

Better Minds Ahead: Understanding Cognitive Enhancement

Observer

Vol. 30, No. 8 • October 2017



A Magnetic Field

Psychological Scientists Lead fMRI Labs

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FEATURED SPEAKERS



Keynote

Making and Remaking Memory: Past, Present and Future

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

LYNN NADEL

The University of Arizona



Presidential Symposium

Memory: From Neurons to Nations

These distinguished psychological scientists will speak about the cognitive neuroscience of learning, memory, and emotions from a variety of perspectives.

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ISSN: 1050-4672

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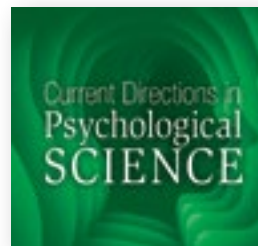
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The APS Fellow and personality researcher talks about the scientific and practical challenges of classifying mental disorders — the subject of an article she has co-authored for *Psychological Science in the Public Interest*.

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Science Is Not a Spectator Sport

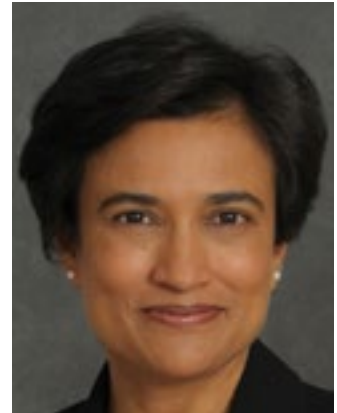


Photo credit: Jeanne Neville

Suparna Rajaram

Stony Brook University

Be the change that you wish to see in the world.
-Attributed to Mahatma Gandhi

It was a late August morning, but I could feel the crisp air of autumn already setting in as I stood in the starting corral of a race in Central Park. Having traveled much of the summer (and armed with a few other excuses), I had little to no preparation for even a short run that day. Yet, as I began to put one foot in front of the other I could feel my belief return, slowly but surely, in being able to cross the finish line.

The journey of becoming a scientist and of practicing science can often bring such tough patches. In this column, I focus on a particular aspect of this journey that goes hand in hand with

our central goal of producing rigorous science — that of cultivating an appreciation for science in others. As I noted in my September column, the need to communicate the value of our science is more important and more urgent than ever. How can we all do our part to serve this goal?

We are fortunate to have high-profile figures communicating science to millions. But each of us has a responsibility, too. You might say: “But I don’t have Alan Alda’s celebrity and platform or Neil deGrasse Tyson’s wit and reach.” “What can I do if I am a new faculty member, a transitioning postdoc, an eager graduate student, or an undergraduate student who just declared psychology as a major?” “How can I become the change that I wish to see in our world?”

I’ll offer a simple start — one that is in our daily practice but one that we can lose sight of every now and then. And one that calls for simply putting one foot in front of the other. We are lucky because we are in the business of teaching and learning. This instantly gives us reach. For those of us who get to teach, we know that we have opportunities all around us to focus everyone’s attention on the science that lies behind the findings. We have the opportunity not just to create sound bites but also to go behind the nifty findings and talk about the process of science. We can do this as faculty and teaching assistants in the classroom; as faculty, postdocs, and graduate students in the lab; and as psychological scientists working in applied settings.

Suparna Rajaram is Professor of Cognitive Science at Stony Brook University, where she studies social transmission of memory and the emergence of collective memory.

My main message in this column is to our psychology majors. You might ask, “What can I do if I am still a student?” You can start to spread the message about the importance of science. For example, join a lab as an undergraduate student and get hands-on research experience. If you are not in a position to participate in a lab, then aim to learn how those fascinating psychology experiments work. You can seek out APS communications on the latest scientific developments coming out in our discipline, and talk to graduate students and faculty to find out how it all works (remember those office hours!). Then share all of this with your friends. Share not just the findings but how psychological scientists arrive at these findings. Those of us who teach regularly know this secret — you learn best when you teach. As a student, you can start to teach your friends what you learned, and you’ll be amazed how wonderful that experience is. In brief, cultivate curiosity.

Why do this? Communicating the excitement and the ideals of science is ever more important today when scientific inquiry seems to be among our key solutions to the very many problems that we face as a species. Once you become curious and make your friends curious about psychological science, you are effecting a change — you have joined forces with your professors and lab mentors to cultivate educated consumers of science.

Science, like running, cannot be simply a spectator sport, an exercise in knowing about a bunch of facts. That’s important, of course. But, like running, science — to paraphrase Natalie Angier — is a state of mind. It is to “know how to think about information that is presented in front of you,” as Neil deGrasse Tyson would say. So, no matter how distant the finish line may seem from where we are standing or how small our own part in the journey may seem, if we put one foot in front of the other, we move forward — one step at a time.

I did cross the finish line that morning. I also felt exhilarated, and I felt eager to enter the next race. I ask all the students of psychological science to join me in our journey to create rigorous science and to communicate it as ably as we can in our spheres. ●



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

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



Preregistered Direct Replications: A New Article Type in *Psychological Science*

Psychological Science has launched a new category of articles called Preregistered Direct Replications (PDRs) — replications of studies published previously in the APS flagship journal.

PDRs aim to employ — as closely as possible — the same methods and procedures as the original study to determine if the original effects are reproduced.

“The aim is to create conditions that competent experts agree test the same hypotheses in essentially the same way as the original study,” Editor in Chief **D. Stephen Lindsay** writes in an editorial introducing the new article type.

PDRs are distinct from Registered Replication Reports (RRRs) and other multilab empirical papers, which originated in *Perspectives on Psychological Science* and will now transition to the newest APS journal, *Advances in Methods and Practices in Psychological Science*.

One of the motivations for adding PDRs, Lindsay says, is the belief that a journal is responsible for the work it publishes.

“Some PDRs will be ‘successes’ in which the original findings are closely replicated, and some will be unambiguous failures to replicate (made compelling by fidelity to the original study, high statistical power, and appropriate analyses),” he says in his editorial. “Both of those outcomes are valuable and informative. Some will produce ambiguous results, indicating that better methods are needed.”

PDRs will be subject to external review; typically, the author of the study being replicated will be invited to provide a review, along with at least two independent experts.

For more details on submitting PDR proposals, see Lindsay’s editorial at journals.sagepub.com/doi/full/10.1177/0956797617718802.

AT RANDOM

“Popular children grow up to have greater academic success and stronger interpersonal relationships, and to make more money in their jobs years later, while those who were not popular are at much greater risk for substance abuse, obesity, anxiety, depression, problems at work, criminal behavior, injury, illness, and even suicide. We now also understand that popularity changes the wiring of our brains in ways that affect our social perceptions, our emotions, and how our bodies respond to stress.”

APS Fellow Mitch Prinstein in his new book *Popular: The Power of Likability in a Status-Obsessed World*.

NEW BOOKS

Popular: The Power of Likability in a Status-Obsessed World by Mitch Prinstein; Viking, June 6, 2017.

Minding the Weather: How Expert Forecasters Think by Robert R. Hoffman, Daphne S. LaDue, H. Michael Mogil, Paul J. Roebber, and J. Gregory Trafton; The MIT Press, August 4, 2017.



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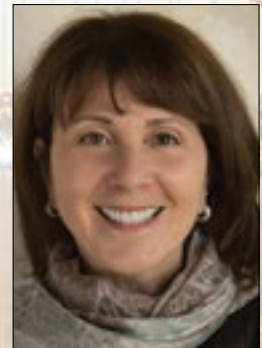
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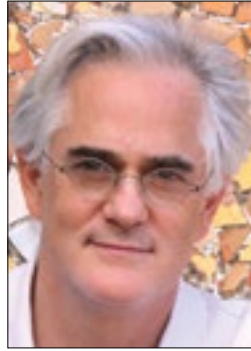
Mentor Award winners will be featured in the APS Observer.

ACHIEVEMENT AWARDS

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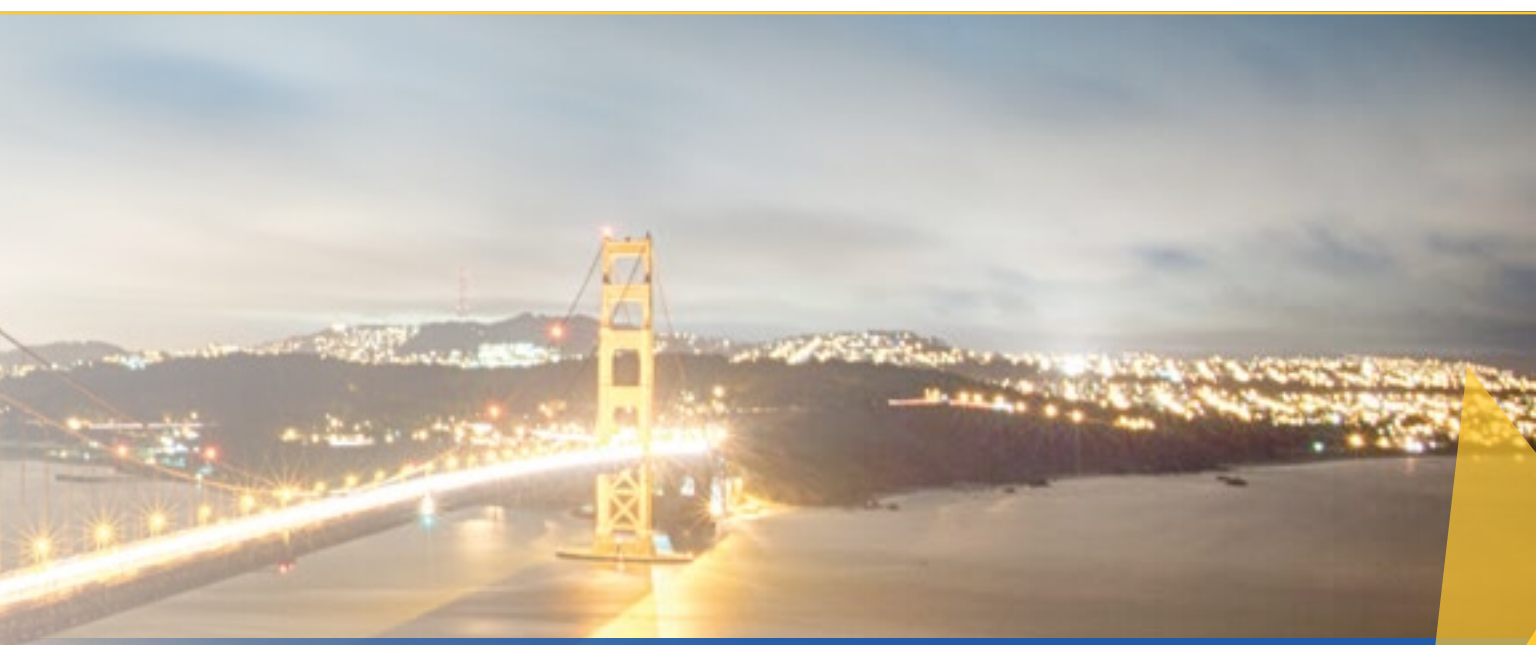


Barbara Landau
Johns Hopkins University



Linda B. Smith
Indiana University Bloomington

William James Fellow Award Addresses will be presented at the convention.

A wide-angle photograph of the Golden Gate Bridge at night, illuminated with warm lights. The bridge spans across a body of water, with city lights visible in the background under a cloudy sky.

The awardees will be recognized at the 30th APS Annual Convention
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Psychological Scientists Receive Grants for Integrative Research



Franco Pestilli

How are different areas of the brain connected? And how do those connections produce the range of complex behaviors involved in everyday skills like navigating space or remembering information? These questions cannot be answered by research in one discipline alone — they require a fundamentally integrative approach. APS Fellow Franco Pestilli and psychological scientist Terry Sejnowski are two researchers taking such an

interdisciplinary perspective, receiving National Science Foundation (NSF) grants specifically aimed at supporting team-based research that integrates behavioral, neural, computational, and engineering sciences.

Pestilli (Indiana University Bloomington) and his team will receive \$650,000 for their project titled “Connectome Mapping Algorithms With Application to Community Services for Big Data Neuroscience.” The proposed project is a cloud-based platform named Brain-Life.org that collects numerous types of brain data (e.g., connectivity matrices, cortical segmentations, white matter tracts) and analysis algorithms.

Brain-Life.org will promote the “upcycling” of data derivatives, which are the data and algorithms created by researchers that might ordinarily be underutilized or never published, Pestilli explains. The platform will also allow multiple communities of researchers to access these data and analytical tools by automatically standardizing the collected data and algorithms and integrating them with national supercomputers and cloud systems.

“This process is meant to promote data sharing [and] reproducibility of scientific results as well as to expand the user base of data and algorithms,” says Pestilli, a 2016 recipient of the APS Janet Taylor Spence Award for Transformative Early Career Contributions.

Through the platform, the research team plans on making these materials and tools widely available so that high-scale computational analyses can be performed on an entire population of human brains, including the Human Connectome data set — one of the largest brain network mapping efforts to date.

“I am very much excited by the possibility to ask questions that are currently difficult to ask — questions about variability and individuality [and] variations in human brains and behavior across large populations,” Pestilli says.

Sejnowski, of The Salk Institute for Biological Studies, is on a team receiving over \$480,000 for a collaborative project



Terry Sejnowski

titled “Integrative Foundations for Interactions of Complex Neural and Neuro-Inspired Systems with Realistic Environments.” With collaborators at the California Institute of Technology, the proposed project will model the layered architecture of sensorimotor control in the brain to develop and improve complex and adaptable engineered systems. The resulting computational model will then be tested by human subjects who will perform tasks requiring fast

reflexes and long-range planning in a virtual reality environment.

The project’s findings could have a major impact on the development of artificial technologies, including those surrounding human–robot interactions. Says Sejnowski:

“Our growing understanding of how these layered architectures are organized in the brain to produce highly robust, flexible, and efficient behavior will have many applications to rapidly evolving technologies in complex environments, including the Internet of Things, autonomous transportation, and sustainable energy networks.”

Looking toward the future applications of this model, Sejnowski and team hope to “engineer a new generation of control systems with the same robustness as found in nature.”

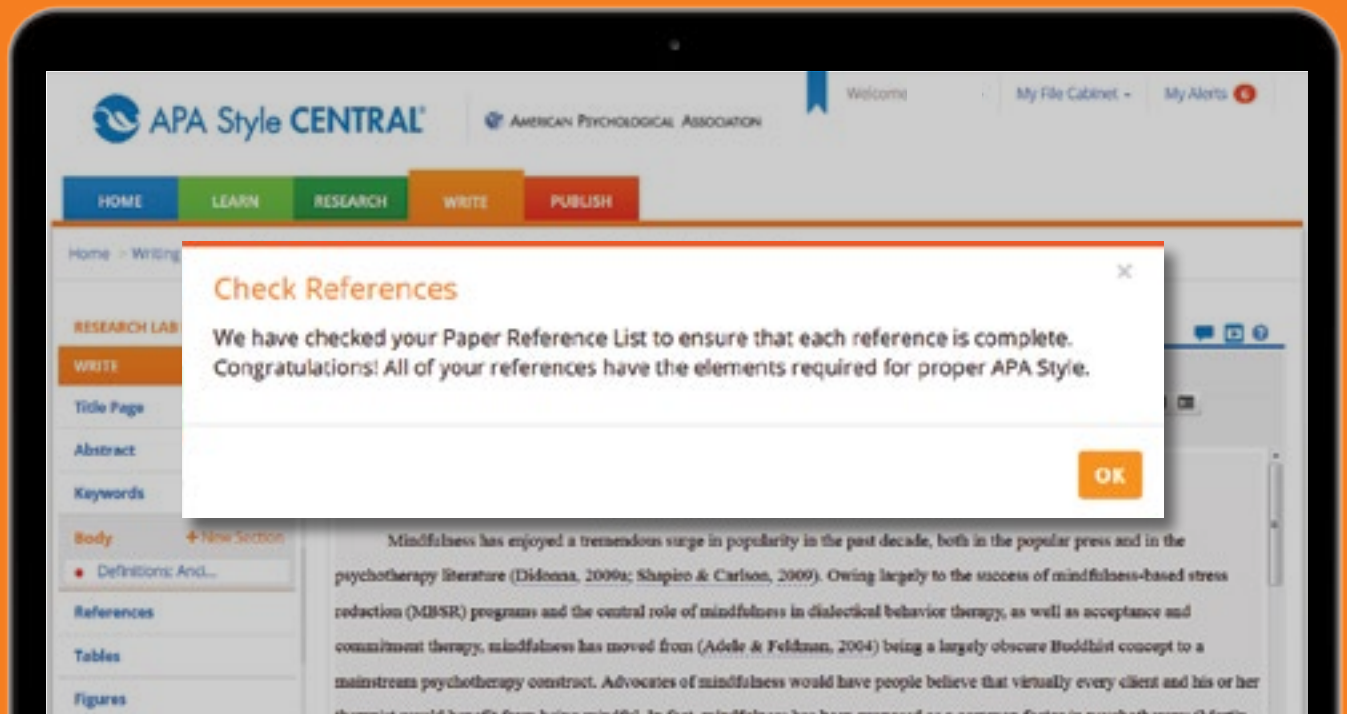
NSF’s Integrative Strategies for Understanding Neural and Cognitive Systems (NCS) program will support research projects focusing on one of four themes: individuality and variation, data-intensive neuroscience and cognitive science, neuroengineering, and cognitive and neural processes in complex environments.

NCS is part of NSF’s Understanding the Brain (UtB) initiative to support basic research on brain function and related behaviors and the development of new neurotechnologies. According to NSF, UtB activities merge the agency’s efforts in cognitive science and neuroscience with the Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative established in 2013 by President Barack Obama. With the goal of mapping the brain spatially and temporally, the BRAIN Initiative brings together multiple federal agencies, such as NSF and the National Institutes of Health, to support basic research on the fundamental function and structure of the brain. Between fiscal years 2014 and 2016, NSF invested nearly \$150 million in the BRAIN Initiative and nearly \$375 million in UtB activities.

To learn more about the BRAIN Initiative, see the March 2014 APS Presidential Guest Column in the *Observer* at bit.ly/2iJ1otF. ●

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Seven Costs of the Money Chase

How Academia's Focus on Funding Influences Scientific Progress

By Scott O. Lilienfeld

This essay is adapted from the article "Psychology's Replication Crisis and the Grant Culture: Righting the Ship," published as part of the Special Symposium on the Future of Psychological Science in the July 2017 issue of Perspectives on Psychological Science (journals.sagepub.com/toc/pps/current).

You may recall Willie Sutton, the thief who, when asked by a reporter why he robbed banks, purportedly replied, "because that's where the money is."

Whether or not Sutton actually said this (he denied it), the Willie Sutton Principle makes a point self-evident to those familiar with the matching law: When organisms, including academicians, are confronted with two or more choices that differ substantially in reinforcement value (read: grant dollars), they will apportion more of their efforts to the alternative possessing the highest reinforcement value. This pattern of behavior is amplified when administrators impose incentives (e.g., tenure, promotions, awards, salary increases, resources) and penalties (e.g., threats of being denied tenure, loss of laboratory space) tied to the acquisition of grant dollars.

As our field gradually rights the ship — addressing questionable research practices (QRPs) that have contributed to the replication crisis — we have been insufficiently proactive in confronting institutional obstacles that stand in the way of our scientific progress.

Institutional variables, including the growing emphasis on external funding as an expectation or de facto requirement for faculty tenure and promotion at many research-oriented institutions, pose largely unappreciated hazards for psychological science.

Grants Versus Discoveries

About a decade ago, I was a regular attendee at Grand Rounds presentations in a prestigious psychiatry department. Before introducing speakers, the chairman routinely announced the names of professors who had received large federal grants

along with their precise dollar amounts. It struck me as odd that he never announced faculty members' important publications or scientific discoveries. I have since come to realize that this reinforcement pattern is common in psychology departments, too: Faculty members routinely garner plaudits for receiving grants but frequently find that their scholarly accomplishments go largely unnoticed.

Grants in science should be regarded as means to an end rather than ends in and of themselves. After all, we don't laud novelists or film producers for securing large contracts for their planned projects. Instead, we rightly acclaim them if and when they produce high-quality artistic work.

For a field that prides itself on empirical rigor, psychology's encouragement of this practice is decidedly nonempirical. In a 2008 bibliometric study, APS Fellow Nick Haslam and his University of Melbourne colleagues found that grant funding bore a minimal relation to published studies' citation impact, and perhaps no relation when controlling for potential confounds such as journal and first-author prestige.

What's more, grants aren't needed for many forms of impactful research. For example, most researchers who have authored articles cited 1,000 or more times had no current National Institutes of Health (NIH) funding, according to a 2012 evaluation by biomedicine researchers Joshua M. Nicholson and John P. A. Ioannidis; many of those articles had reported landmark methodological advances. Furthermore, numerous Nobel laureates in physics, chemistry, and medicine received no federal funding for the work that culminated in their prizes, Ioannidis and other colleagues found.

To be clear, I am not opposed to grants. For some scientific questions, grant funding is essential for high-quality research — or any research at all. For many of my colleagues in neuroscience-related fields, for example, money is a virtual prerequisite for research. We should encourage these scholars to apply for grants and make allowances in their workloads for grant-related work. Furthermore, we should reward colleagues who obtain training grants to support graduate student education. In addition, the grant culture has its upsides, including provision of funding for graduate and postdoctoral scholars and its propensity to spur competition in the marketplace of ideas.

What I am opposed to is the implication that researchers' scholarly merit should be gauged in large measure by grant success. This fundamental and largely unquestioned law of academic life has spawned several corollary ordinances. Most



APS James McKeen Cattell Fellow **Scott O. Lilienfeld** is Editor of *Clinical Psychological Science* and Samuel Candler Dobbs Professor of Psychology at Emory University.

notably, faculty members in a growing number of psychology departments cannot be hired, tenured, or promoted without a solid grant track record — regardless of the quality or impact of their work. Remarkably, researchers who are generating significant discoveries and influencing the field's thinking without using large sums of money may nonetheless risk being fired if they don't obtain grants.

A Bevy of Negative Consequences

The grant culture has contributed to a number of other troublesome consequences for psychological science, each of which I describe briefly.

1. **Heightened incentives for questionable research practices (QRPs).** To obtain large grants, promising pilot work is typically required; to maintain uninterrupted grant funding, a strong track record of positive results can be a virtual necessity. Adding to the pressure for positive findings is the reality that investigators whose research programs hinge on grants often feel responsible for the livelihoods of their postdoctoral candidates, students, and administrative staff.

In these respects, the grant culture would appear to be a virtual recipe for confirmation bias, fueled by motivated reasoning, the lure of grant dollars, and the fear of losing funding. These powerful inducements can generate incentives for positive results by means of p hacking, outcome reporting bias, and other QRPs. Training in research ethics, important as it is, may only partially discourage these QRPs because confirmation bias operates largely outside of conscious awareness.

Furthermore, as Columbia University biological scientist Stuart Firestein noted in his 2015 book, *Failure: Why Science is So Successful*, failure is a crucial element of the scientific enterprise. When studies are well-designed, we learn at least as much from disconfirmation as from corroboration of our hypotheses. Nevertheless, the grant culture implicitly discourages failure, especially when negative results raise the specter of the investigator's theory being in error.

Fortunately, the preregistration of hypotheses and analytic plans is a critical safeguard against QRPs, as it diminishes the odds that researchers will erroneously present exploratory research as confirmatory. Preregistration won't, however, significantly diminish the foregoing problems emanating from the grant culture.

2. **Single-minded focus on programmatic research.** One of the unquestioned mantras of academia is that programmatic research is invariably preferable to nonprogrammatic research. To be fair, programmatic research brings certain clear-cut advantages. Cracking an exceedingly complex scientific question often requires a lengthy series of interlinked investigations. Still, programmatic research can foster confirmation bias, especially when designed to test the investigator's favored theory. Research on sunk costs and effort justification

further suggests that once individuals have invested a great deal of time and effort in a project, they'll feel the need to persist with it even when doing so is no longer fruitful. In addition, programmatic research often runs its course and may yield diminishing returns of knowledge following a large number of studies.

3. **Intellectual hyperspecialization.** An allied consequence of the grant culture is its tendency to canalize scholars into highly specialized lines of thinking. Although interdisciplinary grants can force scholars to step outside of their comfort zones to collaborate with colleagues in other fields, the grant culture often keeps researchers locked into similar intellectual questions for long stretches of their careers. In today's academic environment, big-picture thinkers may be at risk for extinction, Columbia University political scientist Alan Wolfe wrote last year in *The Chronicle of Higher Education*. Paul Meehl, the most influential clinical psychologist of the latter half of the 20th century, received a grand total of one federal grant during his career. I'm hardly the first to observe that psychology's great generalist thinkers of the past, such as Meehl, Lee J. Cronbach, Donald Campbell, Lloyd Humphreys, Jane Loevinger, and Robyn Dawes, are now few and far between. What would have come from these scholars had they experienced incessant career pressure to apply for funding?
4. **Disincentives for conducting direct replications.** Until recently, major federal agencies allocated relatively little funding to supporting direct replications of previous work. Hence, investigators had scant incentive for replicating others' research. In this respect, the grant culture has often worked against the accumulation of reproducible knowledge. (On the positive side, in the United States and the Netherlands, grant agencies are beginning to appreciate the value of replication. Last year, for example, the Netherlands Organisation for Scientific Research, the nation's largest research-funding agency, launched what is believed to be the world's first national fund for replication studies.)
5. **Stifling of creativity and intellectual risk-taking.** Scientists who pursue daring lines of work, whose ideas don't fit into accepted paradigms, are essential to the field's progress. But the grant culture has almost certainly led many scholars to instead pursue safe research that is more likely to secure funding. Those same reinforcement contingencies operate for methodologies. Functional neuroimaging is now all the rage in psychological science, and provisional survey data suggest that many investigators feel pressured to incorporate neuroimaging and other biological techniques into grant applications. Hence, researchers whose questions don't readily lend themselves to such methods may be hard pressed to obtain funding.
6. **Promising more than we can deliver.** Many grant applications on the etiology of psychopathy (my own field of expertise) dutifully conclude by assuring reviewers that the findings may bear significant implications for intervention. Yet despite a handful of promising leads, there has

been minimal progress in the treatment or prevention of psychopathy over the past several decades, despite dozens of large federal grants — including one on which I was co-principal investigator. One trick of the “grantsmanship” trade, especially for grant applications submitted to the National Institutes of Health, is the art of persuading reviewers that planned research bears significant real-world implications, even when grant applicants are well aware that such implications are at best a faint hope. Our field’s habitual tendency to overpromise has almost certainly tarnished our perception in the public eye.

7. **Diminished time to think deeply.** Along with the grant culture comes mounting pressure to apply for funding at each entry point in the grant cycle. For psychologists on research tracks in medical schools, the grant cycle has become the human equivalent of the hamster’s running wheel, although with less positive reinforcement. Inevitably, these demands allow diminished time for thinking deeply about psychological questions. A prime example of this point can be found in the pages of Nobel laureate Daniel Kahneman’s magisterial book, *Thinking, Fast and Slow*, or in Michael Lewis’s *The Undoing Project*, about the historic collaboration between Kahneman and Amos Tversky. You can’t help but be struck by the extent to which these two scientists’ remarkable intellectual collaboration was cultured by lengthy conversations during leisurely walks. The freedom to engage in this kind of freewheeling, in-depth reflection is becoming increasingly constrained in today’s supercharged grant environment.

Looking Forward

My concerns aside, my global appraisal of psychology’s progress is reasonably positive. The replication crisis has taught us that we need to become more modest in our assertions and to steer clear of confident proclamations based on isolated positive results. Despite resistance from some quarters within our field, we are starting to engage in the healthy self-scrutiny that characterizes a mature science.

Still, formidable institutional challenges lie in the way. For a group of psychologists, our approach to the grant culture has been surprisingly nonpsychological. We have accorded scant consideration to how reinforcement contingencies, abetted by cognitive biases, make our myopic focus on grant funding counterproductive to scientific progress. These psychological impediments collide head-on with our recent emphases on minimizing false-positive findings and generating a corpus of reproducible scientific knowledge.

The corporate culture of academia places young scholars in a precarious position, as they feel incessant pressure to secure grant funding even if they don’t need it. Perhaps the best advice I can give them is to strive for balance between specialization and breadth in their thinking and reading, and to remember that the best science typically emerges from the integration of diverse perspectives. Admittedly, reading broadly is easier said than done given the growing demands on young investigators to invest much of their time applying for grants, and it will almost certainly necessitate

challenging tradeoffs. This pragmatically knotty issue demands considerably more thought than it has received.

Finally, it’s incumbent on us as a field to initiate a thoroughgoing and intellectually honest conversation about the negative impact of funding on scientific progress, and on potential remedies for the problem. As Ioannidis has suggested, those correctives could range from institutions prioritizing scholarly quality and replicability over financial success to more radical proposals, such as penalties for scholars who have a lengthy track record of grant funding without a commensurate record of high-quality published research (although I am at present loathe to endorse the latter recommendation).

Much like a dysfunctional family that avoids addressing uncomfortable issues out of fear of opening up a can of worms, we have put off this difficult discussion for too long. But we need to take it up if we ever hope to realize psychological science’s considerable potential. ●

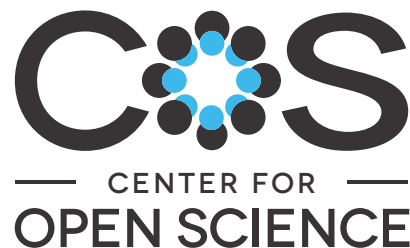
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APS Award Address

Declaration of Interdependence

Hazel R. Markus Discusses the Science of Interconnection

Americans pride themselves on a certain sense of independence. Children are taught to express and promote their individuality and creativity from an early age, and workplaces often encourage employees to show initiative and stand out from their colleagues. Yet given the tasks we face and the resources available, many of us are much more *interdependent* than psychologists realize.

APS William James Fellow Hazel R. Markus says that, although US institutions promote independent attitudes, “in our current, diverse America, the majority of Americans are actually more practiced and more familiar with a relatively interdependent way of being.” The 68% of Americans without a college degree, and most people of color, are likely to have had considerable practice and familiarity with interdependence — adjusting to relationships, fitting in, and cultivating an awareness of one’s social rank. During her award address at the 2017 APS Annual Convention in Boston, Markus underscored the importance of further research into interdependence. She presented a framework developed in her book *Clash! How to Thrive in a Multicultural World*, coauthored with Alana Conner of Stanford University.

As co-director of the Social Psychological Answers to Real-world Questions (SPARQ) center at Stanford University, Markus has hosted research clinics that bring together practitioners from fields as wide-ranging as education, health, and law to examine how they interact with the populations they serve. The social psychologists at SPARQ found that “practitioners seem to be using an independent model of how to behave on populations most familiar with an interdependent way of behaving,” she said, adding that the one of the center’s goals is “to create and share social psychological innovations with people working to improve society.”

Markus explained that some subsets of Americans are more culturally attuned to an interdependent way of life. For example, working-class individuals will, on average, interact more with friends and family; move less, geographically speaking; and have jobs that offer less choice and control than their professional-class counterparts. They also place particular emphasis on teaching their children to fit in, observe the community hierarchy, and follow cultural traditions. For these societies, “interdependence is actually a very useful strategy,” she said.

“If there are too few resources to go around, then relating and fitting in with other people helps build networks that can deliver

both material and emotional support,” Markus said. “Surviving is a very important aspect of the [interdependent] way of being that I think we understand much too little of in psychology.” For example, much of the new research on the psychological consequences of social class demonstrates that working-class people tend to be particularly attuned to other people and particularly sensitive to threat and exclusion.

Young adults who grow up in an interdependent communities and hope to branch out may face difficulties, Markus said. Along with Nicole Stephens (Northwestern University) and Stephanie Fryberg (University of Washington) and other colleagues, she has found that even something as innocuous as a university admissions letter can have a profound effect on a first-generation student’s self-confidence. In examining the letter Stanford University sends to accepted students, Markus found language geared toward individuality and independence — sentences along the lines of “We’re so excited that you chose Stanford.” The researchers designed a version that highlighted interdependence — e.g., “We’re so excited that you and *your family* will be joining the Stanford *community*.” They found that first-generation students given the community-oriented letter performed better on both verbal and nonverbal tasks than those given the traditional version. When this higher-education institution was framed as “a place for interdependence where families are included or at least mentioned, where there’s a place for family, where relationships with others are important, where you can collaborate and cooperate,” students unfamiliar with the process felt that the tasks were easier and performed better, Markus said.

The conflict between interdependence and independence continues once students are actually enrolled in college, Markus



Hazel R. Markus has found that framing interdependence in a positive way, rather than in the negative light in which it often is portrayed, has concrete effects on college students’ learning.



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Questions?

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James McKeen Cattell established the Fund in 1942 to support "scientific research and the dissemination of knowledge with the object of obtaining results beneficial to the development of the science of psychology and to the advancement of the useful application of psychology."

continued, using an example that compared students of color with European American students.

“When you are in a group that’s the nondominant group ... you are quite likely to experience yourself as interdependent,” she said. “That is the case because what others think of you when you’re in the minority position has more impact on your behavior. As a function of a stereotype, you are often seen not as a separate individual but as only as a member of your ethnic or racial group. This interdependence then can have ... very negative consequences for behavior.”

Markus and collaborator Tiffany Brannon of the University of California, Los Angeles, wondered whether framing interdependence in a positive way that evoked pride in one’s racial group could help minority students embrace the college experience. They asked a sample of African American and European American students to evaluate one of two new history courses (created for the experiment): One focused on African American culture and the other on European American culture. The course descriptions presented very positive representations of both classes, thereby casting interdependence with the African American experience in a favorable light rather than in the negative light in which it is often presented.

The results were marked: African American students who evaluated the African American culture course solved more word problems correctly, persisted longer on a math test, and gave more creative answers on a creativity test than their counterparts who evaluated the European American course. Teaching minority students that interdependence has positive aspects seemed to boost their self-confidence and persistence on academic tasks.

College graduates from working-class backgrounds also face unique challenges when job hunting, Markus said, because workplaces privilege applicants who show initiative and

assert themselves. Those raised in an interdependent setting and unaccustomed to taking charge can thus be at a disadvantage. This is especially the case when compared with their peers from college-educated backgrounds who have practiced independence and self-promotion since preschool.

“If you’re just working on your independent self and you don’t really have it honed yet, you’re not going to do well in a lot of these settings,” Markus explained.

Microsoft, for example, encourages employees to compete with each other; presumably, the idea is to foster creativity and productivity. But this can be stressful for people more used to a collaborative environment.

To maximize a positive workplace for those with interdependent backgrounds, “we have to think about somehow disrupting the culture cycle of independence,” Markus said. Citing research by colleagues Stephens and Sarah Townsend (University of Southern California), she listed a number of strategies, including acknowledging that social class matters, providing opportunities for practicing independence, recognizing the virtues of interdependence, and incorporating the value of interdependence into everyday institutional policies and practices. Ultimately, these are strategies that can be generalized beyond the office.

“Cultures themselves are not monolithic or static,” Markus added. “They are changing all the time ... Leveraging interdependent agency can enhance performance and motivation and bridge cultural divides.” ●

-Mariko Hewer

To watch video of Hazel R. Markus's award address, visit psychologicalscience.org/r/interdependence.



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Better Minds Ahead

Understanding Cognitive Enhancement

Politicians, parents, and students all dream of an easy road to super smart. What kind of utopia would we live in if everyone were operating at their highest cognitive capacity? How do we get there?

Lorenza S. Colzato, principal investigator at the Leiden Institute for Brain and Cognition in the Department of Psychology at Leiden University, is one of the scientists at the forefront of cognitive enhancement study.

“In recent years, cognitive enhancement has become a very hot topic” both politically and culturally, she said during her introduction to “Better Minds: Understanding Cognitive Enhancement,” an Integrative Science Symposium at the 2017 International Convention of Psychological Science in Vienna. “Recent economic problems of the welfare system have boosted public interest in enhancement procedures and activities that will make the welfare of society more affordable. [The] ideological turn toward individualism in many societies has boosted public interest in procedures and activities that help to express and to further develop individual needs and interests.”



Lorenza S. Colzato says recent economic problems have spurred public interest in cognitive enhancement, from video-game-playing benefits to exercise interventions and music practice.

In the symposium, Colzato and four other leading scientists in the field of cognitive enhancement spoke on such varied topics as video games, music training, exercise, and the neuroethics of “smart drugs.”

Brain Games

Though many parents worry about the mental and behavioral effects of video games on their children, Daphné Bavelier and other researchers have found a good deal of evidence that some video-game play can enhance cognition in specific ways.

Bavelier, a cognitive psychologist at the University of Geneva, focuses her research on the effects of action games. Some early experiments showed vision improvements such as contrast sensitivity and visual acuity in long-time action gamers as well as experimental short-term gamers. These changes could be induced by having people play action video games for as few as 5 hours per week, and persisted months after the experiment and video-game playing ended.



Daphné Bavelier has found that playing action video games for as few as 5 hours per week can improve people’s vision — and that the phenomenon extends for months after the experiment.





Exercise interventions can benefit a wide variety of people, from Alzheimer's patients to women battling breast cancer, says **Arthur F. Kramer**.

Along with these promising vision studies, Bavelier began to explore a broader question: “What are the benefits that those games bring and translate to other skills and other behavior?”

Later study results suggested that action-game players were not just better at the skills specific to game play, such as good vision, but also were better at more cognitive skills, a phenomenon driven, at least in part, by improvement in attentional control.

“Attentional control is probably one of the easiest skills to change with action video games,” she said. “It can change relatively fast, with 10 to 12 hours of training.”

Work from other groups also showed that playing these types of games has real-world benefits.

“Young laparoscopic surgeons who play video games — and especially action video games — perform better in the simulators in terms of being faster and not making more errors than the most seasoned laparoscopic surgeons on the team,” Bavelier explained.

In these games, players must switch tasks and divide their attention. They monitor errors in skill and judgment. On a higher cognitive level, they also must plan goals and revise them on the fly. Bavelier and her colleagues have been trying to tease these skills out in isolation in order to identify the ones that are most important for learning. So far, it appears that the combination of demands, and not any challenge in isolation, is what produces the kind of cognitive enhancements seen in relation to commercially available action video games.

“It happens that video games are very efficient training tools,” she said, “at least when it comes to sensing our environment. More research is needed to assess whether this also applies to higher cognitive skills such as reasoning or problem solving.”

Your Brain on Jogging

As exercise helps the heart and other organs, might it also promote brain health? APS Fellow Arthur F. Kramer, former Director of the Beckman Institute for Advanced Science & Technology at the University of Illinois at Urbana-Champaign and currently senior Vice President for Research and Graduate Education at Northeastern University in Boston, has studied the relationship between exercise and cognitive enhancement for 25 years, with promising results in both animals and humans. Researchers in this field face the challenges of finding good metrics for cognitive enhancement and brain health, identifying the limits of cognitive enhancement from exercise, and bridging the gap between animal and human research.

Brain scans produced some of the first clues about the effects of exercise on the brain, showing that certain regions changed in volume in both long-term exercisers and in intervention groups. Size, white matter, and connectivity measurements all indicated that exercise has lasting effects on the brain. Exercise seems to show benefits in many tests and also in several cognitive tasks. In a 2003 meta-analysis of randomized control trial exercise and cognition studies, Kramer and Stanley Colcombe found that exercise positively impacts cognition with an effect size of nearly half a standard deviation.

“Fitness interventions have been assessed in early Alzheimer's or mild cognitive impairment patients, multiple sclerosis patients, Parkinson's patients, and in breast cancer patients,” Kramer said. “In each case, there have been benefits.”

Kramer acknowledged the need to establish the limits of cognitive enhancement, determining which interventions and lifestyle choices work best for different individuals.



Improved listening skills, test-training abilities, and language learning are among the gains found in study participants who regularly practiced music, according to **E. Glenn Schellenberg**.

“One of the important things we’re trying to do is bring the animal and human literature a bit closer together,” he said.

Minds on Melodies

APS Fellow E. Glenn Schellenberg, head of the Music and Cognition Lab in the University of Toronto’s Department of Psychology, investigates the effects of music on our minds. His research spans decades, from his early studies on lullabies and infants to current research on music practice, personality, and intelligence. While studies suggest correlations between music listening and practice and cognition, Schellenberg’s work aims to clarify causal effects through experimentation, teasing out the roles played by personality and disposition in studies of music and the brain.

A great number of studies have found associations between music training and nonmusical abilities. Despite the amount of research, however, it is unclear exactly what the benefits are and which populations would enjoy them.

Studies have shown improved listening skills, test-training abilities, and language abilities in those who practice music often, Schellenberg said, but science has produced few other conclusions.

One of the logistical issues that researchers face is young people’s tendency to drop out of music lessons. With such attrition rates, empirical results are hard to come by. The experiments that have been performed have found that music practice that focuses on rhythm and timing can have specific reading benefits, even in those with dyslexia. Group music lessons also seem to provide social benefits to children and infants, suggesting that group synchrony could be its own cognitive enhancer.

“There is much evidence of association between music training and nonmusical abilities,” Schellenberg said. “There is little evidence for causal association.”

While taking music lessons is correlated with high grades and IQ scores, researchers also have found preexisting differences between people who take lessons and those who do not.

When studied more closely, the link between school performance and music training appeared to be due to conscientiousness, Schellenberg said.

Research into the benefits of music practice have not held personality variables constant in the past, and Schellenberg believes they should in the future.

Schellenberg cautions against using cognitive arguments as rationales for funding or providing music lessons to young people.

“If you don’t have those effects, you’re saying music is essentially useless,” he says. “Isn’t it reasonable to teach kids about the only thing that makes people everywhere dance, dream, and connect with one another?”

If Only It Were That Easy...

As a researcher of neuroscience, ethics, and society at the University of Oxford, psychological scientist Iliina Singh is focused on the present and potential future use of “smart drugs” for cognitive enhancement. While answering large-scale philosophical questions is part of her study (e.g., is it right to give these types of drugs to low-performing students or populations?), it is also important to



Iliina Singh says that studying the use and misuse of Ritalin, Adderall, and other drugs used for cognitive enhancement can be challenging because their use varies widely by social group and geographic region.

determine how widely such smart drugs are actually being used, she says. This has proven complicated, as drug use varies by social group — and by whether or not the drugs are even legal in a given geographic region.

While smart drugs are covered extensively in the media, their effectiveness for students remains in question. “The hype has come before the evidence,” Singh said.

Students report taking the drugs for increased attention, focus, mood modulation, or executive function, but science has yet to produce convincing evidence that the most common smart drugs — Ritalin, Adderall, and Modafinil — provide these benefits in nonclinical populations. Aside from a large placebo effect, “what you hear most is that students say they feel more awake,” Singh said, noting that these drugs are indeed stimulants.

Should we try to make smart drugs more accessible in the name of social justice? Do governments have a responsibility to make them more available to the disadvantaged members of the public, since public-health data show their lifelong outcomes are improved through education?

According to Singh, the answer is no. Existing evidence of benefits is weak and clouded by various factors, including homogenous study samples and unknown effects of group membership, geographic region, and even diagnostic status. On the other hand, researchers haven’t established the risks that widespread, frequent use of these drugs carries.

In Singh’s view, looking at cognitive enhancers and fitting them into the framework of brain health would help to reframe these questions and help define the ethics in a different way.

By looking at brain health in regards to video games, exercise, music, and smart drugs, the questions shift from “Who gets these benefits?” to “How do we promote brain health for everyone?” ●

—Joe Dawson

A Magnetic Field

Psychological Scientists Lead fMRI Labs



In 1991, Thomas J. Brady gave a plenary address on the “Future Prospects for MRI” at the 10th annual meeting of the Society of Magnetic Resonance in Medicine. Presenting data and visualizations of the first-ever dynamic, functional images of the brain, Brady and colleagues introduced a revolution in the way researchers study the brain and the mind.

Since then, magnetic resonance imaging (MRI) has moved from single-time-point scans that were separated by several minutes to functional MRI (fMRI) that can now be presented in real time. With the evolution of fields such as cognitive neuroscience and neuroeconomics, brain imaging has rapidly expanded the study of our mental faculties.

Ongoing research in these fields comes not only from hospitals and medical facilities that allow researchers to use their machines, but increasingly it also comes from new research-dedicated brain imaging facilities. These centers are attracting diverse and interdisciplinary research teams from all over the globe and psychological scientists are increasingly involved in the direction and leadership of these brain imaging centers.

The Center for Cognitive and Behavioral Brain Imaging (CCBBI) at The Ohio State University is a model of these types of facilities. Under the direction of APS Fellow Zhong-Lin Lu, researchers at the CCBBI have uncovered the neural basis of facial action recognition and demonstrated the association between physical activity and improved working memory for individuals with multiple sclerosis, among many other impressive research findings, all while engaging the scientific and local communities in brain imaging research.

Building a Center and Making Imagers

Given that machines and software can cost more than \$2 million and regular system upgrades cost approximately \$1 million, the average researcher might not dream of building a center like the CCBBI. But in CCBBI’s case, the funding to build and establish the center was provided by Ohio State’s College of Arts and Sciences and by the Department of Psychology. While construction of the facility and the purchase and installation of equipment took 2 years, the true challenge, Lu explained, was recruiting and establishing an experienced technical team and developing a community of “imagers.”

“Although several faculty members had functional imaging experience prior to CCBBI, a great deal had to be done



Under the direction of **Zhong-Lin Lu**, The Ohio State University’s Center for Cognitive and Behavioral Brain Imaging has uncovered the neural basis of facial action recognition, demonstrated the association between physical activity and improved working memory for people with multiple sclerosis, and more.

to increase the user community,” he explained. “Recruiting principal investigators to a university can be a lengthy and complex challenge.”

With imaging sessions that cost the researcher \$550 per hour, investigators also need assistance in securing funding for their research. Critical support comes from the College of Arts and Sciences, which provides fMRI startup funding for new faculty. The CCBBI also contributes by allowing investigators to apply for free scanning hours geared toward prospective studies for which they have not yet secured funding. This pilot program makes it possible for researchers to obtain and produce data to strengthen their grant proposals. Lu explained that solidifying these opportunities for researchers interested in utilizing the CCBBI was fundamental in establishing the center.

Another challenge, Lu said, was encouraging scientists using behavioral techniques, but interested in answering their research questions at another unit of analysis, to use this methodology.

Learning to conduct fMRI research can be complicated and intimidating for researchers new to the process. Researchers must master safety requirements in an MRI environment that involves extra-strong magnet fields, and they must learn how to operate the MRI system as well as all the MRI-compatible ancillary equipment for stimulus presentation and data collection. They also must take into account the signal and noise properties of MRI images during experimental design. In addition, they need to learn how to process MRI images and analyze the results with emerging advanced data

Christopher Collins is a staff writer at the Association for Psychological Science.

analysis techniques. Most importantly, they must generate hypotheses that can be tested with functional imaging that can answer important scientific questions.

“Many of my colleagues have been very brave to dive into imaging after they have had very successful careers based on mostly behavioral research,” Lu said. “We have been very fortunate to have them join and enrich the imaging community.”

Despite these challenges, Ohio State’s CCBBI is exceeding expectations in becoming one of the top centers in the field for interdisciplinary research and psychological science.

The Breadth of fMRI and Psychological Science

Ohio State’s CCBBI has three dozen principal investigators representing 17 diverse research departments across the university, including psychology, business marketing, cardiovascular medicine, electrical and computer engineering, health and rehabilitation sciences, pediatrics, psychiatry, sociology, speech and hearing science, and more. The active learning environment at the CCBBI is open for researchers, graduate students, and undergraduates alike, Lu explained, and the center houses experts in structural and functional imaging technologies, experimental design, and advanced data analytics techniques.

The skilled staff and an interdisciplinary community offer opportunities for researchers of any experience level to engage in studies investigating diverse research topics.

Ruchika Prakash, an associate professor of psychology who studies behavioral and neural correlates of neuropsychological rehabilitation, is a principal investigator conducting research at the CCBBI. Her research examines changes in connectivity of large-scale networks in the brain and aims to design interventions using basic sciences to tap into neuroplasticity and reduce the cognitive deficits involved with multiple sclerosis and aging. She in particular appreciates the multifaceted and interdisciplinary nature of the center.

One of the strong suits of the CCBBI, she said, is “the fact that the center works on building these interdisciplinary teams that can design projects that transcend traditional boundaries so we no longer work in silos, but draw upon one another’s expertise and complement that expertise while also bringing different perspectives to the table.”

By assembling teams of experts in diverse fields such as computer science, mathematics, biomedical engineering, physics, and medicine, centers like CCBBI are drawing scientists to the field of brain imaging at an increasing rate.

Outside of Ohio State’s CCBBI, there are many other psychological scientists involved in brain imaging. At the Harvard Center for Brain Science, APS Fellow Joshua Buckholz is an experimental psychologist and neuroscientist studying the neuroscience of self-control and impulse control disorders. At Stanford University, there is APS Fellow Russell A. Poldrack, the Director of the Stanford Center for Reproducible Neuroscience, whose lab investigates decision-making, executive control, and learning

and memory. In addition, Poldrack’s lab places a strong emphasis on the development of neuroinformatic tools and open science.

At the University of California, Berkeley, APS Fellow Ann M. Kring researches emotion and psychopathology, specifically looking at the negative symptoms in schizophrenia and the link between cognition and emotion. APS William James Fellow Richard J. Davidson utilizes fMRI at the University of Wisconsin–Madison, where he is the Core Director, Brain Imaging Core, at the Waisman Center. His research examines the neural bases of healthy and disordered behavior, studying individuals with anxiety and mood disorders as well as expert meditation practitioners to inform our understanding of emotional and contemplative styles.

In Germany, APS Fellow Angela D. Friederici, Vice-President of the Max Planck Society and Director of the Department of Neuropsychology at the Max Planck Institute, has identified specific neurophysiological markers reflecting the phonological, lexical, and syntactical processes involved in language learning and development. Her department is one of many at the Max Planck Institute using fMRI to study language in the brain. In the United Kingdom, APS Fellow Heidi Johansen-Berg is the Director of the Oxford Centre for Functional MRI of the Brain at the University of Oxford. Her research examines brain plasticity and how the brain responds to learning, experience, and damage. Her work has had a real-world impact by illuminating methods for rehabilitation for individuals who have had damage to their brain.

“Many of my colleagues have been very brave to dive into imaging after they have had very successful careers based on mostly behavioral research.”

Zhong-Lin Lu, The Ohio State University

Meanwhile, these centers also are bringing outside perspectives into psychological science. Ming Hsu, an associate professor at the Haas School of Business at the University of California, Berkeley, did not study psychological science in graduate school — he has a PhD in economics and a bachelor’s degree in political science — but he now conducts technical research involving cognitive neuroscience, economics, psychology, and marketing. His studies examine social behavior and decision-making “through the lens of game theory” with a basis in competition and cooperation. Utilizing brain imaging centers, Hsu has collaborated with neuroscientists and psychological scientists, taught as a professor of psychology, and examined the genetic and molecular mechanisms behind marketing and consumer choice.

At Ohio State’s CCBBI, Lu has a background in physics but has applied himself to the field of cognitive neuroscience and psychology, with more than 200 publications relating to the computational and psychophysical study of perceptual and sensory

brain functions and deficits. The physicist has served as a professor of psychology, biomedical engineering, and neuroscience.

These brain imaging centers offer unique opportunities to bring researchers from disparate backgrounds together to conduct impactful, cutting-edge research in the name of psychological science, neuroscience, and medicine. The research topics at these centers are simultaneously wide-ranging and specific: the easiest summary is, if you can think or feel it, somebody is probably studying that process using fMRI.

Expanding the Community

While they are gaining public interest, neuroscience and brain imaging are not always the most easily digestible subjects. Those unfamiliar with the discipline may feel as though they are reading a foreign language when trying to parse a jargon-filled, peer-reviewed article, but Ohio State's CCBBI has programs designed to change that.

The CCBBI is also open to institutions that do not have the capabilities to use or access the same type of facilities for research.

“We regularly facilitate educational activities for the public including academic lectures, facility tours, and programming opportunities for the public to meet with, and learn from, our researchers,” said Lu. “We organize interactive learning experiences for junior-high-school students, create newsletters geared for a nonscientific audience and host professional seminars for the greater Columbus community.”

At the CCBBI, Lu and his colleagues are dedicated to keeping their doors open to Ohio State's large student body. The center hosts national and international brain imaging experts and provides monthly forums intended to facilitate interdisciplinary discussion on brain imaging ideas and techniques within the university's community. Researchers offer workshops designed to promote partnerships between student researchers and to help foster a student imaging community by supporting a student organization of emerging fMRI researchers and providing fellowships to graduate students, especially women and minority students to conduct imaging research. Undergraduate and graduate students are able to take university credit courses in fMRI taught by experienced faculty who conduct research at the center. This innovative, hands-on opportunity allows students to learn design and analysis of fMRI experiments and operation of a Siemens PrismaFit system in a real-world facility.

The CCBBI is also open to institutions that do not have the capabilities to use or access the same type of facilities for research. The Center is a member of the Concussion Neuroimaging Consortium (<http://www.concussionimaging.org/>), which consists of nine universities aiming to advance evidence-based treatment for traumatic brain injury by establishing best practices for diagnosis, prognosis, and management of head injuries. The CCBBI currently col-

laborates with Kent State University, Nationwide Children's Hospital, Wright State University, Arizona State University, University of Toronto, University of Southern California, and University of California, Irvine.

“CCBBI's availability to institutions that do not have fMRI capability contributes to building a broader community of researchers who can learn different research approaches through cross-institutional collaborations,” Lu said.

Looking Back and Looking Forward

“The establishment of Ohio State's CCBBI contributes significantly to recruiting first-rate scientists to the university, facilitating advanced imaging research, securing internal and external grants, and educating the next generation of imagers,” Lu said.

By supporting researchers and students from various disciplines and promoting collaboration on impactful and applied research, the CCBBI and centers like it have set an impressive precedent for neuroimaging centers.

“The study of brain functioning and behavior is one of the fastest growing fields in psychology and the social and biological sciences more generally,” Lu concludes. “As a research-dedicated imaging center, CCBBI provides an environment that facilitates an interdisciplinary approach that combines techniques and expertise from many disciplines which will contribute to advancements in many critical fields. The pioneering research and educational activities at the Center place us on the path to transformative discoveries that will fundamentally improve our understanding of health and well-being.” ●





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Bridging Psychological Science and the Humanities

By Jason R. Finley

Being a psychology professor at a small liberal arts college comes with certain perks. One is that I routinely have deep discussions with experts outside of my field. My office at Fontbonne University is just down the hall from colleagues who work in philosophy, sociology, history, English, and communications, and we discuss various ways that our disciplines intersect. For example, in what ways do themes from qualitative research in the humanities complement the empirical research of psychology? If we consider information stored in the physical environment as a form of external memory, as I do in my research, then what is the difference between that and history? How is memory represented in movies and literature? How has new technology changed the way people remember events in everyday life, the way psychologists study human memory, and the way libraries and museums manage archives as part of collective memory? How does the reconstructive nature of human memory play out in the narratives of immigrant communities such as the large Bosnian population here in St. Louis?

These conversations have led to a source of grant funding that was unexpected for me as a psychological scientist: the NEH. No, not the familiar NIH (National Institutes of Health); the NEH is the National Endowment for the Humanities [<https://www.neh.gov/>]. I am part of an interdisciplinary team that applied for and has been awarded a \$100,000 grant [<https://www.fontbonne.edu/news/100000-neh-grant-fund-memory-identity-exploration/>] from NEH's new Humanities Connections program [<https://www.neh.gov/grants/education/humanities-connections>]. With this grant, we will develop several interlocking courses in which students will explore memory as a unifying theme across the humanities and the sciences. Our team consists of me (psychology), my fellow professors Corinne Wohlford (history and culture), Ben Moore (English, Bosnia Memory Project [<https://www.fontbonne.edu/academics/departments/english-and-communication-department/bosnia-memory-project/>]), and Julie Portman (library and digital humanities), and our collaborators at the nearby Missouri History Museum, Jody Sowell and Angela Dietz.

Jason R. Finley is an assistant professor of psychology at Fontbonne University. His research interests include memory, metacognition, and offloading cognition onto the environment, particularly as the interplay of internal and external memory continues to change with 21st century technology. He can be reached at jfinley@fontbonne.edu.

I will create and teach a new psychology-based course — “Memory and the Human Experience” — that will include an experiential component in which students use grant-funded wearable cameras on a trip to the Missouri History Museum. Students will compare their unaided recall of the visit with the objective record shown by their pictures. The additional three courses will approach the study of memory from other disciplinary lenses: “Memory and Public History,” “Collective Memory, Migration, and Identity in American Culture,” and “Genocide, Migration, and Transgenerational Memory: The Case of Bosnia.” One of the ways my course will connect to the others is by examining how information is stored internally in the brains of individual humans versus stored externally in the social environment (collective memory) or in the physical environment (everything from cave paintings to libraries and smartphones). I also will challenge students to think of humanities-inspired ideas for new scientific research on memory.

As part of this grant we also will be holding an interdisciplinary conference on memory and identity. The conference will be in St. Louis from May 17 to 19, 2018, and our call for abstracts is open until January 5, 2018 [<https://www.fontbonne.edu/academics/academic-opportunities/interdisciplinary-conference-memory-identity/>]. I can't wait to see what new ideas emerge from this whole endeavor.

Our success story at Fontbonne came at a time of funding uncertainty at the federal level, as President Donald Trump had proposed completely eliminating the NEH and the National Endowment for the Arts (NEA). Fortunately, in May Congress approved a spending bill that preserves funding for the NEH and NEA through the end of fiscal year 2017. I think it is worth letting our congressmembers know [<https://www.congress.gov/contact-us>] how valuable we feel these endowments are, especially given that the public good they do extends to science in collaboration with the humanities.

I encourage fellow psychological scientists at universities small and large to talk with colleagues in the arts and humanities. There is so much fruitful ground for synergy; human experience is vast and multifaceted. Psychological science is a powerful tool for understanding it, but it is by no means the only tool. You never know where cross-discipline conversations might lead. ●

Making the Most of University Museums

As director of Tufts University’s Emotion, Brain, & Behavior Laboratory, Heather Urry offers courses ranging from introduction to psychology to affective neuroscience. But until last year, she never imagined incorporating an art museum into her instructional repertoire.

Urry incorporated the Tufts University Art Gallery into a portion of an undergraduate emotion course that focused on coding facial movements — a step that has drawn praise from her students in their end-of-semester course evaluations.

“In the past when I’ve taught this content, my lecture slides illustrated with pictures how the action units in the face map onto different expressions of emotion,” Urry explained. “I invited questions and did my best in this lecture-oriented setting to invite participation in many different ways, but it was ultimately a relatively passive process. This opportunity in the gallery was really a good way to make it much more active.”

US colleges and universities are home to more than 700 art museums and galleries, many of which are increasingly reaching out to psychological scientists like Urry for collaborative instruction.

College museums are meant to be used for teaching, and not just for art history classes. Along with curatorial staff, many university museums and galleries have staff that specialize in academic programs, education, or staff who specifically work with faculty and students to develop interdisciplinary curricula.

“I think most academic museums, if approached, would be thrilled to try something with a faculty member,” says Liz Canter, the Gallery Educator & Academic Programs Coordinator at Tufts. “If a faculty member already has the initiative and wants to come, I can’t imagine any museum educator saying that they’re not willing to help.”

Tufts’ gallery can be particularly useful when science faculty are focusing on a specific skill set, Canter explains. For an engineering class, it might be pattern recognition; for medical students, it might be visual-observation proficiency. For psychology students learning about the science of emotions, the gallery was an ideal hands-on teaching tool for facial coding techniques.

Alexandra Michel is a staff writer at the *Association for Psychological Science*.



Tufts University researcher **Heather Urry** has integrated museum exhibits into her teaching, using portraiture to engage her students in learning about emotion expressions.

The resource for Urry’s project was an exhibit that opened at the gallery in the fall of 2016. The exhibit included more than 90 portraits spanning over 150 years of art history. As part of her job of encouraging faculty and students to make use of the gallery’s resources, Canter was scouring a course catalog for classes that that could utilize the exhibit. That’s when she spotted Urry’s survey-level psychology course on emotions.

“We have this room of faces and she teaches a class about emotions,” Canter explained. It seemed like an ideal match, but getting faculty to incorporate the museum into their curricula “can be like pulling teeth,” she said.

When Canter first approached her about using the museum for her class, Urry wasn’t sure how a museum visit would improve her course; it also seemed time-intensive. But she was intrigued enough to set up a meeting; by the end

of that meeting, she was convinced that it was worth a try.

Canter worked with Urry to put together a lesson on applying the Facial Action Coding System (FACS) for measuring the “action units” in the face that contribute to expressions of emotion. Based on work by APS William James Fellow Paul Ekman, FACS is one of best-known systems for classifying emotions based on specific movements of the muscles of the face.

In one class, Urry gave a typical lecture about emotion expressions and FACS. During the next class, the students met at the gallery, where they could try their hand at coding the action units of different portraits in the exhibit.

“Everyone coded one piece in common, and we ended with a discussion of that piece to determine whether we could come to consensus about the action units therein and the emotion being expressed,” Urry explained. “This culminated in a discussion of the strengths and limitations of the FACS coding approach.”

The experience led the students to dive into an involved conversation about the benefits and obstacles inherent in any coding scheme, including the fact that there were disparities of context to each art piece, just as there are for people in the real world.

“The idea of using this content to teach a skill is really fantastic,” Urry said. “I think another benefit is that I can teach this content in a way that is so much more interesting, motivating, and exciting. Ultimately, when students

are excited about what we’re doing, they’re going to be invested in the process and better able to retain the critical features of that skill.”

Canter added, “That’s kind of how most classes end up working. We work backwards from a discrete skill, often a skill that an instructor is having trouble teaching in the traditional classroom. Maybe there’s a creative way to get at it from another angle in another space.”

But I Don’t Have Time...

Urry emphasizes that working the museum into her lesson didn’t require a big time commitment.

In addition, looking at the material with a fresh perspective actually provided a sense of inspiration.

“It was not just motivating and interesting for the students, but it was also motivating for me,” she said.

Canter emphasizes that the museum shouldn’t take time and resources away from the content you’re trying to teach and that it shouldn’t be thought of as “just a field trip.”

“A lot of what I hear from people is that they have too much content to distill and they think this will take away from their classroom time or become more work for them,” Canter explains. “Sometimes they’ve been teaching the same syllabus for 15 years and they haven’t really changed it. You’re still teaching that content, just somewhere else.” ●

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Gender Matters!

Teaching Gender-Based Analysis in Psychology

By Alexandra Rutherford

Over the past 10 years, the question of why women continue to be underrepresented in science, technology, engineering, and math (STEM) fields has received sustained attention from researchers, educators, policy-makers, and the general public. Psychological scientists have been at the forefront of research to determine the causes of this underrepresentation, proposing and evaluating multiple possibilities ranging from outright sex discrimination (Moss-Racusin et al., 2012) to lifestyle choices and career preferences (Ceci & Williams, 2011) and the influence of gender roles on women's educational and occupational decisions (Eccles, 1994). One of the effects of the increased focus on gender in science is the renewed realization that *gender matters* at all stages of scientific inquiry, from setting research priorities to formulating research questions to interpreting data and applying findings.

In this project, funded by the APS Teaching and Public Understanding of Psychological Science grants program, we developed a series of videos to explain to students how critical attention to sex and gender helps create more effective science. In developing these teaching videos, we drew on the conceptual framework of the Gendered Innovations project originally developed at Stanford University (see genderedinnovations.stanford.edu/index.html). This framework identifies three strategies for achieving gender equality in STEM:

1. Increase women's participation.
2. Create structural change in research organizations.
3. Integrate gender analysis into research and teaching.

Our project engages with this third strategic approach — gender analysis.

Gender-based analysis, or GBA, is a set of tools to help researchers critically assess how gender norms and assumptions enter and impact the research process. GBA

Alexandra Rutherford is a professor of psychology at York University in Toronto. Her work focuses on the history of feminist-scholar activism in psychology and its impact on society. She is the founder and director of the Psychology's Feminist Voices Oral History and Digital Archive Project (www.feministvoices.com), which documents and analyzes the relationship between feminism and psychology. She can be contacted via apsobserver@psychologicalscience.org.



Alexandra Rutherford (right) and Jacy Young are involved in a project, supported by an APS grant program, aimed at achieving gender equality in STEM fields.

also allows us to consider the impact of research findings on diverse gender groups and the intersections of gender with other identity factors such as race/ethnicity, class, and sexual orientation. The federal government of Canada committed to using gender-based analysis to assess the differential impacts of policies, programs, services, and other initiatives on diverse gender groups in 1995, but only recently is it being used more systematically. In 2015, the World Health Organization identified a continuum of approaches for integrating sex and gender into health research, and as of 2016, the National Institutes of Health has asked grant applicants to elaborate on how they plan to factor consideration of sex as a biological variable into research design and analysis. There have been similar developments in many European granting agencies.

Although GBA is increasingly prominent in STEM (see Schiebinger et al., 2011–2017; Sharman & Johnson, 2012), it has not been as thoroughly applied to psychology and is not generally taught to undergraduates. Feminist psychologists have for many decades called attention to the ways that gender biases operate in psychological research, making it potentially less relevant for all genders and even perpetuating harmful stereotypes about gender and race (e.g., Grady, 1981; Sherif, 1979). Insights from GBA can help avoid these pitfalls and create more socially useful and transformative research and policy, not only about gender but in all areas of psychological

science. Psychology students are well-positioned to integrate gender analysis into their own studies and in so doing produce more gender-equitable science. We just have to teach them how to do it.

To address this need, we conceptualized and developed a series of seven short, accessible videos that can be integrated into a number of psychology courses. We scoured YouTube for design inspiration, pilot-tested the video storyboards with introductory psychology students and our own research group, and honed our acting skills. In content, design, and production, we worked to make the videos as clear, appealing, and dynamic as possible for undergraduates. Starting with “What is Gender-Based Analysis?” we move through “Conceptualizing Sex vs Gender,” “Setting Research Priorities and Outcomes,” “Rethinking Concepts and Theories,” “Formulating Research Questions,” “Analyzing Factors Intersecting with Sex and Gender,” and “Language and Visual Representations.” In each video, we outline the concepts and methods involved in each step, using examples from the psychology research literature. We also provide teaching guides to help instructors use the videos effectively in the classroom. All of the material and resources are available at the Psychology’s Feminist Voice website (www.feminist-voices.com/gender-based-analysis) and on our YouTube channel (www.youtube.com/user/psychsfeministvoices). Remember, gender matters! ●

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Teaching Current Directions in Psychological Science

Edited by C. Nathan DeWall and David G. Myers

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

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

Sexual Conflict: Uncovering the Mysteries of the Mating Battleground

By C. Nathan DeWall

Buss, D. M. (2017). Sexual conflict in human mating. *Current Directions in Psychological Science*, 26, 307–313.

Many people picture their wedding day as a public promise of commitment and cooperation. A wedding signifies the culmination of the lessons learned from years of navigating the relationship market — learning what brought you joy, what invited heartache, and how you found the person of your dreams. But according to David Buss (2017), a heterosexual wedding signifies entry into another arena in the mating battleground, one in which men and women evolved different preferences that often create sexual conflict.

Sexual conflict occurs when an individual's sexual interests clash with a potential mate's sexual interests. Buss argues that most human sexual conflict results from "conflicts between different genes located in individual males and individual females"

(pp. 3–4). The different genes predispose men and women to have differing reproductive interests. For example, men want to pair widely, whereas women prefer to pair wisely. Why? Men, compared with women, have a lower minimum amount of obligatory parental investment — features of human reproductive biology that have favored the evolution of a somewhat different mating psychology when it comes to short-term sex (Buss, Goetz, Duntley, Asao, & Conroy-Beam, 2017).

Successful heterosexual relationships accommodate these evolved sex differences. According to Buss, "sexual conflict is not a narrow flashpoint, but rather a frequently occurring set of forces that permeate many domains of human social interaction" (pp. 14–15). You can spot sexual conflict at three stages of the mating process:

- **Prior to consummation.** People fib, especially when doing so may help them satisfy their relationship goals. Some men may feign emotional involvement in women because they believe doing so will increase their chances of having sex. Seventy-one percent of men admit to deceiving women in this way, whereas only 39% of women report doing so (Buss, 2016). In contrast, women are five times more likely than men to send signals of sexual interest in the hopes of securing nonsexual resources (Haselton, Buss, Oubaid, & Angleitner, 2005).



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- **After a relationship has formed.** Sexual conflict can give rise to jealousy out of fear that one's partner will engage in infidelity. Both men and women experience jealousy, but they show reliable differences when forced to choose whether a partner's sexual or emotional infidelity would cause more psychological distress (Buss & Abrams, 2016). The second teaching activity delves into this example of sexual conflict.
- **After a breakup.** Buss uses the example of stalking to show how sexual conflict can continue after the dissolution of a romantic relationship. Unable to accept a breakup, a person sometimes seeks to threaten or persuade a former partner back into a relationship (Duntley & Buss, 2012). Most stalkers are men stalking women, but some women also stalk their prior relationship partners. In both cases, the goal is often to re-establish the romantic relationship, interfere with a former partner's future mating attempts, or both.

To bring this cutting-edge research to the classroom, instructors may engage in a brief discussion of what constitutes evolutionary psychology. Students tend to vary in how much they understand and acknowledge the principles underlying evolution by natural selection. I have taught ardent evolutionists and devout creationists. All students receive the same message: It's my business that you learn it.

Evolutionary psychologists apply the scientific method to test specific, falsifiable hypotheses regarding the underlying function of our thoughts, feelings, and actions. Dating back to William James, psychology has a rich history of applying evolutionary theory to better understand human nature. Evolutionary psychology attempts to explain our responses; it does not seek to reward or excuse them, even those that individuals and society deem inappropriate.

In the first activity, Buss shows students the following two PowerPoint slides:

Slide 1:

Class Exercise: How Do Men Upset Women?

Think of all the ways—in your experiences and observations—in which a man has irritated, angered, annoyed, or upset a woman.

Slide 2:

Class Exercise: How Do Women Upset Men?

Think of all the ways—in your experiences and observations—in which a woman has irritated, angered, annoyed, or upset a man.

“Basically, I have students nominate ways in which men and women have come into conflict with each other,” he says. “Students REALLY love this exercise and generate dozens of things.” Instructors can select a small number of nominations to discuss in class. What similarities exist between how men upset women and how women upset men? What differences exist? How might evolutionary psychology help explain those male–female differences? Might these differences give rise to sexual conflict?

“The exercises get the students heavily involved into the topic,” Buss says, “since they have all experienced different forms of sexual conflict in their lives.”

Buss uses the second activity to teach students about sexual jealousy. Instructors should forewarn students that the activity involves sensitive material and that participation is voluntary. Drawing on his extensive sexual jealousy research (Buss et al., 1992; 2016), Buss asks students to respond to the following scenario:

Imagine that your romantic partner became interested in someone else and became both deeply emotionally involved with and had sexual intercourse with this person.

Which aspect would upset you more:

- The partner's emotional involvement, or**
- The partner's sexual involvement?**

Instructors can have students anonymously write down their gender and answer on a half-sheet of paper, wad the paper into a ball, and throw it to the front of the classroom, after which the instructor can read each response. In Buss's experience, the results should be clear-cut: “This exercise always produces large sex differences,” he said, “with more women than men picking (a), and more men than women picking (b).”

Ask students to form pairs and discuss why such large sex differences exist. What do these differences say about the pressures that our male and female evolutionary ancestors faced? Do men and women still face different adaptive problems in the modern environment regarding paternity uncertainty (knowing the true identity of a child's biological father) and commitment of resources? When might women become more upset by a male partner's sexual involvement with another woman (vs. by his emotional involvement)? When might men become more upset by a female partner's emotional involvement with another man (vs. by her sexual involvement)?

Learning about evolutionary psychology may upend traditional notions of heterosexual romance. People can experience marital bliss, but doing so often requires resolving sexual conflict when — not if — it arises. The good news is that understanding the underlying functions of our thoughts, feelings, and actions can serve as a mainspring of greater acceptance and patience toward our romantic partners. ●

Religious Engagement and the Good Life

By David G. Myers

VanderWeele, T. (in press). Religious communities and human flourishing. *Current Directions in Psychological Science*.

Despite the secularization of many Western cultures, two in three humans across the planet agree that in their everyday lives “religion is important” (Diener, Tay, & Myers, 2011). Given religion’s prevalence, people understandably wonder: Do religious communities more often foster health, happiness, and altruism, or repression, bigotry, and ingroup selfishness? Do evolutionary psychologists rightly infer that religion fosters morality, social cohesion, and group survival (Wade, 2009; Wilson, 2002; Wright, 2009)? Or is religion “one of the world’s great evils” (Dawkins, 1997)?

Before engaging students in thinking about such questions, a caveat is in order: Remind students that research on religion and well-being does not speak to the truth of any single religion’s beliefs. Any given religious claim might be

1. true and health-promoting,
2. true and unhealthy,
3. false and health-promoting, or
4. false and unhealthy.

Religion’s advocates and skeptics have both recognized that, at their worst, religious communities have done harm, and at their best, they have done good. To highlight this point, instructors could invite students to list examples of religion-associated harm and religion-associated good during a 2-minute writing period. Students could then volunteer some of their examples of each, which might include (on the harm side) religious wars, gay-bashing, women’s subordination, slavery justification, and terrorism, and (on the good side) the founding of hospitals, universities, and hospices; and the antislavery and civil rights movements.

Such history aside, social scientists are now asking: Is religious engagement in today’s world associated more with the flourishing of life or with misery? More with generosity or greed? More with humility or self-serving pride? More with forgiveness or revenge? More with health and longevity or stress and illness? More with happiness and life satisfaction or repression and depression?

Into these waters dives epidemiologist and biostatistician Tyler VanderWeele (2017). VanderWeele is aware of the hundreds of studies that correlate religiosity with health and well-being,

but he notes that these findings are nearly all correlational. If individuals who worship regularly are happier and healthier, is this because religious engagement promotes health and well-being, or because healthy, happy people more often get out of the house to join communal worship?

To explore causality, VanderWeele and others have assessed people’s religiosity and health, along with other health predictors, and then followed them through time — for example, across 20 years with 74,534 women in the Nurses’ Health Study. Even after controlling for other health predictors, those who attended services more than weekly were, compared with nonattenders, a third less likely to have died during the course of the study. And they were five times less likely to have committed suicide. Longitudinal studies also reveal that religiously active people are less likely to divorce, more generous in volunteering and charitable giving, and less likely to smoke and abuse drugs and alcohol than their nonreligious counterparts.

From these and other data, VanderWeele concludes that “religious community is a major contributor of human flourishing” and “a powerful social determinant of health.”

But why? Can your students brainstorm mediating factors that might explain why religious engagement predicts future health?

Unpacking the religiosity variable for the giant nurses’ study, VanderWeele and his colleagues report that

- *social support* explained 23% of the religiosity effect,
- *not smoking* explained 22%,
- *few depressive symptoms* explained 11%, and
- *optimism* explained 9%.

Said differently, people active in faith communities experience more social support, smoke less, are less depressed, and are more optimistic.

Some devout students may object to psychological scientists’ efforts to “explain away” the religion factor in terms of its psychological components. But understanding the physical concepts that explain a rainbow needn’t destroy our sense of its beauty. Examining the brain mechanisms that enable consciousness and language needn’t reduce the significance of mind. Moreover, as VanderWeele illustrates, it is possible to study links between religiosity and human flourishing without presuming either the truth or falsity of religious beliefs. ●

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

APSSC STUDENT GRANT COMPETITION

SUBMIT TODAY FOR THE CHANCE TO RECEIVE FUNDING FOR YOUR RESEARCH!

The APSSC Student Grant Competition provides funding (up to \$500) to support the research of APS Student Members in its initial development stages (e.g. purchasing research materials, data collection expenses, etc.). Proposals from all areas of psychological science are welcome.

Submission Deadline: November 1, 2017

Questions? Contact Emily Hokett:
apssc.graduate@psychologicalscience.org

www.psychologicalscience.org/studentawards

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APS Grants and Recognition for Students

The career path for students in psychological science can seem daunting at times, with many factors influencing your decisions and choices. Is academia the best fit for you, or would you flourish in another setting? If your goal is to work in a lab, what central research questions will you focus on? What are some good ways to forge working relationships and connections with other psychological scientists? APS offers a variety of ways for budding scientists to pursue research projects and build strong CVs.

The Association provides five opportunities that students can apply for in the next several months.

The Student Grant Competition Application deadline: **November 1, 2017.**

Provides small “seed grant” funding to support research in its initial development stages and to help with needs such as purchasing research materials or covering other expenses incurred prior to data collection. Up to eight awards (\$500 each) will be given to APS graduate and undergraduate student affiliates.

The Student Research Award Application deadline: **January 31, 2018.**

Promotes and acknowledges outstanding research conducted by APS student members. Winners of this competition will present their research in symposium format at the APS Annual Convention in May and receive some monetary compensation for travel costs to the event. The program includes up to three awards for graduate students and up to two awards for undergraduates.

The RISE Research Award Application deadline: **January 31, 2018.**

Seeks to cultivate psychological science research in fields related to socially and economically underrepresented populations. The winners present their research at a special symposium at the APS Annual Convention in addition to receiving a monetary award.

The Psi Chi | APS Albert Bandura Graduate Research Award Application deadline: **February 1, 2018.**

Provides \$1,200 for travel expenses to attend the APS Annual Convention to receive the award and two engraved plaques, one for the winner and one for the winner’s psychology department. APS will give the winner a 3-year membership to APS, including subscriptions to all APS journals. All psychology graduate students who are members of Psi Chi, the international honor society in psychology, and are also APS graduate student affiliates are eligible to submit their research for consideration.

Convention Travel Awards


In addition, APS provides travel assistance to APS student affiliates who are presenting their research at the Annual Convention. The assistance includes cash awards of about \$200, plus complimentary Convention registration. Recipients will be asked to volunteer for a 6-hour shift onsite at the Convention. Volunteer duties include working at the registration desk, providing directions to attendees, and completing room counts for various Convention events.


More information about APS grants and recognition for students is available at psychologicalscience.org/members/grants-awards-and-symposia. •

Lisa Feldman Barrett, Northeastern University, *The New York Times*, July 14, 2017: When Is Speech Violence?

Robert Bjork, University of California, Los Angeles, *The New York Times*, June 30, 2017: Forgot Where You Parked? Good.

David DeSteno, Northeastern University, *The New York Times*, August 26, 2017: The Secret to a Good Robot Teacher.

 **Kristin Diehl**, University of Southern California, *New York Magazine*, August 7, 2017: How Taking Photos Affects Your Memory of the Moment Later on.

 **Elizabeth Dunn**, University of British Columbia, Canada, BBC, July 25, 2017: Time, Not Material Goods, 'Raises Happiness'; CNN, July 24, 2017: How to Fight 'Time Famine' and Boost Your Happiness.

Nicholas Epley, University of Chicago Booth School of Business, *The Atlantic*, August 18, 2017: Why Do Humans Talk to Animals If They Can't Understand?

Martha Farah, University of Pennsylvania, *The Guardian*, July 13, 2017: The Neuroscience of Inequality: Does Poverty Show Up in Children's Brains?

Joseph Ferrari, DePaul University, *The New York Times*, July 21, 2017: What We Finally Got Around to Learning at the Procrastination Research Conference.

David Geary, University of Missouri-Columbia, NPR, August 1, 2017: Guess What? We're All Born With Mathematical Abilities.

Lisa Gennetian, New York University, *The Guardian*, July 13, 2017: The Neuroscience of Inequality: Does Poverty Show Up in Children's Brains?

Francesca Gino, Harvard University, *Scientific American*, July 5, 2017: The Problem With Being a Top Performer.

Roberta Golinkoff, University of Delaware, NPR, July 4, 2017: A Plan for Raising Brilliant Kids, According to Science.

Alison Gopnik, University of California, Berkeley, *The New York Times*, August 19, 2017: What Happens to Creativity as We Age?


Adam Grant, The Wharton School of the University of Pennsylvania, *Quartz*, August 8, 2017: One of the Most Popular Job Interview Questions Is Biased and Unfair, Says Adam Grant.

Paul Harris, Harvard University, *The New York Times*, August 26, 2017: The Secret to a Good Robot Teacher.

 **Linda Henkel**, Fairfield University, *The New York Times*, August 18, 2017: Taking Photos Won't Take You Out of the Moment, Study Suggests; *New York Magazine*, August 7, 2017: How Taking Photos Affects Your Memory of the Moment Later on.



Hal Herzog, Western Carolina University, *The Atlantic*, August 18, 2017: Why Do Humans Talk to Animals If They Can't Understand?

Kathy Hirsh-Pasek, Temple University, NPR, July 4, 2017: A Plan for Raising Brilliant Kids, According to Science.

 **Michael Hout**, New Mexico State University, *The New York Times*, August 18, 2017: Taking Photos Won't Take You Out of the Moment, Study Suggests.


Timothy Jay, Massachusetts College of Liberal Arts, *The New York Times*, July 27, 2017: The Case for Cursing.

Becca Levy, Yale University, *The Washington Post*, July 2, 2017: Want To Slow Down Your Aging Process? Mind-Set Can Be Key, Oldest Seniors Say.

  **Elizabeth Loftus**, University of California, Irvine, *The New Yorker*, June 19, 2017: Remembering the Murder You Didn't Commit.

Bill McCown, University of Louisiana at Monroe, *The New York Times*, July 21, 2017: What We Finally Got Around to Learning at the Procrastination Research Conference.

Kimberly Noble, Columbia University, *The Guardian*, July 13, 2017: The Neuroscience of Inequality: Does Poverty Show Up in Children's Brains?

 **Ed O'Brien**, University of Chicago Booth School of Business, *New York Magazine*, July 7, 2017: A Study Encourages You to Have Fun First and Finish Your Work Later.

Steven Pinker, Harvard University, *The New York Times*, July 27, 2017: The Case for Cursing.

Seth Pollack, University of Wisconsin-Madison, *The Guardian*, July 13, 2017: The Neuroscience of Inequality: Does Poverty Show Up in Children's Brains?

Jennifer Richeson, Yale University, *The Washington Post*, August 14, 2017: Why Are People Still Racist? What Science Says About America's Race Problem.

 **Amy Wrzesniewski**, Yale University, NPR, July 31, 2017: You 2.0: How to Build a Better Job

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[www.psychologicalscience.org/
MembersInTheNews](http://www.psychologicalscience.org/MembersInTheNews)

 **Coverage of research from an APS journal**

 **Podcast included in coverage**

 **2018 APS Convention Speaker**
San Francisco, CA, USA, May 24–27, 2018

 **Video included in coverage**

APS EMPLOYMENT NETWORK

MAKING CONNECTIONS THAT MATTER

The APS Employment Network is your connection to the best jobs in psychological science. Employers from colleges and universities, government, and the private sector use the APS Employment Network to recruit candidates like you. Visit www.psychologicalscience.org/jobs for additional job postings and to sign up for job listings by email.

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CALIFORNIA

University of California, Los Angeles

Department of Psychology

Quantitative Faculty

The Department of Psychology at UCLA seeks applications for a full-time tenure-track assistant or early associate professor position with expertise in quantitative psychology. Requirements for the position include: (1) a Ph.D. in quantitative psychology or a closely related data science discipline; (2) a productive research program focusing on quantitative methods; (3) a demonstrated interest in collaboration with psychological researchers; and (4) commitment to quality teaching and mentoring at the undergraduate and graduate level. The topic of quantitative focus is open and should complement the Department's existing strengths. Accordingly, preference will be given to individuals whose specialization has broad application and connection to research in the Department. Special attention will be given to candidates with expertise in the development of methods for clustering, learning, and prediction based on large-scale data. Other possible areas of specialization include, but are not limited to, generalized linear models, latent variable models, research methods and design, and statistical modeling of psychological or neurobiological data. Candidates at the associate professor level should have a record of involvement in external funding. Individuals with a history of mentoring students under-represented in the sciences are encouraged to apply and to describe their experience in a cover letter. The quantitative psychology program at UCLA currently has five core faculty and a cohort of active doctoral students. Quantitative faculty have ongoing collaborations with researchers within the Department of Psychology and with faculty across campus, and UCLA offers a vibrant academic community with a wealth of collaborative opportunities. UCLA is centrally located in the Westwood neighborhood of Los Angeles and offers close proximity to the many amenities available in Southern California. Requests for information should be sent to the chair of the search committee, Dr. Craig Enders, cenders@psych.ucla.edu. Applicants should submit a cover letter, curriculum vitae, statements of research and teaching interests and of contributions to diversity, 3-5 relevant publications, and contact information for 3 references to <http://apptrkr.com/1078060> or mail materials to the Quantitative Psychology Search Committee (Job # 03265), Department of Psychology, Box 951563, UCLA, Los Angeles, CA 90095-1563. Review of applications will begin as soon as they are received; candidates are urged to apply before October 31, 2017. The University of California is an Equal Opportunity/Affirmative Action Employer. All qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, disability, age or protected veteran status. For the complete University of California nondiscrimination and affirmative action policy see <http://policy.ucop.edu/doc/4000376/NondiscrimAffirmAct>.

CALIFORNIA

Stanford University

Graduate School of Business

Faculty Positions in Organizational Behavior

The Graduate School of Business seeks to hire tenure-track faculty in organizational behavior beginning September 1, 2018. Applicants should possess a strong research background and an interest in the study of organizations and organizational behavior broadly defined, and the ability to teach effectively in both MBA and PhD programs. The position is open to all ranks for candidates with a macro-OB/sociology orientation, but we are only looking at the junior level for candidates with a micro-OB/psychology orientation. Applicants should have or expect to complete a PhD by September 1, 2018. Applicants should submit their applications electronically by visiting the web site <http://www.gsb.stanford.edu/recruiting>. For an application to be considered complete, all applicants must submit a CV, a job market paper and arrange for three letters of recommendation to be submitted. Applicants applying with a micro-OB/psychology orientation are encouraged to submit a research statement, but this is not required. The application deadline is October 1, 2017, but candidates are strongly encouraged to submit as soon as possible. For questions regarding the application process, please send an email to faculty_recruiter@gsb.stanford.edu. Stanford University is an equal opportunity employer and is committed to increasing the diversity of its faculty. It welcomes nominations of and applications from women, members of minority groups, protected veterans and individuals with disabilities, as well as from others who would bring additional dimensions to the university's research, teaching and clinical missions.



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EOE

CONNECTICUT

Wesleyan University

Department of Psychology

Tenure-Track Assistant Professor in Clinical Psychology

The Department of Psychology at Wesleyan University (Middletown, Connecticut) seeks to hire a tenure-track Assistant Professor in Clinical Psychology. The appointment is scheduled to begin July 1, 2018. A Ph.D. in clinical psychology or related field in hand by the time of appointment is required. Preference will be given to those whose work focuses on psychological or behavioral interventions, although research area is open. Wesleyan University is a selective liberal arts university with strong support for both research and teaching (two-course per semester teaching load). The ideal candidate will have a research program with a trajectory that will include learning opportunities for undergraduates, and will be prepared to teach a breadth (introductory) course in clinical psychology (e.g., clinical interventions, theories of personality, health psychology), two specialized courses in their area of expertise (seminar and advanced research methods), and one service course (research methods, statistics, or introductory psychology). Additional duties include advising and mentoring students, and participating in faculty governance at the departmental and university level. Salary, fringe benefits, and start-up funds will be competitive. The Department currently has 18 full-time faculty members in cognitive, developmental, neuroscience, psychopathology, cultural, and social psychology; some faculty also contribute to interdisciplinary programs including Feminist, Gender, and Sexuality Studies, Integrative Sciences, Neuroscience and Behavior, and Science and Society. There are additional opportunities to participate in a departmental postdoctoral training program. Wesleyan University does not discriminate on the basis of race, color, religious creed, age, gender, gender identity or expression, national origin, marital status, ancestry, present or past history of mental disorder, learning disability, physical disability, political beliefs, veteran status, sexual orientation, genetic information or non-position-related criminal record. We welcome applications from women, and from historically underrepresented minority groups. Inquiries regarding Title IX, Section 504, or any other non-discrimination policies may be directed to: Antonio Farias, Vice President for Equity & Inclusion, Title IX and ADA/504 Officer, afarias@wesleyan.edu, 860-685-3927. Please apply electronically to: <http://careers.wesleyan.edu/postings/5950> and include: curriculum vitae, reprints, a statement of research plans, teaching interests, teaching evaluations (if available), and email addresses for three recommenders. In your teaching statement and/or cover letter, we invite you to describe your cultural competencies and experiences engaging a diverse student body. Review of applications will begin on October 15, 2017, and applications received after that date may not receive full consideration.

GEORGIA

Georgia State University

Research on the Challenges of Acquiring Language & Literacy

Tenure Track Assistant Professor Language and Literacy Faculty Position at Georgia State University

Georgia State University (www.gsu.edu) invites applications for one anticipated tenure-track (rank of Assistant) faculty position to contribute to its funded initiative: Research on the Challenges of Acquiring Language and Literacy. This anticipated position is part of a major initiative to enhance existing strengths in language and literacy at Georgia State and continues our successful hiring in this area. The focus of this initiative is research with children and adults, with or without disabilities, who face challenges in acquiring language and literacy. In this university-funded initiative, more than 40 faculty members from 10 departments in the Colleges of Arts & Sciences and Education & Human Development come together to engage in interdisciplinary research. The initiative's faculty has a broad range of external support including two national research and development centers from the Institute of Education Sciences in the areas of deafness and adult literacy and grants from the National Institutes of Health including a learning disabilities research innovation hub on reading and reading disabilities of African American children and a program project on neurocognitive factors for children with developmental dyslexia. We encourage applicants whose program of research addresses basic or applied, conceptual or methodological issues concerning challenges in the acquisition of language and literacy with a particular interest in intervention research. Applicants must have a Ph.D. degree in special education, psychology, educational psychology, communication sciences and disorders or related areas. The appointment is open to all programs within the initiative. The successful applicant will be the individual who is prepared to take advantage of the interdisciplinary collaborative research opportunities available within the Language & Literacy Initiative, have a strong record of programmatic research, obtain external grant support, and have a commitment to and experience in the instruction of undergraduate and graduate students. We are particularly interested in applicants whose research programs complement other faculty within this initiative (www.researchlanglit.gsu.edu). Inquiries may be made to Dr. Rose A. Sevcik (rsevcik@gsu.edu) or Dr. Amy Lederberg (alederberg@gsu.edu). Submit curriculum vitae, a brief statement of professional goals and research interests, evidence related to teaching interests and effectiveness, and the names and three letters of reference either electronically to Keneé Stephens at kstephens@gsu.edu, with the subject line "Language & Literacy Faculty Search", or by mail to Attn. Ms. Keneé Stephens, Georgia State University, Language & Literacy Initiative, P.O. Box 5010, Atlanta, GA 30302-5010, USA. The review of applications will begin October 13, 2017 and will continue until the position is filled contingent on available funding. An offer of employment will be conditional on background verification. Georgia State University is an Equal Opportunity Employer and does not discriminate against applicants due to race, ethnicity, gender, veteran status, or on the basis of disability or any other federal, state or local protected class.

INDIANA

Cognition, Brain, and Behavior Assistant Professor



UNIVERSITY OF
NOTRE DAME



The Department of Psychology at the University of Notre Dame invites applications for a faculty position at the assistant professor level. The successful applicant will have research interests in Cognitive Psychology, Cognitive Science, Cognitive Neuroscience, or Cognitive-related Biopsychology. Scholars whose research will contribute to the evolving neuroscience/biopsychology emphasis in the Cognition, Brain and Behavior Area and the department are especially encouraged to apply. The successful applicant will be expected to maintain an internationally visible and externally fundable research program, supervise doctoral research, and teach at the graduate and undergraduate levels. The position will begin in the Fall of 2018. Candidates are asked to apply free of charge at <http://apptrkr.com/1047830>. To guarantee full consideration, applications must be received by October 31, 2017, but the review of applications will continue until the position is filled. Questions and informal inquiries regarding this position may be directed to Search Committee Chair, Prof. Chuck Crowell, at ccrowell@nd.edu.

The University is an Equal Opportunity Employer, and is committed to building a culturally diverse workplace.

MASSACHUSETTS

Harvard University

Department of Psychology

Assistant Professor (Tenure-Track)

The Department of Psychology anticipates making a tenure-track appointment at the assistant professor level to begin July 1, 2018. We seek candidates with expertise in the application of computational models toward understanding human perception or cognition. Our interest is less in specific areas and methods than in innovation and excellence in the application of modeling techniques to experimental data from adult humans, children or animals. The appointment is expected to begin on July 1, 2018. Candidates at all levels are encouraged to apply. Candidates must have a strong doctoral record and have completed their Ph.D. Candidates should have demonstrated a promise of excellence in both research and teaching. Teaching duties will include offerings at both undergraduate and graduate levels. Please submit a cover letter, curriculum vitae, research and teaching statements, up to three representative reprints, and names and contact information of three to five references (three letters of recommendation are required, and the application is complete only when all three letters have been submitted) to <http://academicpositions.harvard.edu/postings/7663>. Questions regarding this position can be addressed to alvarez@wjh.harvard.edu. The committee will consider completed applications starting immediately on a rolling basis through October 1. Interviews will be conducted in late September and continue in October. Harvard University is an affirmative action/equal opportunity employer and all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, disability status, protected veteran status, or any other characteristic protected by law. We actively encourage applications from women and minority groups.

ANNOUNCEMENTS

Send items to apsobserver@psychologicalscience.org

GRANTS

NIH Postdoctoral Research Fellowship Opportunity

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

NIH Announces Funding Opportunities

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

CASBS Fellowship Program Accepting Applications

The Center for Advanced Study in the Behavioral Sciences (CASBS) at Stanford University is now accepting applications for residential fellowships for the 2018–2019 academic year. CASBS has hosted generations of scholars, thinkers, and researchers who come for a year as fellows. Former fellows include Nobel laureates, Pulitzer Prize winners, winners of MacArthur "genius awards," and hundreds of members of the National Academies. Fellows have played key roles in starting new fields, ranging from cognitive science to behavioral economics to the sociology of urban poverty. They have developed new policies and practices in fields as diverse as medicine, education, electoral politics, Third World development, and crime prevention. The CASBS fellowship provides an excellent opportunity to pursue innovative ideas and expand horizons while engaging in a diverse, interdisciplinary community. Online applications

will be accepted at the Center's website through November 3, 2017, for the 2018–2019 fellowship year. For more information, guidelines, and application requirements, visit our website at casbs.stanford.edu/fellowships.

MEETINGS

58th Annual Meeting of the Psychonomic Society

November 9–12, 2017

Vancouver, Canada

psychonomic.org/page/2017annualmeeting

2018 Anxiety and Depression Conference

April 5–8, 2018

Washington, D.C., USA

adaa.org/resources-professionals/conference/registration

2018 Cognitive Aging Conference

May 3–6, 2018

Atlanta, Georgia, USA

cac.gatech.edu

7th International Congress on Interpersonal Acceptance and Rejection

May 15–18, 2018

Athens, Greece

isipar2018athens.panteion.gr

30th APS Annual Convention

May 24–27, 2018

San Francisco, California, USA

psychologicalscience.org/convention

3rd International Convention of Psychological Science

7–9 March 2019

Paris, France

icps.psychologicalscience.org

Minds for Business

A Blog on the Science of Work and Leadership

www.psychologicalscience.org/minds

A CONVERSATION WITH LEE ANNA CLARK

University of Notre Dame



APS Fellow Lee Anna Clark is the lead author of a new Psychological Science in the Public Interest report on the scientific and practical challenges of classifying mental disorders. The report examines the International Classification of Diseases (for which Clark is a member of the Personality Disorders Working Group), the Diagnostic and Statistical Manual of Mental Disorders (which she was actively involved in revising 4 years ago), and the National Institute of Mental Health's Research Domain Criteria initiative. Psychological Science in the Public Interest reports are available at psychologicalscience.org/publications/pspi.

The Observer spoke with Clark about the impetus for the report and her views about the state of the science in diagnostics.

A lot of the information in your new report is directly relevant to researchers and clinicians, but what do you hope that the average person, who is not necessarily involved in clinical issues on a daily basis, gets out of this report?

I think one of the main things that we kept coming back to is helping people to realize that “having a mental disorder” is very different from having the measles or even something like diabetes — and that it can actually be helpful to think about mental disorder psychopathology in this more complex way. While there definitely are treatments and ways to help people deal with mental disorders, there aren't any magic bullets like there are for pneumonia or a “simple” infection or even “simple” directives to eat better, exercise, get more sleep, and stop smoking. We would hope from this that people would take away that nobody just wakes up one day and discovers they have a mental disorder, and nobody then goes to the doctor and takes care of it 10 days later. Psychological problems arise out of a long, unfolding process.

Treatment for mental disorders transitioned from a predominantly psychoanalytic approach to a more medicalized approach — is the field now realizing that mental disorders don't fit within the medical model quite as well as people originally hoped?

Yes, I definitely think that's part of it. It's so tempting to think, “If we could only zap out this one gene, schizophrenia would be gone from the world.” But my prediction is that as we learn more, things will also be revealed that are even more complex than we can imagine. One of the things I tell my students when I'm teaching psychopathology is that

between the time you cut yourself or skin your knee and a scab forms, there are something like 27 distinct biological steps in between the one and the other. And if there are 27 steps in something that we think of as an absolute everyday, normal, “simple” phenomenon, how many more steps are there going to be between genes and the development of psychological problems? It's mind-boggling.

Was there anything you found particularly interesting or surprising in working on the report?

Working on this project made me realize — and I'd heard this many times before, I'd read it, I'd probably even written it — that there are other stakeholders in diagnostic systems and there are immediate needs that science can't address. So I came to appreciate the necessity of putting forth knowingly imperfect systems for diagnosis and classification because life can't wait for the science.

Sort of a “perfect is the enemy of the good” situation?

Yes, that's a good way to put it. If we waited for the science, we'd be waiting a long time, people would be suffering a long time, and there are many, many things we can do with the current knowledge that we have. There's no question that we know a ton more than we did 25 and definitely 50 years ago. The *DSM*, with all its flaws, really did lead to a huge amount of research that has pushed things forward — pushed things forward to the point that we saw what the limitations of the system were. That's a good thing.

And what we know can get us a very long way toward helping people even if we don't understand all the little “ins” and “outs.” This is not a great analogy, but you and I use computers absolutely every day without having a clue about how they work. ●

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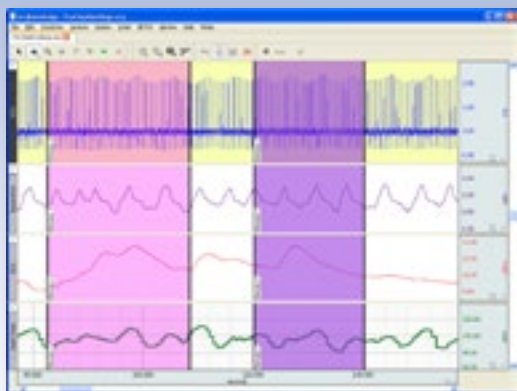


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