2004)?

Time permitting, ask students to work with a partner to discuss their reaction to the demonstration and how their self-control score may have impacted the speed with which their hand moved toward the different foods. Finally, instructors can summarize Sullivan and colleagues' (2014) results. Ask students to predict what the psychological scientists found. The answer? People with relatively low levels of self-control moved their hands toward the healthy foods a bit slower than did people with relatively high levels of self-control. Do students think their responses would replicate those findings? How might measuring hand movements offer a better method for measuring food preferences than simply asking people?

Our hands help us navigate the world. They let us open doors, carry bags, play the guitar, and type papers. But hands do more than that. We extend a hand of friendship; we hand-pick our favorite clothes, foods, and friends; and we offer a helping hand to those in need. In between the mundane and meaningful are the hand's movements — the slow and fast, the straight and zigzagged. By understanding those minute movements, you can understand a lot about the mind.

Gasp! That Face Doesn't Mean What You Think

By Beth Morling

Gendron, M., Crivelli, C., & Barrett, L. F. (2018). Universality reconsidered: Diversity in meaning making about facial expressions. *Current Directions in Psychological Science, 27*, 211–219.

- *Are my students feeling bored, or are they pondering?*
- *She was definitely surprised — did you see her face?*
- *Does that nervous expression mean he's about to break the law?*

Thanks to textbooks, popular books, and TV shows such as "Lie to Me," students often believe that facial expressions reveal people's true feelings. But Maria Gendron, Carlos Crivelli, and Lisa Feldman Barrett (2018) present an about-face, explaining how this misimpression comes from early studies that, unfortunately, have stuck with us.

Universal Faces?

According to the classical perspective, pouting, gasping, or smiling reveal discrete emotions such as "sadness," "fear," or "happiness." In this view, facial expressions have an evolved, universal, and biological basis (Ekman, 2017). After all, even babies pout and chimpanzees bare their teeth. This perspective drives emotion training for people with autism, behavioral-detection officers in airports, and emotional-intelligence improvement courses. If faces provide basic, universal tells, then people can get better at reading others' true internal states.

But according to the Behavioral Ecology View (Crivelli & Fridlund, 2018), facial expressions are tools with which people influence each other in different contexts. If I smile while I approach you, the meaning depends on whether I wield a weapon or a wedding gift. A person's pout could be trying to get the clerk to offer her a free product. A gasp might communicate, "Really? Then what?" In this view, faces, like gestures, facilitate social life.

Beth Morling *is professor of psychological and brain sciences at the University of Delaware. She attended Carleton College and received her PhD from the University of Massachusetts at Amherst. She regularly teaches research methods, cultural psychology, a seminar on the self-concept, and a graduate course in the teaching of psychology.*

Diverse Methods to the Rescue

Research methods are the heroes of this story. Gendron and colleagues argue that research techniques used in past studies tipped the scales. In some early studies, researchers showed photos of posed facial expressions (e.g., smiling, scowling, pouting) to members of various small-scale human societies, such as the Bahimeo and Fore of Papua New Guinea (e.g., Ekman & Friesen, 1971). Participants selected the emotional term that matched each face. Despite limited contact with Western cultural contexts, they matched faces to emotion labels or stories in the same way Westerners did. Apparently, a specific set of facial expressions depict people's internal emotions in the same way around the world!

But Gendron, Crivelli, and Barrett point out that participants were required to select only from emotions (e.g., happy, disgusted, fearful, sad). This method constrains people to assign an internal psychological state (an emotion) to the photo, rather than to something else.

When the methods changed, so did the evidence for universality. For example, when Hadza, Himba, and Trobriander volunteers described faces in an open-ended manner, they used behavior terms such as "smiling" or "smelling" rather than mentalizing emotion terms. When asked to sort faces how they wanted, people used dimensions such as pleasant–unpleasant, not discrete emotions (Gendron et al., 2014).

Other methods asked people to match faces to interactive scenarios (for example, "he is going to start a fight" or "he is greeting you"). This method showed that facial expressions could indicate social intent instead of internal states.

Even when the traditional, constrained method was used, Trobrianders of Papua New Guinea, surprisingly, categorized a gasping face as expressing not fear (as Spaniards overwhelmingly did), but as anger and threat (Crivelli, Russell, Jarillo, & Fernández-Dols, 2016). Therefore, at least one so-called "basic" facial expression is not universal.

Teach How Methods Shape Conclusions

Prepare at least three slides with a different facial expression on each (Figure 1, opposite page) and make three different handouts. Students shouldn't know that their instructions differ, so you might say, "As I show each photo, please answer the question on your handout. Later we'll discuss everyone's reactions.

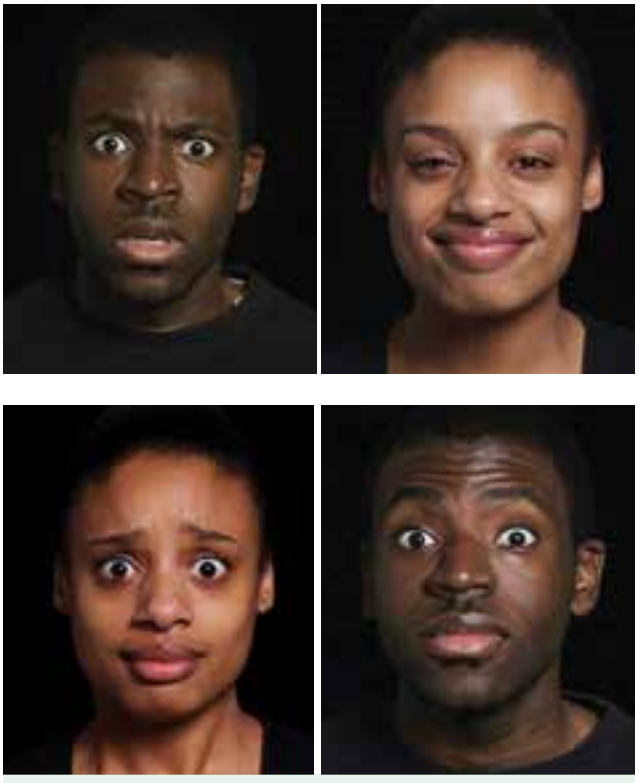


Figure 1. Ask students different questions about these photos to demonstrate how methods shape results. Photos courtesy of the IASL Face set (www.affective-science.org).

Group A answers this question for each photo:
Which word best matches the photo?
__ Happy
__ Sad
__ Angry
__ Disgusted
__ Fearful
__ Surprised
__ Other

Group B answers this question:
Which scenario best matches the photo?
__ The person is saying, "that stinks."
__ The person is saying, "back off or I will attack you!"
__ The person is greeting you and asking where you are going.
__ The person is asking you for help.
__ The best answer is not here.

Group C answers this prompt:
Write a sentence describing the photo.

Have students form groups containing members of A, B, and C. Students will discuss:

Did your responses to the photographs differ? How?

Which of the three research methods *constrains* people to interpret the photographs in a particular way? Which method is least constrained?

Next, address the universality data on emotions. Ask students to imagine a study comparing a Western culture to a small-scale culture such as the Hadza or Himba:

If you wanted to guarantee finding that people everywhere interpret faces as expressions of emotions, which method (A, B, or C) would work?

Which method would be likelier to find diversity in how people understand facial expressions?

Extend the discussion:

These expressions are posed and rather stereotypical (Gendron & Barrett, 2017). What might happen if the photos depicted spontaneous facial expressions?

How else might you measure people's interpretations of faces? What results would you expect?

Methodological choices shape both the questions we ask and how we ask them. As they learn about facial expressions, students can reflect upon how methods have influenced our thinking about what faces have evolved to do. ●

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Professional Networking as a Graduate Student

By Jenna Klippenstein

Networking means many different things to many different people, especially in graduate school. With many graduate students feeling uneasy about the post-PhD job market, the pressure to network, both socially and professionally, has reached a peak. This article will focus on networking at a professional level, defined simply as getting your name out into the academic world. The advice contained within this article may appear most relevant for students approaching graduation, but it is never too early to begin the networking process. Three methods of professional networking will be discussed: conferences, academic Twitter, and personal webpages.

Conferencing

For graduate students in psychology, conferences are the most ubiquitous opportunities to network at a professional level. Before discussing how to network at conferences, it is worth mentioning that most universities offer some sort of financial assistance for travel expenses. Of course, the amount of available funding and procedures for applying will vary by institution, but typically, a reimbursement process is followed (e.g., you will receive your travel stipend upon your return from a conference).

It's important to consider the most efficient ways to network at conferences. One method is to meet principal investigators (PIs) with whom you may be interested in completing a postdoctoral fellowship. The more you interact with these PIs, the more likely they are to consider your job application and provide you with an interview after your graduation.

Although meeting faculty is certainly important, special effort should also be made to reach out to fellow graduate students. I remember attending my first conference and meeting with an advanced graduate student upon my return. The student asked how the conference went, and I told her that I did not feel I had networked well. She said, "Well, did you meet any other graduate students?" I replied that I had indeed met quite a few graduate students, and she replied, "There you go — that is networking!" It took a bit of reflection for me to understand, but now, I realize that other graduate students may be some of the most essential people with whom to network. Importantly, fellow graduate students may be future collaborators — including both those whose research is similar to yours and those farther afield. Furthermore, fellow graduate students are resources, as they may have had academic experiences that you have not (e.g., applying for a certain award) and therefore may be able to share knowledge and advice to help you succeed. For these reasons and more, it is essential to ensure that your networking attempts do not exclude your graduate student colleagues.

Academic Twitter

One way to reach out to and meet other graduate students is through academic Twitter. Academic Twitter is not an independent entity but rather an academic way of utilizing traditional Twitter. This means that this is an easy and free method of networking, and for these reasons alone, Twitter is certainly worth a try. (As a side note, academic Twitter provides more than an outlet to network; it also offers access to useful resources and references. For example, I recently learned about Google Dataset Search, a Google toolbar specifically designed to search for public data sets, via Twitter. Furthermore, many academics share article preprints on Twitter, providing you with a chance to learn about novel research in your field ahead of publication.)

Academic Twitter will assist you in building a professional community by helping you keep up with a circle of academics of interest to you. To this end, Twitter goes hand in hand with conferences, as the colleagues you follow are likely to attend the same conferences as you. At larger conferences, locating all the talks and people you would like to see can be difficult; however, Twitter helps you (1) schedule meetings and (2) follow along with noteworthy research, as many academics will tweet about the conference using a hashtag. In the event that you cannot attend a conference, Twitter remains an alternative venue that will allow you to get your name out in front of a potential employer, for example by replying to a tweet about a preprint to ask questions about a researcher's work.

If you want to give academic Twitter a try, here are a few general accounts you may follow: @ProfessorIsIn (Karen

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Kelsky, focuses on academia and nonacademic matters), @GradSlack (general resource account that answers graduate student questions/comments), and @FromPhdToLife (Jennifer Polk, provides tips for academics who want to transition to nonacademic careers).

Personal Webpages

Personal webpages are another way to get a head start on networking. These webpages go hand in hand with your curriculum vitae by providing you with an extra layer of visibility; they also allow you to highlight a bit of your personality. I would argue that this is just as crucial as highlighting your academic skills while on the job market. Webpages can help PIs and future employers evaluate you as a good fit for a lab or job.

To get your website started, you will need to find a host. One option is Google sites, a free host with simple and generic website templates. Another option is Wordpress.com, which is slightly more customizable than Google sites but starts at $4 per month. A third option is Squarespace.com, which offers quite attractive layouts but starts at $12 per month. Ultimately, you will need to consider a combination of personal factors before deciding on the most suitable webpage host for you (e.g., where you are in your graduate career, what types of jobs you are aiming for).

Summary

The networking methods discussed in this article are simple, versatile, and efficient ways to reach large numbers of people, and you can utilize them in the way that best fits your style. I hope that these tips and information about conferences, academic Twitter, and personal webpages will help you get your name out into the academic world — whether you are a first-year graduate student or are nearing graduation. Happy networking! ●

Dan Ariely, Duke University, *The Washington Post*, August 24, 2018: Why Liars Lie: What Science Tells Us About Deception.

Hilary Bergsieker, University of Waterloo, Canada, *The New York Times*, September 14, 2018: Why Do People Stay When a Hurricane Comes?

Elliot Berkman, University of Oregon, *TIME*, August 28, 2018: 5 Science-Approved Ways to Break a Bad Habit.

Matthieu Boisgontier, University of British Columbia, Canada, *The New York Times*, September 26, 2018: Are We Wired to Sit?

Alia Crum, Stanford University, *The New York Times*, September 19, 2018: How to Help Teenagers Embrace Stress.

William A. Cunningham, University of Toronto, Canada, *Science*, August 27, 2018: Introducing 'Letters to Young Scientists,' a New Column from Science Careers.

Eli Finkel, Northwestern University, NPR, August 13, 2018: You 2.0: When Did Marriage Become So Hard?

Ayelet Fishbach, University of Chicago, *Quartz*, August 22, 2018: Psychologists Have Surprising Advice for People Who Feel Unmotivated.

Will Gervais, *Vox*, August 27, 2018: More Social Science Studies Just Failed to Replicate. Here's Why This Is Good.

Roberta M. Golinkoff, University of Delaware, NPR, August 31, 2018: 5 Proven Benefits of Play.

Alison Gopnik, University of California, Berkeley, *The Wall Street Journal*, September 20, 2018: Imaginary Worlds of Childhood.

Peter Gray, Boston College, NPR, September 3, 2018: To Raise Confident, Independent Kids, Some Parents Are Trying to 'Let Grow.'; *The New York Times*, September 1, 2018: How to Play Our Way to a Better Democracy.

Joshua Greene, Harvard University, *The Washington Post*, August 24, 2018: Why Liars Lie: What Science Tells Us About Deception.

Jonathan Haidt, New York University, *The New York Times*, September 1, 2018: How to Play Our Way to a Better Democracy.

MarYam Hamedani, Stanford University, *The New York Times*, September 14, 2018: Why Do People Stay When a Hurricane Comes?

Stephen Hinshaw, University of California, Berkeley, *The Washington Post*, September 10, 2018: ADHD Numbers Are Rising, and Scientists Are Trying to Understand Why.

Kathy Hirsh-Pasek, Temple University, NPR, August 31, 2018: 5 Proven Benefits of Play.

Jeremy P. Jamieson, University of Rochester, *The New York Times*, September 19, 2018: How to Help Teenagers Embrace Stress.

Corruption at a Glance

Eyes may be the windows to the soul, but a new study in Psychological Science suggests that face width may be the first clue that a politician is corrupt. Shown only a black-and-white photo, participants were able to identify corrupt politicians (or at least, those who've been caught) with 70% accuracy. Whether people with wide faces are more likely to be corrupt, more likely to be approached with corruptible opportunities, or just more likely to be caught remains be seen, said researcher **Chujun Lin** (California Institute of Technology).

Big Think

September 13, 2018

Joseph Kable, University of Pennsylvania, *Penn Today*, September 11, 2018: For the First Time, a Neural Link Between Altruism and Empathy Toward Strangers.

Kostadin Kushlev, Georgetown University, *Wired*, September 11, 2018: When Your Phone Sucks You Into the Void, This App Notices.

Chujun Lin, California Institute of Technology, *Big Think*, September 13, 2018: Wider-Faced Politicians Are Seen as More Corrupt.

Hazel Markus, Stanford University, *The New York Times*, September 14, 2018: Why Do People Stay When a Hurricane Comes?

David M. Mayer, University of Michigan, *Harvard Business Review*, September 4, 2018: To Cope with Stress, Try Learning Something New.

Brian Nosek, University of Virginia, *Vox*, August 27, 2018: More Social Science Studies Just Failed to Replicate. Here's Why This Is Good.

Russell Poldrack, Stanford University, *TIME*, August 28, 2018: 5 Science-Approved Ways to Break a Bad Habit.

William Revelle, Northwestern University, *The Washington Post*, September 17, 2018: Scientists Identify Four Personality Types.

Peter Salovey, Yale University, *The New York Times*, September 19, 2018: How to Help Teenagers Embrace Stress.

Nancy Segal, California State University, Fullerton, *The New York Times*, August 20, 2018: What Twins Can Teach Us About Nature vs. Nurture.

Tali Sharot, University College London, *The Washington Post*, August 24, 2018: Why Liars Lie: What Science Tells Us About Deception.

The Inside Scoop on Succeeding in Science and Academia

"Letters to Young Scientists," a new column from Science Careers, builds on a rich history of sharing words of wisdom with the next generation of researchers. Spearheaded by APS Fellows **June Gruber** (University of Colorado, Boulder), **Jay Van Bavel** (New York University), **Leah Somerville** (Harvard University), and **William A. Cunningham** (University of Toronto) and **Neil Lewis, Jr.** (Cornell University), the column will offer early-career scientists practical advice from professors with a wide range of personal and professional backgrounds.

Science AAAS

August 27, 2018

Stress Plus Rest May Make For Stronger Students

Chronic stress can be a burden on anyone, but research by APS Fellow **Peter Salovey** (Yale University) and **Alia Crum** (Stanford University) suggests that the "garden-variety stress" that often accompanies a big test or challenging homework assignment can be more than manageable for students. Studies have found that people who believe stress prepares them to tackle challenges head on may release higher levels of stress-buffering hormones such as cortisol, giving them exactly the edge they need to get ahead — granted they're given ample time to recover as well.

The New York Times

September 19, 2018

Leah H. Somerville, Harvard University, *Science*, August 27, 2018: Introducing 'Letters to Young Scientists,' a New Column from Science Careers.

Jay Van Bavel, New York University, *Science*, August 27, 2018: Introducing 'Letters to Young Scientists,' a New Column from Science Careers.

Eric Wesselmann, Illinois State University, *The Washington Post*, September 17, 2018: The Invisible People Are Shouting 'We're Here! We're Corporeal! Get Used to It!'

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CONNECTICUT

Fairfield University **Industrial/Organizational Psychology** **Non-Tenure-Track Assistant or Associate Professor**
The Department of Psychology in the College of Arts & Sciences at Fairfield University invites applications for a Non-Tenure-Track Assistant or Associate Professor position in Industrial/Organizational Psychology beginning Fall 2019. Applicants must have a strong commitment to excellence in graduate teaching, including a commitment to innovation and demonstrated excellence in using technology in the classroom. Requirements: Applicants are expected to have a Ph.D. in Industrial/Organizational Psychology or a related field. The teaching load is three graduate courses each semester. The Assistant or Associate Professor will also be responsible for the administrative components of the I/O Master's Program, including admissions, student internship coordination, and overseeing review and revision of the program. Graduate courses taught would include Introduction to I/O Psychology, Organizational Development, Effective Interviewing, and Consulting Theory & Practice, as well as courses in the candidate's area of specialization. Opportunities also exist for teaching undergraduate psychology courses. Additional Information: The psychology department consists of 10 full-time faculty representing a range of specialties and is housed in a spacious, well-equipped facility in the Bannow Science Center. There is a vibrant culture of student–faculty research. The department offers a robust internship program, a Psychology Club, and chapters of Sigma Xi and Psi Chi. The salary and the benefits for the position are competitive. Fairfield University is an Equal Opportunity/Affirmative Action employer, committed to excellence through diversity, and, in this spirit, particularly welcomes applications from women, persons of color, and members of other historically underrepresented groups. The university will provide reasonable accommodations to all qualified individuals with a disability. For full consideration, please visit https://ffd.wd1.myworkdayjobs.com/en-US/EmploymentOpportunities/job/Fairfield-CT/Non-Tenure-Track-Assistant-or-Associate-Professor--Industrial-Organizational-Psychology_JR0000113 and upload the following materials: 1) a curriculum vitae 2) a letter of application 3) a statement of teaching philosophy 4) examples of syllabi and teaching evaluations if available 5) representative reprints of scholarly work if available 6) unofficial graduate transcript 7) contact information for three references.

Fairfield University **Department of Psychology** **Tenure-Track Assistant Professor in Cognitive Neuroscience**
The Department of Psychology in the College of Arts & Sciences at Fairfield University invites applications for a tenure-track Assistant Professor position in Cognitive Neuroscience beginning Fall 2019. Applicants must have a strong commitment to excellence in undergraduate teaching, including a commitment to innovation and demonstrated excellence in using technology in the classroom. The potential for developing an active research program in the candidate's area of specialization is also required. Requirements: Applicants are expected to have completed a Ph.D. in Cognitive Neuroscience or a related field, but ABD candidates who expect their degree by Fall 2019 will also be considered.

The teaching load is three undergraduate courses each semester. Courses taught would include Behavioral Neuroscience, Cognitive Neuroscience, and Psychological Statistics, as well as courses in the candidate's area of specialization. Preference will be given to candidates who are able to teach additional courses such as Cognitive Psychology, Learning, Sensation/Perception, Research Methods, and/or General Psychology. Additional Information: The department consists of 10 full-time faculty representing a range of specialties and is housed in a spacious, well-equipped facility in the Bannow Science Center. There is a vibrant culture of undergraduate student–faculty research and a growing institutional emphasis on the health sciences. Faculty routinely present at regional, national, and international conferences, frequently with undergraduate students as coauthors. Psychology is one of the

largest majors in the College of Arts & Sciences, offering a Psychology Club, a large internship program, and chapters of Sigma Xi and Psi Chi. The salary and the benefits for the position are competitive. Fairfield University is an Equal Opportunity/Affirmative Action employer, committed to excellence through diversity, and, in this spirit, particularly welcomes applications from women, persons of color, and members of other historically underrepresented groups. The university will provide reasonable accommodations to all qualified individuals with a disability. For full consideration, please visit https://ffd.wd1.myworkdayjobs.com/en-US/EmploymentOpportunities/job/Fairfield-CT/Tenure-Track-Assistant-Professor--Cognitive-Neuroscience--Department-of-Psychology_JR0000114 and upload the following materials: 1) a curriculum vitae 2) a letter of application 3) a statement of teaching philosophy 4) examples of syllabi and teaching evaluations if available 5) representative reprints of scholarly work if available 6) unofficial graduate transcript 7) contact information for three references.

TEXAS

Texas A&M University Department of Psychological and Brain Sciences Tenured Faculty Position, Clinical Psychology
The Department of Psychological and Brain Sciences (liberalarts.tamu.edu/psychology/) at Texas A&M University invites applications for a tenured faculty position in clinical psychology. The position will be at the rank of Associate Professor or Professor, with an anticipated start date of Fall, 2019. We are interested in scholars conducting research in any area related to clinical psychology, and value innovation and excellence in methodological, quantitative, and computational approaches. This position will complement a world-class core of clinical researchers, many of whom participate in cross-cutting research concentrations in affective science, diversity science, and personality processes. Applicants should have an outstanding record of research achievement, evidence of extramural research funding, and a strong commitment to undergraduate and graduate education. The successful candidate will contribute to our clinical Ph.D. program, which is APA-accredited and a member of PCSAS, and would teach undergraduate and graduate courses in their area of expertise. Preference will be given to individuals interested in serving as Director of Clinical Training, and leading efforts to strengthen and grow the program. A Ph.D. in psychology or a closely related field is required. To apply, please email a letter of intent, curriculum vitae, statements on research and teaching, and 3 sample research publications to clinicalpsyc@tamu.edu. You will also need to complete an application at https://tamus.wd1.myworkdayjobs.com/TAMU_External (search for "professor psychology"). INTERNAL APPLICANTS: If you currently ARE a Texas A&M System employee: Go to Internal Career Site – https://jobs.tamu.edu/internal-applicants/. For more detailed information https://liberalarts.tamu.edu/psychology/2018/08/28/tenured-faculty-position-available-in-clinical-psychology/. The search committee will begin reviewing applications October 15, 2018 and will continue to review new applications until the position is filled.

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GRANTS

OBSSR Predoctoral Training in Advanced Data Analytics for Behavioral and Social Sciences Research

The Office of Behavioral and Social Sciences Research (OBSSR) of the National Institutes of Health (NIH) and participating Institutes are launching a new Predoctoral Training in Advanced Data Analytics for Behavioral and Social Sciences Research (BSSR) Institutional Research Training Program. Applications are now being accepted. Full details can be found at: bit.ly/2PHtgtW. This Funding Opportunity Announcement solicits applications for new Behavioral and Social Sciences Research (BSSR) predoctoral training programs that focus on innovative computational and/or data science analytic approaches and their incorporation into training for the future BSSR health research workforce. The vision of the Advanced Data Analytics for BSSR training program is to support the development of a cohort of specialized predoctoral candidates who will possess advanced competencies in data science analytics to apply to an increasingly complex landscape of behavioral and social health-related big data.

NSF Funding For Integrative Research on Behavioral Science and Cybersecurity

The National Science Foundation (NSF) is soliciting proposal submissions for the Secure and Trustworthy Cyberspace (SaTC) program, which addresses security and privacy challenges through integrative research, seeking new methods for designing and operating cyber systems, protecting current systems, and educating the public about cybersecurity.

SaTC will fund investigators via the Early-Concept Grants for Exploratory Research (EAGER) award, which grants recipients with up to $300,000 for two years. Current scientific and practical applications of cybersecurity involve behavioral science elements, so EAGER proposals require collaboration between principal investigators in the fields supported by the NSF Social, Behavioral, and Economic Sciences (SBE) directorate, such as psychological scientists, and investigators conducting work related to NSF's Computer and Information Science and Engineering (CISE) directorate.

NSF will fund up to 10 EAGER awards to researchers doing CISE or SBE-type work who have not previously received a SaTC award. The proposed topic must be interdisciplinary, in early stages of exploration, and new to the SaTC program. Suggested topics, which include themes in behavioral science and usability and human interaction, can be found in a recent SaTC program solicitation (NSF 18-572), but other relevant topics are welcomed by NSF.

Prior to submitting a proposal, scientists are asked to send an email and one-page summary of the project to the program directors, who will review the described research and inform applicants if they are encouraged to apply. Approved proposals should describe the contributions of the SBE and CISE disciplines to the topic and the intellectual benefits of the research for the SaTC community. Ideal proposals will support untested but transformative new approaches, applications of expertise, or use of novel integrative perspectives.

Proposals are due December 12, 2018. For details and instructions for submissions, visit bit.ly/2Iwnc4H.

2019–2020 SRCD Federal and State Policy Fellowships Call for Applications

The Society for Research in Child Development (SRCD) is seeking applicants for the 2019–2020 Federal and State Policy Fellowships. The application deadline for Federal Policy Fellowships is December 14, 2018, and the deadline to submit letters of intent for the State Policy Fellowships is December 21, 2018. For more information, visit bit.ly/2O46y2o.

MEETINGS

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

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

31st APS Annual Convention
May 23–26, 2019
Washington, DC
psychologicalscience.org/convention

13th Biennial SARMAC Meeting
June 6–9, 2019
Brewster, Cape Cod, Massachusetts, USA
www.sarmac.org

Conference on Children and Youth 2019
July 4–5, 2019
Columbo, Sri Lanka
youthstudies.co

Raphael Silberzahn

COLLABORATING WITH A CROWD

University of Sussex researcher ***Raphael Silberzahn*** *describes how an early setback led him to develop an innovative crowd-sourced research project. This "many analysts" project reveals how research teams can draw different conclusions from the same data set as a result of the choices they make in conducting their analyses.*

Before transitioning to academia, you had a career as a business consultant. What led you to pursue graduate studies in behavioral science?

After my undergraduate studies in international business administration I couldn't wait to try myself out in the real business world, to participate in the action rather than merely learn about it. During my work, however, I noticed that I enjoyed deep reflections about my observations, and that I was quite curious to understand why our global managers and our employees around the world behaved the way they did. I was fortunate to be able to do so at the University of Cambridge.

You coauthored a collaborative commentary that essentially overturned your previously published findings. How did this experience plant the seed for the "many analysts" project?

Science has an aura of perfection, of lasting truth, to it, and I was in the process of learning to become a scientist. During my doctoral studies, I published a paper in *Psychological Science* about names and career outcomes, which attracted the interest of media and fellow scientists. The findings, however, turned out to be wrong. It was hard to admit so. It turned out to be a test for me and my coauthor Eric Uhlmann, whether we were indeed scientists more interested in truth or in maintaining our own aura of perfection. This paper became the foundation for our interest in crowdsourcing research.

That research involved coordinating many research teams over many months. Why undertake such a large project?

We were delighted about the interest in our project, which combined the work of 65 authors and 29 teams. My background in IT helped me set up processes that allowed for organized contributions from many participants. We worked well as a team and most importantly everyone involved was very responsive and willing to take on tasks.

During the project I was laid off and went through unemployment (going to the unemployment registration was hard), through a separation, through uncertainty about where I'd live and work, and through questions about whether I could remain present in the lives of my children. There were also times when the project got stuck, when we didn't know how to find statistical experts to evaluate the suitability of different responses (we found experts among the authors), when an author rightly noted that two variables didn't capture what was intended and shouldn't be used (each team reran their analysis without the variables).

In the end, we finished our work and got the project published in *Advances in Methods and Practices in Psychological Science* 4 years after its start. I feel proud about persisting and about the understanding and kind words from coauthors when I was unable to focus on the project.

How has that experience informed your own line of research?

It was a humbling experience. I now publish fewer papers but I aim to get others involved more and get people with neutral eyes to reexamine the data and the conclusions. I feel we live in a world thriving on the newest headline, in a race for surprised eyeballs and short-lived facts. Science benefits from having safe spaces prior to publication to shape and refine novel ideas and double check evidence. ●

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